

**Global Assessment of Pediatric Patient Safety (GAPPS):
A Pediatric Measure of Adverse Events**

MANUAL OF OPERATIONS

**Center of Excellence for Pediatric Quality Measurement
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EXECUTIVE SUMMARY

In 1999, the Institute of Medicine published a report estimating that up to 98,000 deaths and one million injuries occur annually in the U.S. due to medical errors. Substantial efforts to improve patient safety have followed, but the effects of these improvement efforts remain uncertain. As such, quantifying harm in medical settings—achieved by measuring adverse event rates—is crucial for hospital quality assessment and improvement. Voluntary incident reporting—the most commonly used method of tracking harm to hospitalized patients—significantly underestimates adverse event incidence. Exhaustive retrospective medical record review is extremely time- and resource-intensive.¹ Multiple studies have shown that the trigger tool, an alternate method, can decrease the time and resources required for detecting adverse events as compared to exhaustive medical record review while still reliably identifying adverse events. However, although trigger tools have been developed and used primarily for adult inpatient populations, standardized trigger tools for use in the pediatric population have not been fully developed or thoroughly evaluated.

The Global Assessment of Pediatric Patient Safety (GAPPS) Trigger Tool facilitates identification of adverse events among hospitalized pediatric patients, enabling measurement of adverse event rates over time.² GAPPS consists of an expedited process, using focused retrospective medical record review, to identify “triggers” (i.e., red flags) that suggest the likely presence of underlying adverse events.

We developed the GAPPS Trigger Tool by first creating an initial candidate trigger list based on a comprehensive literature review of published and unpublished adult and pediatric trigger tools, including the Institute for Healthcare Improvement Global Trigger Tool and the Pediatric All-Cause Harm Measurement Tool, a draft pediatric trigger tool that was tested in six freestanding children’s hospitals.^{2–4} Next, we assembled an expert panel that applied the RAND/UCLA Appropriateness Method to narrow the list to 54 triggers.⁵ We then tested this draft trigger list in 16 hospitals across the U.S. and determined the frequency with which each trigger helped identify adverse events in pediatric medical records. Based on these findings, we created a trigger list for those manually applying GAPPS. By further testing promising triggers in an academic tertiary care hospital, we developed a trigger list for those wishing to automatically flag hospitalizations containing triggers using their electronic health record systems.

Pediatric hospitals can use GAPPS to identify the frequency of inpatient adverse events at their institutions, to assess the level of harm resulting from each adverse event, and to evaluate whether changes in hospital organization or care-delivery practices lead to improved patient safety. Efficiently and reliably detecting adverse events can reveal quality improvement opportunities within hospitals and may allow for inter-institutional comparisons as part of broad-scale efforts to improve inpatient pediatric care.

This Manual of Operations serves as a comprehensive guide for those seeking to implement GAPPS at their hospital. The manual provides detailed guidelines on how to use the Tool to measure inpatient pediatric adverse events. It offers a standard training protocol for GAPPS reviewers, designates specific roles for facility-based personnel, and provides step-by-step instructions for facilities on the methods for collecting, interpreting, and managing results. All GAPPS forms, training materials, and reference tools are available in the appendices or at specified online locations.

The numerator of the GAPPS measure is the rate of preventable AEs per 1000 patient-days among pediatric inpatients. This Manual of Operations also describes how to calculate other

measures using the GAPPS Trigger Tool including all AEs per 1000 patient days, preventable AEs per 100 admissions, and all AEs per 100 admissions. Although we believe the measurement of preventable AEs per 1000 patient days should be prioritized as a metric for nationwide use, the other measures may be valuable for quality improvement efforts and so are included in this Manual of Operations.

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I. INTRODUCTION

A. History

Approaches to Measuring Adverse Events

The 1999 Institute of Medicine report *To Err Is Human* estimated that up to 98,000 deaths and one million injuries occur each year in U.S. hospitals due to medical errors.⁶ These errors lead to tremendous healthcare costs; in 2009 alone, adverse or temporary harm events cost Medicare an estimated \$4.4 billion dollars.⁷ Despite the high incidence of medically induced harm—defined as injuries caused by the use, including nonuse, of a drug, test, or medical treatment⁸—processes to detect harm remain inaccurate and inconsistent.² While the majority of hospitals rely on voluntary incident reporting to identify adverse events, evidence suggests that this method captures only a small percentage (1% to 6%) of adverse events.^{9,10} For this reason, many hospitals have incorporated medical record review into their adverse event detection methods. One long-used method involves reading the entire medical record to find adverse events. While studies show this method has a higher adverse event detection rate than voluntary reporting of adverse events, this process is both time- and resource-intensive.¹¹

Overview of the Trigger Tool Method

An alternative and more time-efficient approach for identifying adverse events through retrospective medical record review is the trigger tool methodology.² The trigger tool uses “triggers”—occurrences or flags found during the review of a medical record—to prompt further investigation in the medical record for the presence of an adverse event.⁸ These triggers are drawn from components of the medical record, such as pharmacy and clinical laboratory data or a focused review of the discharge summary and progress notes. Example triggers include documented administration of an antidote-type medication (e.g., naloxone) and specific laboratory values (e.g., potassium > 6 mEq/L).^{8,12,13} Once a trigger is detected, a more in-depth review is undertaken to examine relevant information in the medical record and to determine whether an adverse event occurred. By using a randomly selected sample of medical records, trigger tool methodology allows for faster assessment than exhaustive record review and higher sensitivity than voluntary reporting.^{14,15}

Trigger tools detect adverse events in a high percentage of hospitalizations, ranging from 3% to 63% depending on the hospital setting and location.^{16–21} A 2010 study commissioned by the U.S. Office of the Inspector General showed that the trigger tool method identifies far more adverse events than voluntary reporting.²² In fact, a separate study found that the trigger tool approach identified 10 times more adverse events than the Agency for Healthcare Research and Quality’s (AHRQ’s) Patient Safety Indicators, and almost 100 times more events than voluntary reporting.¹⁰ A specific trigger tool, the IHI Global Trigger Tool (GTT), has been shown to identify adverse events more comprehensively than other established adverse event detection methods.¹⁰ However, to date, most work on trigger tools has been carried out in adult populations.

Preliminary Studies of Pediatric Trigger Tools

Hospitalized pediatric patients are vulnerable to high adverse event rates: published studies report 11.1 adverse drug events per 100 pediatric inpatients, 74 adverse events per 100 neonatal intensive care unit (NICU) patients, and 203 adverse events per 100 pediatric intensive care unit (PICU) patients.^{8,12,13} As the epidemiology of pediatric adverse events differs from that of adults, and as these events are not necessarily identified by adult adverse event detection methods, a trigger tool for measuring patient harm in pediatric settings is needed. Recently investigators have begun to apply trigger tools that are similar in structure to already widely-

used adult tools in various pediatric settings, including the NICU, PICU, and general pediatric inpatient environments. In these settings, the tools have been found to be more efficient and effective at identifying adverse events than traditional methods.^{8,12,13} For example, using the IHI GTT at Cincinnati Children's Hospital, reviewers measured harm rates two to three times greater than previously reported pediatric rates; the authors suggest that modifying the IHI GTT to better fit the pediatric setting would allow for even better harm detection.¹⁹

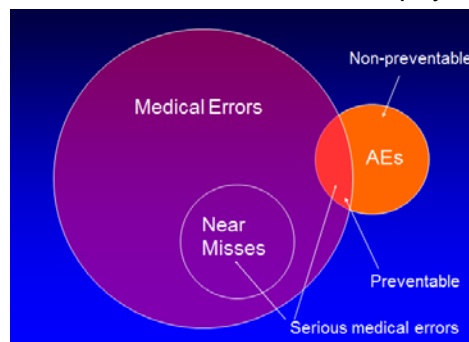
B. Definitions

Adverse Events

Trigger tools are designed to identify adverse events, which are defined as “unintended physical injuries resulting from or contributed to by medical care that require additional monitoring, treatments, or hospitalizations, or that result in death.”² An example of a hospital-based adverse event is bleeding following anticoagulant use. Adverse events may occur with appropriate care or as a result of medical error.

According to the Institute of Medicine, a medical error is defined as “the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim.”⁶ Adverse events and medical errors are not synonymous terms.⁸ Medical errors may lead to

adverse events, but many errors are unlikely to harm patients, are caught before negatively affecting the patient, or result in no detectable harm despite reaching the patient. The latter two categories of medical errors are considered “near misses.” Conversely, some patient harms, such as an allergic drug reaction when there was no previous knowledge of an allergy, are adverse events but are not due to medical errors. As such, medical errors and adverse events are distinct but overlapping categories, with adverse events encompassing both non-preventable and preventable events, as depicted in the diagram.²³



As with the IHI GTT, GAPPS is designed to identify *all* adverse events, not only harms that occur due to medical errors. In addition, unlike the IHI GTT, GAPPS includes a measure of whether harms are preventable, as described below.

Severity Ratings

GAPPS rates the severity of adverse events according to a modified version of the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) Index for Categorizing Errors. Although the index was initially developed to rank the severity of medication errors, it is often used for broader categories of adverse events, not just those events that occur due to medication errors. The NCC MERP harm categories E through I are the standard for severity categorization in the IHI GTT as well as other published trigger tools.²⁴

Category E:	Temporary harm to the patient and required intervention
Category F:	Temporary harm to the patient and required initial or prolonged hospitalization
Category G:	Permanent patient harm
Category H:	Intervention required to sustain life
Category I:	Patient death

Preventability

One of the important innovations of the GAPPS Trigger Tool is the assessment of the preventability of all identified adverse events, unlike the adult trigger tools which measure all

AEs rather than preventable AEs. Accurately identifying all adverse events is a critical first step in improving patient safety, followed by assessing preventability of AEs. Identification of areas with high rates of preventable AEs across different hospitals can help national stakeholders prioritize research and innovation efforts to address important patient safety concerns. Preventability of AEs can change over time as previously unpreventable AEs may become preventable due to future innovation. Preventability is defined in GAPPS as follows.²⁴

Category	Description	Specific Case Example
Definitely not preventable	Events in which no obvious error occurred; necessary precautions were taken; no alteration in method or care exists to prevent the event.	<i>Drug-associated rash (no prior exposure or history):</i> A 9-year-old male with no known allergies presented to the emergency department for a sore throat, cough, and fever. When the patient was given ibuprofen for his fever, he developed hives and itching. The patient was then given diphenhydramine and responded well to the drug with no respiratory distress. Ibuprofen was discontinued and listed as an allergy on the patient's medical record.
Probably not preventable	Events that do not appear preventable but would require further investigation to assess certainty.	<i>Procedural complications (with skilled proceduralist and no errors):</i> Despite nursing standards being followed, a 7-year-old female developed an IV infiltrate.
Probably preventable	Events that appear preventable but would require further investigation to assess certainty.	<i>Hospital-acquired infections:</i> A male infant born at 35 weeks estimated gestation age had an umbilical catheter placed. An inflamed wound developed at the catheter site, and he was started on antibiotics. An abscess formed at the site over the next few days, so the wound was drained, and cultures were obtained that were positive for MRSA and <i>Enterobacter</i> spp.
Definitely preventable	Events where error was identified; necessary precautions were not taken; event was preventable by modification of behavior, technique, or care.	<i>Medication overdose:</i> A 13-year-old female was given an overdose of insulin during treatment for diabetic ketoacidosis. Her blood glucose dropped precipitously, and she required a D50 bolus.

C. Development of the Global Assessment of Pediatric Patient Safety Trigger Tool

Background

In 2009, Congress passed the Children's Health Insurance Program Reauthorization Act (CHIPRA), under which the Centers for Medicare & Medicaid Services and AHRQ established the Pediatric Quality Measures Program (PQMP) to develop and improve pediatric quality measures.²⁵ Through the PQMP, seven Centers of Excellence (CoE) across the United States were charged with developing pediatric quality measures and testing their performance according to criteria outlined in the CHIPRA legislation. One of these centers, the Center of Excellence for Pediatric Quality Measurement (CEPQM) at Boston Children's Hospital (BCH), was tasked with developing a tool for measuring inpatient pediatric safety.

Purpose of GAPPS

GAPPS was developed to identify adverse events among hospitalized pediatric patients and to measure rates of adverse events in various hospital settings over time. GAPPS is designed to capture adverse events across all acute care pediatric inpatient environments and to increase the specificity and time-efficiency of medical record reviews. It can be implemented with one of two approaches: 1) an automated approach that uses algorithms programmed into electronic health record (EHR) systems to automatically identify hospitalizations that contain triggers or 2) a manual approach that requires human review of records in all stages of the review process. The automated approach is recommended to expedite the review process and to reduce costs, but the manual approach may be preferable for institutions with paper records or EHR systems with limited programming capabilities. Using the GAPPS methodology, healthcare facilities can obtain pediatric patient safety data for use in hospital-wide or service-specific quality improvement.

Trigger Selection

We developed the manual and automated GAPPS trigger lists through a multi-step process. First, the study team compiled a list of 78 potential triggers through a literature review of existing pediatric and adult triggers, the findings of a prior pilot study using a draft pediatric trigger tool, and the recommendations of trigger tool experts from the Children's Hospital Association.^{2,4} The triggers fell into six general categories: medications/fluids, hospital care environment, hospital-acquired infections, hospital transfers/outcomes, surgical, and neonatal intensive care unit (NICU)/pediatric intensive care unit (PICU). We then conducted a nine-member expert panel from top national stakeholder organizations using the RAND/UCLA Appropriateness Method,⁵ an established practice for developing health indicators, to narrow down the candidate trigger list. Each panel member reviewed the triggers, accompanying definitions, and potential case examples of associated adverse events. Each member then rated the validity and feasibility of each trigger on a scale of 1-9 using the following criteria:

- *Validity:* A trigger was judged as valid if the trigger was reasonably likely to identify an underlying adverse event/harm.
- *Feasibility:* A trigger was judged as feasible if the trigger could be accurately and consistently identified both in large tertiary care as well as smaller community hospitals, whether a paper medical record system or an EHR system was in use.

The 54 triggers that were voted as valid, feasible, and not overly burdensome for use during manual review formed the final draft GAPPS trigger list.

From 2013 to 2014, we tested the draft trigger list in 16 hospitals across the United States that represented diverse geographic regions (four hospitals in each of the four U.S. census regions: Northeast, South, West, and Midwest) and included eight teaching and eight non-teaching hospitals (teaching status was based on standards set by the American Hospital Association).²⁶ At each study site, reviewers took a random sample of 240 hospitalizations from patients discharged between January 2007 and December 2012, selecting 10 hospitalizations per quarter. The inclusion criteria were: 1) patients who were in an acute care setting (e.g., not patients admitted for non-acute psychiatric care or rehabilitation), 2) patients who were less than 18 years old at admission, and 3) patients who were discharged, transferred to another facility, or died during an inpatient/observation stay of at least 24 hours.

All reviewers participated in a series of three training sessions on the GAPPS Trigger Tool and received detailed instructions on data extraction, collection, and validation. A primary reviewer (usually a nurse at the hospital site) conducted an initial medical record review, recording all of the triggers and adverse events he or she identified in a centralized database. Afterward, two

secondary reviewers at the same institution independently verified each suspected adverse event and rated the event's preventability and severity.

Overall, we reviewed 3,814 pediatric medical records across the 16 study sites, from which 412 adverse events were identified, translating to 18.9 adverse events and 9.3 preventable adverse events per 1,000 patient-days. We calculated the frequency with which each trigger helped reviewers identify an adverse event (i.e., positivity rate).

We included in the final manual trigger list triggers that had sufficient incidence (≥ 10 occurrences) and positivity rates ($\geq 10\%$), resulting in a total of 27 triggers. Triggers that appeared fewer than 10 times in the entire sample were not considered for the final manual trigger list as their incidence was felt to be insufficient to merit reviewers' time and efforts and as their performance could not be thoroughly evaluated in light of the small sample size. Three triggers were retained as exceptions to this rule because of their high preventability, specificity, and positivity rates; more details about these triggers are in Section VII.

To form the automated trigger list, we compiled all of the manual triggers that could be automated in an academic tertiary care hospital's EHR system and all low frequency (< 10 occurrences) candidate triggers that could feasibly be automated and had a positivity rate $\geq 10\%$ when further tested in the tertiary care hospital, resulting in a final list of 30 triggers. The manual and automated triggers are listed in Appendices A and B, respectively. The SAS programs used to automate triggers are provided in Appendix N.

II. METHODS

This section provides detailed instructions for hospital and health center staff and administrators who wish to use GAPPS to measure the rates and types of adverse events that occur among their pediatric inpatients. GAPPS can be applied within entire hospitals, individual divisions or services, or specific programs. The instructions in this section detail the manual implementation of GAPPS. For institutions using the automated approach, the implementation process is the same except that trigger identification step is completed by EHR systems rather than performed by primary reviewers; the primary reviewers then review the flagged medical records. Section II.H describes in greater detail how implementation differs if using the automated approach.

A. The Review Team

The GAPPS review team should consist of:

- *Two primary reviewers who are responsible for reviewing and identifying adverse events in medical records.* It is recommended that each primary reviewer have extensive clinical experience, have familiarity with multiple clinical settings and interventions (including diagnostic tests, medications, and procedures), and be well-acquainted with the hospital's medical record system and typical delivery of care. Historically, the primary reviewer in trigger tool applications has been a nurse, but physicians, physician assistants, and pharmacists—among others—may also be good candidates.
- *Two secondary reviewers who are responsible for reviewing any suspected adverse event identified by a primary reviewer.* The secondary reviewers verify the occurrence of adverse events, as well as the ratings of severity and preventability for the events. They do not review medical records directly; instead, they listen to the primary reviewer's description of the adverse events he or she identified and ask questions as needed for clarification. Some secondary reviewers may choose to read the primary reviewer's written assessment in addition to listening to the reviewer's description of the hospitalization. Secondary reviewers should be physicians.

To help ensure reliability and validity, we recommend that reviewers follow the GAPPS review procedure as closely as possible, adhering to the time limit and the definitions of harm, severity, and preventability specified in this manual. Training sessions and discussions among the review team will be crucial for developing consistent identification AEs and assessment of preventability and severity. When new primary reviewers join the review team, we recommend that following training, they initially review the same records as an experienced reviewer to learn the GAPPS process and to ensure that ratings are consistent. When new reviewers and experienced reviewers agree on ratings at a sufficiently high rate, the new reviewers can then begin to review medical records independently. We recommend that new and experienced primary reviewers agree that a record does or does not contain at least one adverse event 90% of the time or more. From all records where primary reviewers find at least one adverse event, reviewers should identify the same events at least 75% of the time. We recommend that secondary reviewers making final judgments about the presence or absence of an adverse event agree that a case represents an adverse event at least 85% of the time.

B. Medical Record Selection

We recommend that primary reviewers select a random sample of at least 20 inpatient hospitalizations each month from a list of all inpatient hospitalizations with discharge dates that fall within the month being reviewed; the hospitalizations may be drawn from an entire hospital or from a specific division, service, or program. The hospitalizations should meet eligibility criteria (noted below) for a minimum of 60 hospitalizations per quarter. For institutions with high pediatric patient volume, records for 60 unique patients typically will be reviewed. However, patients who have multiple discharges that fall within a given quarter may have their records reviewed multiple times.

A two-stage process is used to determine which pediatric medical records should be included in the GAPPS sample frame. The first stage determines whether patients meet the inclusion criteria listed below. For patients who meet inclusion criteria, certain exclusion criteria are then applied, also described below.

Inclusion Criteria:

GAPPS is intended for broadly reviewing the medical records of pediatric patients who meet the following criteria:

- Patients <18 years of age at admission;
- Patients with length of stay (LOS) ≥ 24 hours;
- Patients admitted for acute care. Acute care does not include patients discharged from the Emergency Department without admission to the hospital; or patients in rehabilitation and residential units, non-acute inpatient psychiatric units, newborn nurseries, and day treatment areas. If a patient is initially admitted acutely but subsequently transferred to inpatient psychiatric care, the acute portion of the hospitalization should be included; and
- Patients who were discharged from, who were transferred out of, or who died during the inpatient or observation hospital stay.

Exclusion Criteria:

Patients who meet the above inclusion criteria but fall into the following exclusion categories should be excluded from the GAPPS sample frame:

Patients with inpatient LOS <24 hours are excluded because patients with brief hospital stays are less likely to have received the amount of medical intervention necessary to evaluate the quality of care.

Patients ≥18 years of age at admission are excluded because CEPQM's task was to create a tool to measure patient safety in the pediatric age group (i.e., <18 years of age). With this in mind, GAPPS is designed to perform in pediatric patients exclusively.

Patients admitted for non-acute care are excluded because rates of adverse events in non-acute settings are generally lower and are outside of the intended scope of GAPPS. In contrast, the risk of adverse events increases with the greater medical or surgical activity typical of acute care settings.

Records should be selected through a random process to eliminate any potential bias. A variety of selection methods can be used to ensure a random sample, such as:

- For a given month, number all discharge records (including those ending with deaths) sequentially starting with one. Using random-number generating software, generate 25 numbers between one and the total number of records. Select the hospitalizations labeled with the random number. Keep the first 20 hospitalizations that meet eligibility criteria. If 25 records is insufficient to yield 20 hospitalizations, select more hospitalizations using the random-number generating software until you obtain 20 hospitalizations per month.

For medical facilities, departments, or programs that have fewer than 20 pediatric inpatients per month, review records for all hospitalizations during the month.

C. Trigger Lists

The GAPPS trigger lists are divided into six categories:

- Medications/Fluids
- Hospital Care Environment
- Healthcare-Associated Infections
- Hospital Transfers/Outcomes
- Surgical
- NICU/PICU

The table below lists all of the triggers included in GAPPS. For detailed descriptions of each trigger, see Appendix C.

Trigger	Automated	Manual
Serum creatinine doubling	Yes	Yes
Nephrotoxin use (e.g., aminoglycosides, cyclosporine, tacrolimus, vancomycin) and rising creatinine (Cr)	Yes	Yes
Hepatotoxic medications and elevated liver enzymes (AST, ALT)	Yes	Yes
Hypoglycemia (<2 mmol/L or 40 mg/dL)	Yes	Yes
Opiate-related constipation with intermittent laxative use	Yes	Yes
Naloxone (Narcan) administration	Yes	Yes
Pressure ulcer documentation (≥stage 2)	Yes	Yes
Embolus/thrombus documentation	Yes	Yes

Healthcare-associated infections: Positive <i>C. difficile</i> test	Yes	Yes
Healthcare-associated infections: Positive blood culture (only after 48 hours from admission)	Yes	Yes
Healthcare-associated infections: Positive urine culture (only after 48 hours from admission)	Yes	Yes
Healthcare-associated infections: Positive respiratory or gastrointestinal (GI) viral infection (only after 48 hours from admission)	Yes	Yes
Hospital readmission within 30 days	Yes	Yes
Any code or arrest, or rapid response team activation	Yes	Yes
All inpatient deaths	Yes	Yes
Drop of hemoglobin (Hgb) or hematocrit (Hct) of >25% in less than 24 hours	Yes	Yes
Mechanical ventilation >48 hours postoperatively	Yes	Yes
Return to surgery	Yes	Yes
Transfer to higher level of care	Yes	Yes
Racemic epinephrine administration (patients mechanically ventilated within last 24 hours)	Yes	Yes
Warfarin triggers: INR >6	Yes	No
Elevated drug levels (anti-epileptics): Phenytoin (>30 mcg/ml)	Yes	No
Elevated drug levels (anti-epileptics): Oxcarbamazepine (>45 mcg/ml)	Yes	No
Total bilirubin >25 mg/dL (less than 28 days old)	Yes	No
Flumazenil administration	Yes	No
Infiltrations: Hyaluronidase administration	Yes	No
Oral vancomycin	Yes	No
Operative time >6 hours (non-cardiac patients)	Yes	No
Intraoperative epinephrine, norepinephrine or phenylephrine (non-cardiac patients)	Yes	No
Readmission to ICU within 24 hours after discharge/transfer	Yes	No
Abrupt medication stop*	No	Yes
Patient fall*	No	Yes
Infiltrations: Infiltration/extravasation or phlebitis documentation*	No	Yes
Surgical site infection*	No	Yes
Change in procedure*	No	Yes
Unplanned endotracheal extubation*	No	Yes
Failed endotracheal extubation (reintubation within 24 hours of planned extubation)	No	Yes

* These triggers were not automatable at our academic tertiary care hospital so were not included in the automated trigger list. We recommend that institutions capable of programming their EHR systems to search for these triggers do so since these triggers have high positivity rates for identifying adverse events.

D. Data Extraction

Review time: Primary reviewers should spend up to 30 minutes reviewing each hospitalization in a medical record. Although reviewers may choose to spend more time, 30 minutes should be sufficient for fully reviewing the hospitalization for most patients; prior evaluations have shown that longer review times identify few additional events in most medical records.^{8,13,27,28} Note that if a patient has >1 discharge during the quarter being sampled, reviewers should only review the discharge or discharges that were randomly selected (it is possible that >1 discharge for a patient could be randomly selected).

Reviewers should focus on identifying triggers and adverse events. Experienced reviewers who have used GAPPS in the past have found the following order of reviewing sections of medical records particularly useful when searching for triggers:

Medical Record Section	Example Triggers
Discharge summary	<ul style="list-style-type: none">• All inpatient deaths• Mechanical ventilation >48 hours• Hospital readmission within 30 days• Return to surgery
Laboratory reports	<ul style="list-style-type: none">• Valproic acid >170 mcg/ml• Carbamazepine >20 mcg/ml• Serum creatinine doubling• Nephrotoxin use (e.g., aminoglycosides, cyclosporine, tacrolimus, vancomycin) and rising creatinine (Cr)• Hepatotoxic medications and elevated liver enzymes (AST, ALT)• Drop of hemoglobin (Hgb) or hematocrit (Hct) of >25% in less than 24 hours
Radiology results	<ul style="list-style-type: none">• Patient fall
Physician orders	<ul style="list-style-type: none">• Abrupt medication stop• Transfer to higher level of care
Medication administration records (MARs)	<ul style="list-style-type: none">• Vitamin K administration after warfarin• Naloxone administration• Hypoglycemia (<2 mmol/L or 40 mg/dL)
Nursing flow sheets	<ul style="list-style-type: none">• Surgical site infection• Infiltration/phlebitis documentation• Embolus/thrombus documentation• Pressure ulcer documentation (≥ stage 2)
Procedure notes (diagnostic, surgical)	<ul style="list-style-type: none">• Any code or arrest, or rapid response team activation• Mechanical ventilation greater than 48 hours post-operative
Nursing/Physician/Multi-disciplinary progress notes	<ul style="list-style-type: none">• Opiate-related constipation with intermittent laxative use• Healthcare-associated infections: positive <i>C. difficile</i> test• Healthcare-associated infections: positive blood culture (only after 48 hours from admission)• Healthcare-associated infections: positive urine culture (only after 48 hours from admission)• Healthcare-associated infections: positive respiratory or GI viral test (only after 48 hours from admission)• Racemic epinephrine administration (patients mechanically ventilated within the last 24 hours)

- Identifying triggers: When a trigger is discovered in the record, primary reviewers should look for information relevant to that event to investigate whether an adverse event occurred. Reviewers typically identify many more triggers than adverse events. If no adverse event is found, continue reviewing the remainder of the record for additional triggers.
 - Some adverse events will be found without the identification of a related trigger. These events should still be recorded in the Primary Review Forms and Suspected Adverse Event Forms.
- Identifying adverse events: Whether discovered due to a positive trigger or encountered while searching for triggers, adverse events and their corresponding information should be recorded by the primary reviewer. In addition to using the definition provided in Section I.D, we recommend reviewers consider the following items when determining whether an adverse event has occurred:²
 - Harm likely occurred in events in which people experiencing the event would be unhappy the event(s) occurred (e.g., IV infiltrate, even if minor).
 - Adverse events are, by definition, the result of medical treatment. If an incident was part of the natural progression of a patient's disease process, it is unlikely to be an adverse event (e.g., patient admitted for respiratory failure due to pneumonia worsens despite appropriate management and consequently needs to be intubated), unless medical care somehow contributed to the incident.
 - Events that are the *intended* results of medical care are not considered adverse events (e.g., neutropenia with chemotherapy).
 - Psychological harm alone is not generally considered an adverse event (e.g., stress).

All identified adverse events should be recorded, regardless of location. The Primary Review Forms and Suspected Adverse Event Forms allow reviewers to specify where harms occurred, so those occurring outside the hospital can be analyzed separately or removed from assessments of unit/hospital care quality as needed.

- Determining severity and preventability
 - Severity: Reviewers should use the five-point severity scale described in Section I.D when assigning severity to an adverse event. Since the categories are not mutually exclusive, reviewers should assign the highest severity category that applies to the adverse event. It is important to note that adverse events in high-severity categories do not have to meet all of the requirements of lower-harm-level categories. For example, an adverse event can be categorized in harm level H (i.e., insulin bolus) but not qualify as a G-level harm (i.e., permanent injury).

The standard for assigning a severity of H (i.e., an intervention required to sustain life) to an adverse event is that an intervention was required within one hour to sustain a patient's life.

- Preventability: Reviewers should rely on the category definitions provided in Section I.D and their own clinical experience when determining preventability.

E. Data Collection

Primary reviewers

Primary reviewers should review each medical record and note the following information on the Primary Review Form (Appendix D):

- Medical record number (MRN);
- Demographic information about the patient, specifically, his/her age, sex, race, ethnicity, and type of health insurance;
- All triggers found in the medical record
For expanded definitions of the triggers, please refer to Appendix C; and
- All adverse events found in the medical record (including those identified independent of any triggers).

For each adverse event identified in a record, primary reviewers should note the following information on the Suspected Adverse Event Form (Appendix E):

- Medical record number (MRN);
- Date of harm;
- Setting where harm occurred;
- Primary hospital service at time of harm;
- Brief description about the patient and the suspected harm, including the period leading up to, during, and following the incident;
- Triggers that helped identify the harm (if any);
- Level of severity of harm;
- Preventability of harm;
- The immediate follow-up response during the two hours after the harm occurred;
- The harm category; and
- The harm code.

Secondary reviewers

Secondary Reviewer A should complete the Secondary Review Form A (Appendix F) for each suspected adverse event identified by the primary reviewer, either confirming or denying that an adverse event occurred. For each suspected adverse event, the reviewer should note the following information on the form:

- Medical record number (MRN);
- Confirmation or denial of harm occurrence;
- Whether the adverse event should be split into multiple harms;
- Number of suspected harms;
- Level of severity of harm;
- Preventability of harm; and
- Cause of harm.

Secondary Reviewer B should complete the Secondary Review Form B (Appendix G) for each suspected adverse event identified by the primary reviewers, either confirming or rejecting that an adverse event occurred. For each suspected adverse event, the reviewer should note the following information on the form:

- Medical record number (MRN);
- Confirmation or denial of harm occurrence;
- Whether the adverse event should be split into multiple harms;
- Number of suspected harms;
- Level of severity of harm; and
- Preventability of harm.

In cases in which Secondary Reviewers A and B disagree about whether an adverse event has occurred or do not independently rate an adverse event with the same severity and preventability (note: preventability agreement is determined dichotomously, i.e., definitely/probably preventable vs. definitely/probably not preventable), the secondary reviewers must discuss the case and reach consensus on all rankings. If the two secondary reviewers are unable to reach a consensus after discussing the case, a third physician should be consulted. Once reviewers agree on all rankings, one of the reviewers should complete the Consensus Form (Appendix H). The reviewer will be asked to provide the following information:

- Medical record number (MRN);
- Confirmation or denial of harm occurrence;
- Whether the adverse event should be split into multiple harms;
- Number of suspected harms;
- Level of severity of harm; and
- Preventability of harm.

F. Reliability Check

To assess the reliability with which institutions use GAPPS to identify triggers and adverse events, a second primary reviewer should perform a completely independent review of a random 10% sample of the medical records reviewed by the first primary reviewer from each sampling time frame (i.e., 6 records per quarter). This second review should occur at the end of each year on a total of 24 records annually. During this check, the second primary reviewer completes the same forms as the primary reviewer: the Primary Review Form (Appendix D) and, for each adverse event identified in a medical record, the Suspected Adverse Event Form (Appendix E). Knowing the rates at which primary reviewers identify and agree about adverse events will allow institutions to assess the reliability of their adverse event detection and to improve training efforts for reviewers as needed.

G. Data Analysis

After the primary and secondary reviewers complete their reviews in each collection period, the data should be analyzed by computing adverse event rates and preventable adverse event rates. Specifically, calculation of the following variables is recommended:

- Number of adverse events per 1,000 patient-days;
- Number of preventable adverse events per 1,000 patient-days;
- Number of adverse events per 100 hospitalizations; and
- Number of preventable adverse events per 100 hospitalizations.

To compute the number of adverse events per 1,000 patient-days, use the following equation: $[(\text{Total number of adverse events identified in all the medical records in the sampling frame})/(\text{Sum of the total number of inpatient days for all of the medical records reviewed in the sampling period})]*1,000$.

To compute the number of preventable adverse events per 1,000 patient-days, use the following equation: $[(\text{Total number of preventable adverse events identified in all the medical records in the sampling frame})/(\text{Sum of the total number of inpatient days for all of the medical records reviewed in the sampling period})]*1,000$.

To compute the number of adverse events per 100 hospitalizations, use the following equation: $[(\text{Total number of adverse events identified in the sampling period})/(\text{Total number of medical records reviewed})]*100$.

To compute the number of preventable adverse events per 100 hospitalizations, use the following equation: $[(\text{Total number of preventable adverse events identified in the sampling period})/(\text{Total number of medical records reviewed})]*100$.

To evaluate long-term trends in preventable adverse event rates, institutions should plot a “Preventable adverse events per 1,000 patient-days” graph. Preventable adverse events per 100 hospitalizations could also be used as an alternative form of measuring harm. In addition to presenting preventable AEs, institutions can also choose to present all AEs. All AEs could be plotted for either 1,000 patient days or 100 hospitalizations, depending on the institutions priorities. The unit of time should be quarterly (because that is the frequency of the data collection period). These graphs will allow institutions to note trends and correlate them with potential causes of variation in harm rates at their organizations.

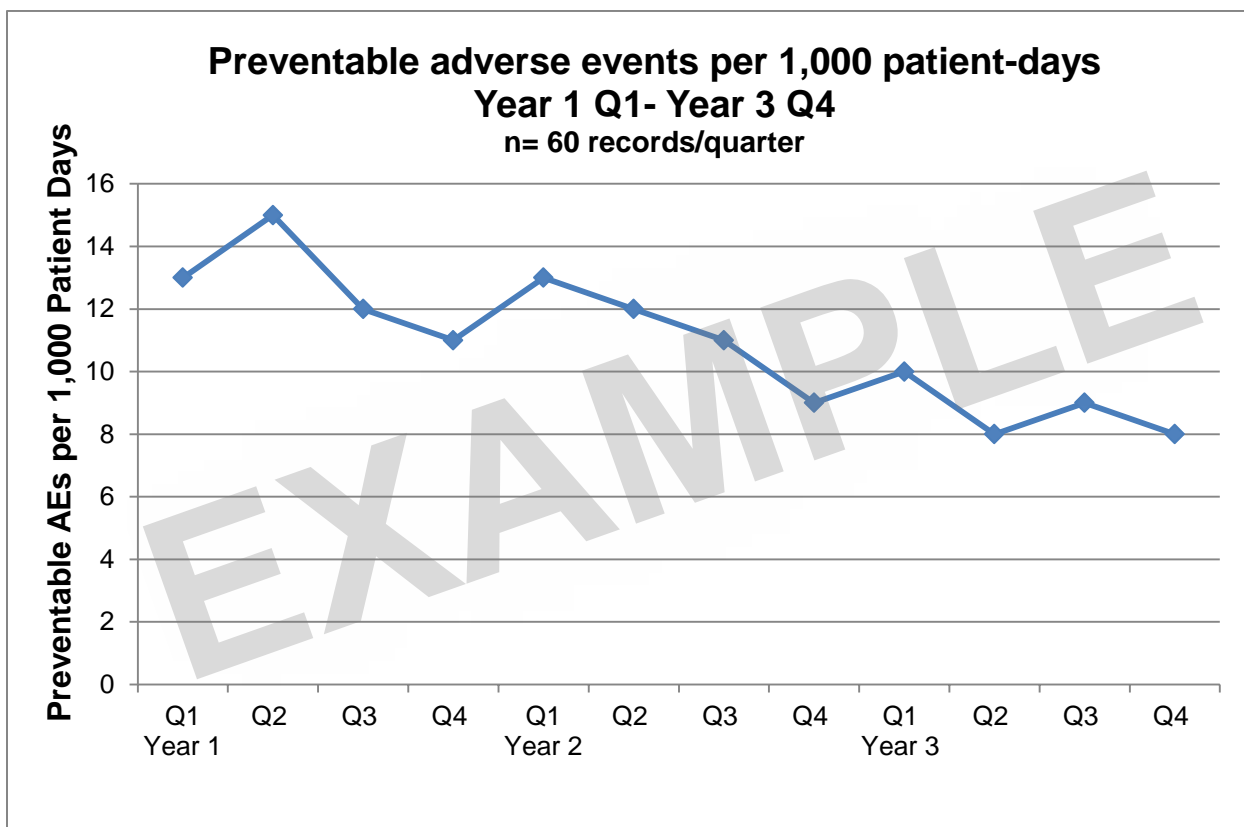


Figure 1. Example graph for displaying preventable adverse events over time (hypothetical data).

While measurement of data in terms of preventable adverse rate incidence is recommended, institutions may find the following measures helpful as well:

- Graphing the frequency of each harm category (E through I) in a bar chart;
- Measuring disparities in adverse event incidence based on demographic characteristics such as race/ethnicity and insurance status; or
- Comparing inter-rater reliability among primary reviewers.

For the purpose of inter-hospital comparisons, we recommend similar data collection methods with a few slight variations. Firstly, we recommend the focus of inter-hospital analyses be preventable AEs per 1,000 patient days. Inter-hospital analyses of preventable AEs may indicate clinical areas with broad-reaching room for immediate improvement and will assist stakeholders in prioritizing nationwide efforts to improve pediatric patient safety. In addition, we recommend hospitals calculate annual instead of quarterly rates for cross-hospital comparisons.

H. Manual versus Automated Approach

The main ways in which the automated GAPPS approach differs from the manual approach are that 1) an institution's EHR system is configured to identify triggers in medical records automatically and to flag those hospitalizations for further review, thus slightly changing the role of the primary reviewers and 2) additional triggers can be used because automated methods allow for incorporation of triggers with low occurrence rates.

The methodology for the automated GAPPS approach is similar to that detailed above for the manual approach. As in the manual methodology, selection of no fewer than 60 hospitalizations per quarter is recommended using the inclusion and exclusion criteria detailed in Section II.B. Using programmed algorithms in their EHR systems, institutions analyze these hospitalizations and flag those in which triggers are present (for the list of automated triggers and their codes, see Appendices B and N). Primary reviewers review flagged hospitalizations using the same methodology as in the manual approach but with additional information on the type and date/time of occurrence of the trigger, which enables more targeted review for adverse events. The steps involved in the manual and automated approaches are illustrated in Appendix I.

The main advantages of using the automated, rather than manual, GAPPS approach are speed (it eliminates the need to find triggers manually in medical records and allows primary reviewers to avoid looking at non-flagged records) and consistency of trigger detection (it reduces human error during review). The automated approach works well for detecting triggers that involve medication administration, drug dosage, and laboratory values. Additionally, it allows institutions to review more hospitalizations (if able) or to focus their review on hospitalizations flagged with triggers usually associated with high severity and/or high preventability adverse events (e.g., naloxone administration). At the same time, this approach is limited by the programming capacities of an institution's EHR system (i.e., not all triggers may be automatable), the extent to which documentation in medical records is reliably recorded electronically (versus manually) at the institution, and the difficulty of detecting some triggers in an automated fashion (e.g., surgical site infection). As such, institutions should consider the benefits and limitations of both approaches in light of their institutional needs, goals, and capabilities before deciding whether to use the automated or manual approach. With technological advances and more pervasive use of EHRs, we anticipate that the automated approach will increasingly become standard for implementing GAPPS.

I. Next Steps: Using Data for Hospital Improvement

The frequency of preventable adverse events that can be recognized with initiation of systematic surveillance and identification of previously unrecognized harm can be daunting. Organizations successful at managing this challenge face the need to address the preventable adverse events detected with the same vigor used to identify them. GAPPS data represent a new stream of safety data to which an organization will need to determine how to respond. Results from inter-hospital comparisons represent another stream of new information to which hospitals will need to respond.

Delivering data on preventable adverse events to appropriate clinical leaders is critical to improvement and resolution of safety issues. Because teams that identify preventable harm events are often distinct from the clinical experts responsible for care, the initial step for translating preventable harm data to changes in practice is effective communication of GAPPS measurements to the appropriate organizational leaders. These include safety and quality leaders and the heads of specific microsystems. For example, a harm identification team should engage with the respective physician and nursing leads of a specific inpatient unit to target improvement efforts for that unit's identified issues. As needed, the team should also consult content experts (e.g., nursing experts for IV infiltrates, endocrinologists for insulin-related hypoglycemia) to increase the practicality and face validity of improvement efforts.

Capitalizing on Harm Data

To effectively act on harm data, we recommend that the harm identification teams follow these five steps:

1. Ensure accuracy of the identified harm: Prior to delivering results on institutional adverse event rates to clinicians, the data must be verified and defensible. A stable team that identifies and categorizes the identified adverse events should assist with this effort. Engaging respective content experts for specific issues will enhance credibility.
2. Prioritize identified harm: Harm identification teams should have a multidisciplinary steering committee responsible for consistently creating a prioritization scheme based on factors such as the frequency, severity, and preventability of the identified harms. This committee should also be responsible for presenting reports on harm data to important institutional stakeholders and organizational architects.
3. Identify and integrate the organization's clinical quality and safety leaders (e.g., chief quality officer, patient safety director) into decision making: These leaders are essential in prioritizing and implementing changes in the institution's healthcare delivery and practice. In addition, support from these leaders will help improvement efforts gain traction within the organization.
4. Identify and integrate clinical leaders from relevant microsystems (e.g., nurse manager or medical director of the neonatal intensive care unit) into development and execution of implementation changes. Because introduction of novel data may be potentially challenging to clinical leaders, developing a partnership from the outset is critical.
5. Develop meaningful metrics to measure hospital quality and safety for high priority issues: As harms are identified, harm identification teams may create new metrics to track progress. Consistent application of GAPPS can provide data for these metrics.

Clear Pathway for Improvement

Once the steps above are accomplished, the organization will have a reliable data stream in place for high priority items and improvements. Quality improvement teams will find that as new issues are identified, addressing them will become more straightforward.

Hospitals that have followed these steps have found that the information generated from systematic surveillance of harm events is a powerful driver of clinical improvements.^{19,21} Clinical leaders may find that combining safety data streams such as GAPPS harm data with voluntary reporting is useful. In addition, working within the hospital's existing team and committee structures will help facilitate use of harm measurements.

Teams and committees that will likely benefit from harm data include:

- Unit-based care delivery teams
- Safety committees

- Pharmacy and therapeutics committees
- Medication safety committees
- Anticoagulation committees
- Sedation committees
- Code blue committees
- Rapid response team oversight committees
- Throughput committees
- Hospital-acquired conditions oversight committees
- Peer review committees
- Risk management.

Once these groups are equipped with relevant harm data, they can undertake changes to improve safety and assess the effectiveness of their efforts by further tracking harm rates. In addition, GAPPS data may be helpful to these teams as they report healthcare quality metrics to regulatory bodies.

Successful communication of harm data to microsystem teams facilitates ongoing robust assessment of an organization's operations and outcomes. These activities assist with creation of a learning organization and ultimately a highly reliable organization.

III. TRAINING

Five web-based, video training sessions (located in Appendix J) have been prepared to teach clinical staff how to use GAPPS. The training sessions are led by trigger method experts and experienced primary reviewers. They use both practice medical records and descriptions of real adverse events. The first three sessions are intended for both primary and secondary reviewers, while the final two sessions provide additional specialized training for primary reviewers.

Trainee reviewers should participate in all of the GAPPS training sessions to familiarize themselves with using GAPPS. The sessions consist of the following steps (all of the materials below are available in the Appendices J-M).

1. Watch the GAPPS Training Video 1, which provides an overview of the trigger tool method, defines adverse events and triggers, and gives example cases of adverse events.
2. Review 10 training records for adverse events and record any observations between sessions 1 and 2. Although these records are fictional, they describe realistic cases and follow a standardized structure derived from real hospital records. There are two copies for each of the 10 patient cases: one record has no annotations while the other highlights triggers, adverse events, and key lessons. Trainees are recommended to use the unannotated training records during review and then check their observations with the annotated records.
3. Watch the GAPPS Training Video 2, which has two expert reviewers talk through the findings in each training record. For concurrent or future reference, reviewers can look in Appendix M for the triggers, adverse events, and key lessons found in each record.
4. Review 10 randomly selected hospitalizations that meet inclusion criteria from the trainees' institution. This review should simulate the use of GAPPS as closely as possible, including searching for triggers and recording findings in the Primary Review Forms and Suspected Adverse Event Forms. During this period, the 30-minute time limit can be loosely observed.

5. Watch the GAPPS Training Video 3, which has primary reviewers from several hospitals across the U.S. discussing patient cases with adverse events from their own institutions. For each case, primary reviewers will discuss where they looked, what triggers helped find what adverse events, and what ambiguities they ran into during review. These cases are designed to allow trainees to become more familiar with the variety of patient cases and adverse events they might find at their own institution. While trainees do not receive interactive feedback on their own institution's records, this video may clarify questions that they have.
6. Watch the GAPPS Training Video 4, in which experienced primary reviewers provide "tips and tricks" they learned when using GAPPS. This session will include advice on what triggers are likely found in which documents of the medical record, the order of documents to review to maximize efficiency during the 30-minute review process, and different approaches to take to tackle challenging patient cases.
7. After completing Training Video 4, trainees are asked to apply GAPPS to about 20 of their institution's medical records (i.e., a one-month sample of records if the institution is sampling 60 records per quarter).
8. Watch the GAPPS Training Video 5, which has primary reviewers from several hospitals across the U.S. discussing more patient cases with adverse events from their own institutions. This is a continuation of Training Session 3 and is meant to further solidify trainees' understanding of the GAPPS methodology by giving them more practice on a diverse range of patient cases.

IV. STAFF ROLES AND RESPONSIBILITIES

A. GAPPS Lead

Each hospital should appoint a GAPPS Lead to assemble the review team, which consists of two primary reviewers and two secondary reviewers. The Lead will be responsible for overseeing the GAPPS training and the record review process, including record selection, review, and data management. As such, it is recommended that the GAPPS Lead have extensive clinical experience, have familiarity with multiple clinical settings and interventions (including medications, procedures, and diagnostic tests), and be familiar with the hospital's medical record system and standard care practices. Consequently, either a primary reviewer or a secondary reviewer is a suitable candidate for serving as the GAPPS Lead concurrent to fulfilling his or her duties as a reviewer.

The GAPPS Lead is responsible for assuring that all staff members are trained according to the training guidelines in order to perform standardized record reviews. Training must be documented and may require periodic refreshers. The Lead is also responsible for ensuring that reviewers have a clear understanding of the GAPPS procedures.

B. Primary Reviewers

The review team should include at least two primary reviewers. As detailed in Section II.E, the primary reviewers will review medical records using GAPPS and document all adverse events. Facilities can choose one of two routes for primary review and internal quality assessment: either one individual reviews all 60 hospitalizations each quarter and the second individual independently reviews 10% of those hospitalizations or each individual reviews 30 hospitalizations and 10% of the other individual's hospitalizations each quarter. If primary reviewers have any questions on specific medical cases, they should ask their GAPPS Lead.

After completing reviews of medical records, primary reviewers will discuss the background and relevant information for each suspected adverse event with two secondary reviewers.

C. Secondary Reviewers

Each facility should identify at least two secondary reviewers. The secondary reviewers will only discuss cases in which a primary reviewer flagged a potential adverse event. For each flagged case, the secondary reviewers read through the primary review form (which includes a summary of the suspected adverse event) and speak directly to the primary reviewer. Secondary reviewers do not review medical records directly.

V. CONCLUSION

By implementing GAPPs, institutions can establish an adverse event detection system that facilitates quality improvement through the efficient and effective identification of adverse events and resulting enhancements in care delivery. On a national level, improved detection of pediatric adverse events will raise awareness of pediatric patient safety events and potentially contribute to broad efforts to reduce pediatric adverse event rates by identifying adverse events that can be targets for improvement of systems of care.

VI. REFERENCES

1. Bates DW, Evans RS, Murff H, Stetson PD, Pizziferri L, Hripcsak G. Detecting Adverse Events Using Information Technology. *J Am Med Inform Assoc.* 2003;10(2):115-128. doi:10.1197/jamia.M1074.
2. Griffin FA, Resar RK. *IHI Global Trigger Tool for Measuring Adverse Events (Second Edition)*. Institute for Healthcare Improvement; 2009.
3. Stockwell DC, Bisarya H, Classen DC, Kirkendall ES, Lachman PI, Matlow AG, Tham E, Hyman D, Lehman SM, Searles E, Muething SE, Sharek PJ. Development of an Electronic Pediatric All-Cause Harm Measurement Tool Using a Modified Delphi Method. *J Patient Saf.* August 2014. doi:10.1097/PTS.0000000000000139.
4. Stockwell D, Bisarya H, Classen D, Kirkendall E, Landrigan C, Lemon V, Tham E, Hyman D, Lehman S, Searles E, Hall M, Muething S, Schuster M, Sharek P. A trigger tool to detect harm in pediatric inpatient settings. *Pediatrics.* 2015.
5. Brook R. The Rand/UCLA appropriateness method. In: *McCormick K, Moore S, Siegel R, Eds. Clinical Practice Guideline Development: Methodology Perspectives*. Rockville, MD: Agency for Health Care Policy and Research; 1994.
6. Kohn LT, Corrigan JM, Donaldson MS. *To Err Is Human: Building a Safer Health System*. Washington, DC: Institute of Medicine Committee on the Quality of Health Care in America; 1999.
7. Office of the Inspector General. Adverse Events In Hospitals: National Incidence Among Medicare Beneficiaries. November 2010.
8. Sharek PJ, Classen D. The incidence of adverse events and medical error in pediatrics. *Pediatr Clin North Am.* 2006;53(6):1067-1077. doi:10.1016/j.pcl.2006.09.011.
9. Cullen DJ, Bates DW, Small SD, Cooper JB, Nemeskal AR, Leape LL. The incident reporting system does not detect adverse drug events: a problem for quality improvement. *Jt Comm J Qual Improv.* 1995;21(10):541-548.
10. Classen DC, Resar R, Griffin F, Federico F, Frankel T, Kimmel N, Whittington JC, Frankel A, Seger A, James BC. "Global Trigger Tool" Shows That Adverse Events In Hospitals May Be Ten Times Greater Than Previously Measured. *Health Aff (Millwood).* 2011;30(4):581-589. doi:10.1377/hlthaff.2011.0190.
11. Murff HJ, Patel VL, Hripcsak G, Bates DW. Detecting adverse events for patient safety research: a review of current methodologies. *J Biomed Inform.* 2003;36(1-2):131-143. doi:10.1016/j.jbi.2003.08.003.
12. Takata GS, Mason W, Taketomo C, Logsdon T, Sharek PJ. Development, testing, and findings of a pediatric-focused trigger tool to identify medication-related harm in US children's hospitals. *Pediatrics.* 2008;121(4):e927-935. doi:10.1542/peds.2007-1779.
13. Agarwal S, Classen D, Larsen G, Tofil NM, Hayes LW, Sullivan JE, Storgion SA, Coopes BJ, Craig V, Jaderlund C, Bisarya H, Parast L, Sharek P. Prevalence of adverse events in

- pediatric intensive care units in the United States. *Pediatr Crit Care Med J Soc Crit Care Med World Fed Pediatr Intensive Crit Care Soc*. 2010;11(5):568-578. doi:10.1097/PCC.0b013e3181d8e405.
14. Rozich JD, Haraden CR, Resar RK. Adverse drug event trigger tool: a practical methodology for measuring medication related harm. *Qual Saf Health Care*. 2003;12(3):194-200. doi:10.1136/qhc.12.3.194.
 15. Resar RK, Rozich JD, Classen D. Methodology and rationale for the measurement of harm with trigger tools. *Qual Saf Health Care*. 2003;12(suppl 2):ii39-ii45. doi:10.1136/qhc.12.suppl_2.ii39.
 16. Baker GR, Norton PG, Flintoft V, Blais R, Brown A, Cox J, Etchells E, Ghali WA, Hébert P, Majumdar SR, O'Beirne M, Palacios-Derflingher L, Reid RJ, Sheps S, Tamblyn R. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. *CMAJ Can Med Assoc J J Assoc Medicale Can*. 2004;170(11):1678-1686.
 17. Thomas EJ, Studdert DM, Burstin HR, Orav EJ, Zeena T, Williams EJ, Howard KM, Weiler PC, Brennan TA. Incidence and types of adverse events and negligent care in Utah and Colorado. *Med Care*. 2000;38(3):261-271.
 18. Wilson RM, Runciman WB, Gibberd RW, Harrison BT, Newby L, Hamilton JD. The Quality in Australian Health Care Study. *Med J Aust*. 1995;163(9):458-471.
 19. Kirkendall ES, Kloppenborg E, Papp J, White D, Frese C, Hacker D, Schoettker PJ, Muething S, Kotagal U. Measuring adverse events and levels of harm in pediatric inpatients with the Global Trigger Tool. *Pediatrics*. 2012;130(5):e1206-1214. doi:10.1542/peds.2012-0179.
 20. Matlow AG, Baker GR, Flintoft V, Cochrane D, Coffey M, Cohen E, Cronin CMG, Damagnani R, Dubé R, Galbraith R, Hartfield D, Newhook LA, Nijssen-Jordan C. Adverse events among children in Canadian hospitals: the Canadian Paediatric Adverse Events Study. *CMAJ Can Med Assoc J J Assoc Medicale Can*. 2012;184(13):E709-718. doi:10.1503/cmaj.112153.
 21. Stockwell DC, Kirkendall E, Muething SE, Kloppenborg E, Vinodrao H, Jacobs BR. Automated adverse event detection collaborative: electronic adverse event identification, classification, and corrective actions across academic pediatric institutions. *J Patient Saf*. 2013;9(4):203-210. doi:10.1097/PTS.0000000000000055.
 22. Levinson DR. *Adverse Events in Hospitals: Methods for Identifying Events*. Washington, DC: Office of the Inspector General, Department of Health and Human Services; 2010.
 23. Bates DW, Boyle DL, Vander Vliet MB, Schneider J, Leape L. Relationship between medication errors and adverse drug events. *J Gen Intern Med*. 1995;10(4):199-205.
 24. Landrigan CP, Parry GJ, Bones CB, Hackbarth AD, Goldmann DA, Sharek PJ. Temporal trends in rates of patient harm resulting from medical care. *N Engl J Med*. 2010;363(22):2124-2134. doi:10.1056/NEJMsa1004404.
 25. Children's Health Insurance Program Reauthorization Act (CHIPRA). <http://www.ahrq.gov/policymakers/chipra/index.html>. Accessed February 18, 2016.

26. Hospital Quick Reports | Aggregate Reports for U.S. Hospitals & Health Care Systems | AHA Data Online. <http://www.ahadataviewer.com/quickreport/>. Accessed July 24, 2014.
27. Lander L, Roberson DW, Plummer KM, Forbes PW, Healy GB, Shah RK. A trigger tool fails to identify serious errors and adverse events in pediatric otolaryngology. *Otolaryngol--Head Neck Surg Off J Am Acad Otolaryngol-Head Neck Surg*. 2010;143(4):480-486. doi:10.1016/j.otohns.2010.06.820.
28. Unbeck M, Schildmeijer K, Henriksson P, Jürgensen U, Muren O, Nilsson L, Pukk Härenstam K. Is detection of adverse events affected by record review methodology? an evaluation of the "Harvard Medical Practice Study" method and the "Global Trigger Tool." *Patient Saf Surg*. 2013;7(1):10. doi:10.1186/1754-9493-7-10.

VII. APPENDICES

Appendix A. Manual GAPPS Trigger List

- Serum creatinine doubling
- Nephrotoxin use (e.g., aminoglycosides, cyclosporine, tacrolimus, vancomycin) and rising creatinine (Cr)
- Hepatotoxic medications and elevated liver enzymes (AST, ALT)
- Hypoglycemia (<2 mmol/L or 40 mg/dL)
- Opiate-related constipation with intermittent laxative use
- Naloxone (Narcan) administration
- Pressure ulcer documentation (≥stage 2)
- Embolus/thrombus documentation
- Healthcare-associated infections: Positive *C. difficile* test
- Healthcare-associated infections: Positive blood culture (only after 48 hours from admission)
- Healthcare-associated infections: Positive urine culture (only after 48 hours from admission)
- Healthcare-associated infections: Positive respiratory or gastrointestinal (GI) viral infection (only after 48 hours from admission)
- Hospital readmission within 30 days
- Any code or arrest, or rapid response team activation
- All inpatient deaths
- Drop of hemoglobin (Hgb) or hematocrit (Hct) of >25% in less than 24 hours
- Mechanical ventilation >48 hours postoperatively
- Return to surgery
- Transfer to higher level of care
- Failed endotracheal extubation (reintubation within 24 hours of planned extubation)
- Racemic epinephrine administration (patients mechanically ventilated within last 24 hours)
- Abrupt medication stop
- Patient fall
- Infiltrations: Infiltration/extravasation or phlebitis documentation
- Surgical site infection
- Change in procedure
- Unplanned endotracheal extubation

Appendix B. Automated GAPPS Trigger List

This list contains triggers that were successfully automated during pilot testing at an academic tertiary care hospital. We were not able to automate the triggers with asterisks but they may be automatable depending on the capabilities of a particular institution's EHR System. We recommend that hospitals use the provided codes for the automated triggers not as definite rules, but as guidelines, for how to program searching for these triggers.

- Serum creatinine doubling
- Nephrotoxin use (e.g., aminoglycosides, cyclosporine, tacrolimus, vancomycin) and rising creatinine (Cr)
- Hepatotoxic medications and elevated liver enzymes (AST, ALT)
- Hypoglycemia (<2 mmol/L or 40 mg/dL)
- Opiate-related constipation with intermittent laxative use
- Naloxone (Narcan) administration
- Pressure ulcer documentation (≥stage 2)
- Embolus/thrombus documentation
- Healthcare-associated infections: Positive *C. difficile* test
- Healthcare-associated infections: Positive blood culture (only after 48 hours from admission)
- Healthcare-associated infections: Positive urine culture (only after 48 hours from admission)
- Healthcare-associated infections: Positive respiratory or gastrointestinal (GI) viral infection (only after 48 hours from admission)
- Hospital readmission within 30 days
- Any code or arrest, or rapid response team activation
- All inpatient deaths
- Drop of hemoglobin (Hgb) or hematocrit (Hct) of >25% in less than 24 hours
- Mechanical ventilation >48 hours postoperatively
- Return to surgery
- Transfer to higher level of care
- Racemic epinephrine administration (patients mechanically ventilated within last 24 hours)
- Warfarin triggers: INR >6
- Elevated drug levels (anti-epileptics): Phenytoin (>30 mcg/ml)
- Elevated drug levels (anti-epileptics): Oxcarbamazepine (>45 mcg/ml)
- Total bilirubin >25 mg/dL (less than 28 days old)
- Flumazenil administration
- Infiltrations: Hyaluronidase administration
- Oral vancomycin
- Operative time >6 hours (non-cardiac patients)
- Intraoperative epinephrine, norepinephrine or phenylephrine (non-cardiac patients)
- Readmission to ICU within 24 hours after discharge/transfer
- Abrupt medication stop*

- Patient fall*
- Infiltrations: Infiltration/extravasation or phlebitis documentation*
- Surgical site infection*
- Change in procedure*
- Unplanned endotracheal extubation*
- Failed endotracheal extubation (reintubation within 24 hours of planned extubation)*

Appendix C. Trigger Memos

WARFARIN TRIGGERS: INR >6	
CATEGORY	Medications/Fluids
TITLE	Warfarin triggers: INR >6
DEFINITION	International Normalized Ratio (INR) >6.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify adverse events caused by warfarin.</p> <ol style="list-style-type: none"> 1) Note the Laboratory Value: INR >6 2) In addition, to help determine preventability, review the clinical notes to determine whether a warfarin dosing error occurred. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>If the INR is >6, the patient is on warfarin, and signs/symptoms of bleeding are documented, this may be considered an adverse event. The most common places to look for evidence of bleeding are the lab report, the progress notes, and the nursing notes.</p> <ol style="list-style-type: none"> 1) Review the Medication Administration Record (MAR) for use of warfarin. 2) If the INR is >6 while the patient is on warfarin, and there is evidence of bleeding (e.g., lowering of Hgb or Hct, melena, new anemia, or new pallor), this is likely an adverse event related to the use of warfarin. 	
NON-ADVERSE EVENT	
<p>An elevated INR level alone is not generally considered an adverse event. Only when the elevated INR is associated with evidence of bleeding is it considered an adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>INR is commonly used to measure the impact of warfarin on the coagulation system. The dosing of warfarin is complicated by its interactions with many commonly used medications and even with chemicals that may be present in certain foods. These interactions may enhance or reduce warfarin's anticoagulation effect. In order to optimize</p>	

the therapeutic effect without risking dangerous side effects such as bleeding, close monitoring of the degree of anticoagulation is required by blood testing (INR).

POTENTIAL ASSOCIATED HARM

- 1) Bleeding
- 2) Bruising
- 3) Anemia
- 4) Exposure to additional blood products
- 5) Shock
- 6) Mortality

CITATIONS

1-8

TRIGGER: SERUM CREATININE DOUBLING	
CATEGORY	Medications/Fluids
TITLE	Serum creatinine doubling
DEFINITION	<p>Any creatinine (Cr) value that satisfies both criteria below:</p> <ol style="list-style-type: none"> 1) doubled over the lowest prior value during the admission that is being reviewed, and 2) the doubled Cr value is above 0.5 mg/dL.
Identifying associated adverse events	
<p style="text-align: center;">TRIGGER</p> <p>Trigger Identification Process: The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify renal injury due to medical care. Most often, the cause will be a nephrotoxin (e.g., nephrotoxic medications, radiologic contrast media; see the table below for a list of nephrotoxic drugs).</p> <ol style="list-style-type: none"> 1) Identify the lowest Cr value of the admission and monitor for any value that is twice as high as the identified baseline. 2) Ensure that any doubled value of Cr is over 0.5 mg/dL. 3) Review the Medication Administration Record (MAR) for the administration of a nephrotoxic drug. 4) In addition, to help determine the preventability, review the clinical notes to determine whether a nephrotoxic medication dosing error occurred. 5) Elevated levels of nephrotoxic drugs can serve as supplementary information when available. 	
<p style="text-align: center;">ADVERSE EVENT</p> <p>Adverse Event Identification Process: Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>Elevated Cr indicates cellular damage to the kidney; this alone would generally be considered an adverse event if it is a consequence of medical care (as opposed to progression of the underlying disease in which medical care did not play a role). More serious adverse events may also sometimes be identified by a rising Cr (e.g., acute renal failure).</p> <p>The most common places to look for rising Cr levels and associated information include the MAR, the physician orders, the lab reports, and the progress and the nursing notes.</p>	

NON-ADVERSE EVENT

If the doubling of Cr is not a result of care but is instead due to intrinsic disease, it may not represent an adverse event.

A partial list of intrinsic conditions that may result in rising Cr includes:

- 1) progressive chronic renal disease
- 2) acute pyelonephritis
- 3) volume depletion (e.g., traumatic blood loss, gastroenteritis)
- 4) glomerulonephritis
- 5) urinary tract obstruction

PREVALENCE/IMPORTANCE

The mortality rate associated with severe acute renal injury in children is approximately 30-40%. The highest mortality rates are found in infants (42%), patients with multi-organ failure (50%), and patients requiring renal replacement therapy (30-50%).

The survivors of acute renal injury are at risk for long-term complications. These complications include reduced kidney function or dependence on dialysis. Chronic kidney disease and end stage renal disease are also seen in children with acute renal injury.

POTENTIAL ASSOCIATED HARM

- 1) Fluid overload
- 2) Respiratory failure
- 3) Kidney dialysis
- 4) Mortality

CITATIONS

2-6,6-17

List of Nephrotoxic Medications		
Acyclovir	Enalaprilat	Mesalamine
Ambisome	Foscarnet	Methotrexate
Amikacin	Gadopentetate dimeglumine	Nafcillin
Amphotericin B	Gadoxetate disodium	Piperacillin/tazobactam
Captopril	Ganciclovir	Piperacillin
Carboplatin	Gentamicin	Sirolimus
Cefotaxime	Ibuprofen	Sulfasalazine
Ceftazidime	Ifosfamide	Tacrolimus
Cefuroxime	Iodixanol	Ticarcillin/clavulanic acid
Cidofovir	Iohexol	Tobramycin
Cisplatin	Iopamidol	Topiramate
Colistimethate	Ioversol	Valacyclovir
Cyclosporine	Ketorolac	Valganciclovir
Dapsone	Lisinopril	Vancomycin
Enalapril	Lithium	Zonisamide

NEPHROTOXIN USE (AMINOGLYCOSIDES, CYCLOSPORINE, TACROLIMUS, VANCOMYCIN) AND RISING CREATININE

CATEGORY	Medications/Fluids
TITLE	Nephrotoxin use (e.g., aminoglycosides, cyclosporine, tacrolimus, vancomycin) and rising creatinine (Cr)
DEFINITION	This is a combination trigger and both elements need to be present to consider it as a positive trigger. A >0.3 mg/dL increase in serum Cr within 48 hours after the documented administration of a nephrotoxic drug (e.g., Aminoglycosides, Cyclosporine, Tacrolimus, Vancomycin) should have occurred to classify this as a trigger. See the table below for a list of nephrotoxic drugs.

Identifying associated adverse events

TRIGGER

Trigger Identification Process:

The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).

This trigger is designed to identify adverse events related to nephrotoxins.

- 1) Review the chemistry lab results for a serum Cr level increase >0.3 mg/dL over the baseline value in the 48 hours following nephrotoxin administration. The baseline value can be any Cr measurement prior to nephrotoxin administration.
- 2) Review the Medication Administration Record (MAR) for the administration of a nephrotoxic drug within 48 hours of the elevated serum Cr level.
- 3) In addition, to help determine the preventability, review the clinical notes to determine whether a medication dosing error occurred.

ADVERSE EVENT

Adverse Event Identification Process:

Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.

The most common places to look for the signs/symptoms of an adverse event caused by nephrotoxins include the lab reports, the MAR, and the progress and the nursing notes.

- 1) Elevated serum Cr level >0.3 mg/dL within 48 hours of administration of any nephrotoxic drug is likely to be an adverse event.
- 2) Any documented kidney dysfunctions after the elevated serum Cr level >0.3 mg/dL is an adverse event if unexplainable from another disease process.

NON-ADVERSE EVENT	
If the rise in Cr is due to a patient's disease process, it may not be an adverse event. However, the combination of a Cr rise with the use of nephrotoxic medications makes it highly likely that the elevated Cr value represents an adverse event.	
PREVALENCE/IMPORTANCE	
As many as 30% of cases of end stage renal disease may have been caused or exacerbated by nephrotoxins, and 20% of cases of acute renal failure are attributable to drugs.	
POTENTIAL ASSOCIATED HARM	
1) Fluid overload 2) Respiratory failure 3) Kidney dialysis 4) Mortality	
CITATIONS	
2,17-19	

List of Nephrotoxic Medications		
Acyclovir	Enalaprilat	Mesalamine
Ambisome	Foscarnet	Methotrexate
Amikacin	Gadopentetate dimeglumine	Nafcillin
Amphotericin B	Gadoxetate disodium	Piperacillin/tazobactam
Captopril	Ganciclovir	Piperacillin
Carboplatin	Gentamicin	Sirolimus
Cefotaxime	Ibuprofen	Sulfasalazine
Ceftazidime	Ifosfamide	Tacrolimus
Cefuroxime	Iodixanol	Ticarcillin/clavulanic acid
Cidofovir	Iohexol	Tobramycin
Cisplatin	Iopamidol	Topiramate
Colistimethate	Ioversol	Valacyclovir
Cyclosporine	Ketorolac	Valganciclovir
Dapsone	Lisinopril	Vancomycin
Enalapril	Lithium	Zonisamide

ELEVATED DRUG LEVELS (ANTI-EPILEPTICS): PHENYTOIN (>30 MCG/ML)	
CATEGORY	Medications/Fluids
TITLE	Elevated drug levels (anti-epileptics): Phenytoin (>30 mcg/ml)
DEFINITION	Look for values above the stated value.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process: The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify adverse events related to anti-epileptics.</p> <ol style="list-style-type: none"> 1) Review the Medication Administration Record (MAR) for the administration of phenytoin or any other derivatives. 2) Review the chemistry lab values for any phenytoin level >30 mcg/ml. 3) In addition, to help determine the preventability, review the clinical notes for mention of a possible phenytoin dosing error. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process: Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The toxic effects of phenytoin depend on the route of administration, the duration of the exposure, and the dosage used. The intravenous administration of phenytoin carries the greatest risk.</p> <p>The most common places to look for the signs/symptoms of phenytoin toxicity include the progress and nursing notes. If any of the following signs/symptoms are documented, and the phenytoin level is >30 mcg/ml, this may represent an adverse event.</p> <ol style="list-style-type: none"> 1) Uncontrollable eye movements 2) Loss of coordination 3) Low or slurred speech 4) Uncontrollable shaking of a part of the body 5) Nausea and or vomiting 6) Difficulty understanding reality or coma 	
NON-ADVERSE EVENT	
<p>If no harms are documented in spite of the elevated level of phenytoin, this is not an adverse event.</p>	

PREVALENCE/IMPORTANCE
Major cardiac toxicity only occurs following parenteral administration. It is more common in the elderly and those with underlying cardiac disease, but it has been described in young healthy patients as well. Many of the side effects of the oral preparation are dose-related and are predictable at higher plasma concentrations.
POTENTIAL ASSOCIATED HARM
1) Loss of temporary motor function or speech 2) Respiratory depression 3) Mortality
CITATIONS
2,15,20,21

ELEVATED DRUG LEVELS (ANTI-EPILEPTICS): OXCARBAMAZEPINE (>45 MCG/ML)	
CATEGORY	Medications/Fluids
TITLE	Elevated drug levels (anti-epileptics): Oxcarbamazepine (>45 mcg/ml)
DEFINITION	Look for values above the stated value.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process: The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any adverse events related to oxcarbamazepine.</p> <ol style="list-style-type: none"> 1) Review the chemistry labs for an elevated oxcarbamazepine level >45 mcg/ml. 2) In addition, to help determine the preventability, review the clinical notes to determine whether a dosing error occurred. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process: Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for the following signs/symptoms include the lab reports, the progress notes, and the nursing notes. If the following symptoms are documented and the oxcarbamazepine level is >45 mcg/ml, it may be considered an adverse event.</p> <ol style="list-style-type: none"> 1) Central nervous system (CNS) symptoms: dizziness, blurred/double vision, headache, inability to concentrate/sluggishness 2) Gastrointestinal (GI) symptoms: nausea, vomiting, loss of appetite, dry mouth, diarrhea, or constipation 3) Hyponatremia 4) Skin rash, sunburn 	
NON-ADVERSE EVENT	
<p>If no harms are documented, an elevated oxcarbamazepine level itself is not an adverse event.</p> <p>Elevated drug level due to intentional or accidental consumption of oxcarbamazepine outside of the hospital is a trigger but is not an adverse event.</p>	
PREVALENCE/IMPORTANCE	

Oxcarbamazepine causes hyponatremia in 2.7% of patients, which may contribute to fatigue and seizures.

POTENTIAL ASSOCIATED HARM

- 1) CNS or GI symptoms
- 2) Hyponatremia and related complications (e.g., seizure)
- 3) Mortality

CITATIONS

2,22

TOTAL BILIRUBIN >25 MG/DL (LESS THAN 28 DAYS OLD)	
CATEGORY	Medications/Fluids
TITLE	Total bilirubin >25 mg/dL (less than 28 days old)
DEFINITION	Look for values above the stated value.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per 24-hour period).</p> <p>This trigger is designed to identify adverse events related to hyperbilirubinemia.</p> <ol style="list-style-type: none"> 1) Review the chemistry labs for any total bilirubin >25 mg/dL. 2) Note the days of life from the progress or nursing notes. The infant must be less than 28 days old. Hyperbilirubinemia is most common in the first one to two weeks of life. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>Hyperbilirubinemia >25 mg/dL during the first 28 days of life may result from failure of monitoring, or failure to initiate early treatment as bilirubin levels begin to rise. Phototherapy, hydration, or exchange blood transfusions can be used as treatments.</p> <p>Newborns with visible jaundice or risk factors should have their bilirubins monitored and treated with hydration and phototherapy well before the bilirubin level exceeds 25 mg/dL. Exchange transfusion is indicated even for low risk infants when the total bilirubin reaches 30 mg/dL, and is indicated at lower levels for infants in the first 96 hours of life, for premature infants, or for those with risk factors, including prematurity, sepsis, acidosis, asphyxia, lethargy, temperature instability, isoimmune hemolytic disease, or G6PD deficiency.</p> <p>Adverse events associated with hyperbilirubinemia include signs of acute encephalopathy (e.g., hypertonia, arching, retrocollis or opisthotonos [abnormal rigid posturing], fever, high pitched cry). Hyperbilirubinemia can result in severe cognitive or motor impairments or loss of hearing, vision or speech (kernicterus).</p> <p>The most common places to look for hyperbilirubinemia and the circumstances leading to it include the lab reports, the physician orders, and the physician and nursing notes.</p>	

NON-ADVERSE EVENT

If the elevated bilirubin level does not lead to any medical intervention and if no harms are documented, it may not be an adverse event.

PREVALENCE/IMPORTANCE

Elevated levels of bilirubin occur in 60% of full-term babies and 80% of premature babies. The causes of hyperbilirubinemia in the neonatal/infancy period include physiologic jaundice, breast feeding jaundice, and hemolytic jaundice. The treatment choices and the levels to initiate the treatment are vastly different in each of these cases. While hyperbilirubinemia cannot be totally prevented, early recognition and treatment are important in preventing bilirubin levels from rising to dangerous levels. Standardized pathways for the prevention of severe hyperbilirubinemia should be followed.

POTENTIAL ASSOCIATED HARM

- 1) Impairment of motor functions
- 2) Impairment of cognitive function
- 3) Loss of hearing, vision, or speech
- 4) Mortality

CITATIONS

2,15,23,24

HEPATOTOXIC MEDICATIONS AND ELEVATED LIVER ENZYMES (AST, ALT)	
CATEGORY	Medications/Fluids
TITLE	Hepatotoxic medications and elevated liver enzymes (AST, ALT)
DEFINITION	Elevated AST or ALT levels >150 when patients have been on any hepatotoxic medications.
Identifying associated adverse events	
TRIGGER	
<p><i>Trigger Identification Process:</i></p> <p>This is a combination trigger, and both elements need to be present to consider it a positive trigger. Therefore, elevated aspartate transaminase (AST) or alanine transaminase (ALT) >150 after the documented administration of a hepatotoxic drug is considered a positive trigger.</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any adverse event related to hepatotoxic drugs.</p> <ol style="list-style-type: none"> 1) Review the Medication Administration Record (MAR) for all hepatotoxic drugs including immunosuppressants (e.g., methotrexate, anti-epileptics, antimicrobials, and INH). See "Common Hepatotoxic Medications" table below. 2) Review the home medication list for any hepatotoxic medications including acetaminophen. 3) Monitor the chemistry labs for any AST or ALT >150. 	
ADVERSE EVENT	
<p><i>Adverse Event Identification Process:</i></p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for hepatotoxicity include the lab reports and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) If the patient has been on hepatotoxic drugs at home or at another institution, and the AST or ALT levels >150, this may represent an adverse event. 2) Sustained AST or ALT >150 even after discontinuing the hepatotoxic drugs may represent an adverse event. 3) Hepatic injury can occur for many reasons. If a trigger review reveals that a hepatic injury was primarily the result of something other than a hepatotoxic medication, it is possible that this may still be an adverse event if the use of hepatotoxic medications is believed to have exacerbated the hepatic injury. The 	

determining factor is whether the injury resulted from or was contributed to by medical care.
NON-ADVERSE EVENT
Hepatic injury, and therefore elevated hepatic enzymes such as AST and ALT, may occur for many reasons. If there is an AST or ALT elevation with a discernible etiology that is not related to hepatotoxic medications, this may not be an adverse event.
PREVALENCE/IMPORTANCE
Drug-induced liver injury is responsible for 5% of all hospital admissions and 50% of all acute liver failures. Early detection of an elevated AST or ALT is crucially important for the pediatric population.
POTENTIAL ASSOCIATED HARM
<ol style="list-style-type: none"> 1) Permanent organ damage 2) Hepatic coma 3) Mortality
CITATIONS
25–27

Common Hepatotoxic Medications	
Analgesics	NSAIDs Acetaminophen Allopurinol Baclofen Methotrexate
Antiarrhythmics	Amiodarone Procainamide
Antibiotics	Isoniazid (INH) Nitrofurantoin (Macrobid) Sulfonamides Rifampin Pyrazinamide Tetracycline
Anticonvulsant Medications	Phenytoin (Dilantin) Valproic Acid Carbamazepine
Antifungal Medications	Fluconazole (Diflucan) Itraconazole (Sporanox) Ketoconazole (Nizoral) Voriconazole
Antihypertensives	Labetalol Hydralazine Lisinopril Losartan (Cozaar)
Medications used in Diabetes Mellitus	Acarbose (Precose) Pioglitazone (Actos) Sulfonylureas (e.g. Glyburide)
Hormonal Medications	Tamoxifen Testosterone
Lipid-lowering Medications	HMG-CoA Reductase Inhibitors (Statins)
Psychotropic Medications	Bupropion (Wellbutrin, Zyban) Chlorpromazine (Thorazine) Depakote Er Risperidone (Risperdal) Trazodone

Disclaimer: This table is not meant to be an exhaustive list of hepatotoxic drugs. It is meant to assist chart reviewers as a quick reference tool.

HYPOGLYCEMIA (<2 mmol/L or 40mg/dL)	
CATEGORY	Medications/Fluids
TITLE	Hypoglycemia (<2 mmol/L or 40 mg/dL)
DEFINITION	Look for values below the stated values.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify hypoglycemia associated with medical care.</p> <ol style="list-style-type: none"> 1) Review the chemistry labs for any serum glucose level <2 mmol/L or 40 mg/dL. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>For children >30 days, hypoglycemia (<2mmol/L or 40mg/dL) that is due to medical care is considered to be an adverse event even in the absence of other physical findings, as hypoglycemia has been associated with dysfunctional glucose counterregulation in diabetic patients and with neurodevelopmental deficits in preterm infants, even in the absence of other clinical manifestations. For children <30 days, further review is necessary.</p> <p>The most common places to look for medications that may result in hypoglycemia and the signs/symptoms of hypoglycemia include the Medication Administration Record (MAR), the physician orders, and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) Sweating, palpitations, anxiety, headache, and nausea/vomiting may be associated with hypoglycemia. 2) Altered mental status or seizures may be associated with hypoglycemia. 3) In extremely severe cases, a loss of consciousness or death may occur. 	
NON-ADVERSE EVENT	
<p>If hypoglycemia is caused by underlying conditions, such as the following, it may not be an adverse event.</p> <ol style="list-style-type: none"> 1) Transient neonatal hypoglycemia 2) Prematurity 3) Intrauterine growth retardation 4) Perinatal asphyxia 5) Maternal hyperglycemia due to diabetes 6) Sepsis 	

- 7) Congenital hypopituitarism
- 8) Congenital hyper-insulinism
- 9) Inborn errors of carbohydrate metabolism, such as glycogen storage disease
- 10) Prolonged fasting
- 11) Diarrheal illness in young children, especially rotavirus gastroenteritis
- 12) Idiopathic ketotic hypoglycemia
- 13) Isolated growth hormone deficiency
- 14) Gastric dumping syndrome (after gastrointestinal surgery)
- 15) Congenital metabolic diseases
- 16) Insulin-secreting pancreatic tumor
- 17) Reactive hypoglycemia and idiopathic postprandial syndrome
- 18) Addison's disease

PREVALENCE/IMPORTANCE

Hypoglycemia may lead to acute crises in diabetic patients and may have lasting neurological consequences for neonates.

POTENTIAL ASSOCIATED HARM

- 1) Neurologic injury
- 2) Further episodes of hypoglycemia and associated harms

CITATIONS

2,4–8,16,28

Common Hypoglycemic Medications
Chloramphenicol
Chlorpromazine
Insulin
Metformin
Ritonavir
Pentamidine
propranolol
Somatostatin
Chlorpropamide
Tolbutamide
Tolazamide
Glipizide
Temafloxacin
Tolazamide
Tolbutamide
Acarbose
Miglitol
Rosiglitazone

ABRUPT MEDICATION STOP	
CATEGORY	Medications/Fluids
TITLE	Abrupt medication stop
DEFINITION	An abrupt medication stop is best described as an unexpected stop or deviation from typical ordering practice (e.g., discontinuation of a recently started medication).
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any potential adverse event related to a sudden medication stop.</p> <ol style="list-style-type: none"> 1) Identify cancelled or discontinued medication orders and review the clinical record for explanations. Scan the orders for “hold” or “stop” medication orders; then look for the reason this was done in the clinical documentation. It may indicate that an adverse event has occurred. 2) Look for unexpected switches or significant dose changes of medications in the physician orders. 3) In addition, to help determine preventability, review the clinical notes for possible dosing errors of the stopped medication. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>Although the discontinuation of medications is a common finding in the record, abruptly stopping medications is a trigger requiring further investigation for a cause. An adverse drug event may require the immediate discontinuation of a medication.</p> <p>The most common places to look for potential adverse events related to a sudden stop of medications include the physician orders, the lab reports, the radiographic studies, and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) If there is an order for stat drug levels of the stopped medication, investigate the lab reports further. 2) If any drug levels are out of the normal ranges, investigate for the possibility of a drug toxicity related adverse event. 3) New rashes or hives are common adverse drug events. 4) More serious adverse drug events may result in blood pressure changes, 	

<p>tachycardia, respiratory distress, anemia, wheezing, or other new clinical findings.</p> <p>5) An unplanned transfer to a higher level of care (e.g., pediatric intensive care unit or cardiac intensive care unit), may result from adverse drug events.</p>
<p>NON-ADVERSE EVENT</p> <p>1) If the family or patient opted for an abrupt discontinuation of a medication as a re-direction of treatment in the case of terminal malignancy or a similar situation, this is not an adverse event.</p> <p>2) Completion of the course of a medication should not be considered an abrupt medication stop.</p> <p>3) Many abrupt medication stops occur as patients' diagnoses become clearer during a hospitalization, and therapy is tailored appropriately; these types of medication stops are not usually the result of adverse events.</p>
<p>PREVALENCE/IMPORTANCE</p> <p>Adverse drug events are extremely common in inpatient settings, and abrupt medication stops have been shown to be excellent triggers for identifying them in prior studies.</p>
<p>POTENTIAL ASSOCIATED HARM</p> <p>1) Adverse drug events can have downstream effects on any organ system</p> <p>2) Organ damage</p> <p>3) Shock</p> <p>4) Mortality</p>
<p>CITATIONS</p> <p>2,4–8,13,14,16,29–31</p>

FLUMAZENIL ADMINISTRATION	
CATEGORY	Medications/Fluids
TITLE	Flumazenil administration
DEFINITION	Documented administration of flumazenil.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>Flumazenil is a benzodiazepine antagonist.</p> <p>This trigger is designed to identify oversedation by a benzodiazepine.</p> <ol style="list-style-type: none"> 1) Review the Medication Administration Record (MAR) for flumazenil administration. 2) Review the MAR for the administration of a benzodiazepine. 3) In addition, to help determine preventability, review the clinical notes for a possible benzodiazepine dosing error. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>If flumazenil has been used, overdosage of benzodiazepines is a frequent finding and would represent an adverse event if the patient experienced clinical consequences from the overdose.</p> <p>The most common places to identify a benzodiazepine overdose and the signs/symptoms of an overdose include the MAR, the physician orders, the anesthesia notes, and the progress and nursing notes. If the following are documented it may represent an adverse event.</p> <ol style="list-style-type: none"> 1) Oversedation, hypotension, respiratory depression, or respiratory failure following benzodiazepine administration 2) Extubation failure due to over sedation by a benzodiazepine 	
NON-ADVERSE EVENT	
<p>Many cases of flumazenil administration may represent an adverse event even if an error did not occur. However, as with all of the antagonist triggers, if the antagonist is used as a diagnostic measure and does not reverse the effects of a suspected</p>	

benzodiazepine overdose, the sedation or other observed symptoms that prompted the trial of flumazenil may not have been due to benzodiazepines, and may not have been an adverse event at all if due to underlying illness rather than medical care.

PREVALENCE/IMPORTANCE

Overdose of benzodiazepines may result in death, especially when taken in combination with alcohol, barbiturates, opioids, or tricyclic antidepressants. The most common symptoms of overdose include central nervous system depression, intoxication with impaired balance, ataxia, and slurred speech. Severe cases may result in coma or respiratory depression. The main treatments for benzodiazepine overdose are supportive care and reversal agents.

POTENTIAL ASSOCIATED HARM

- 1) Over sedation
- 2) Respiratory failure
- 3) Mortality

CITATIONS

2,4–8,14,29–31,32(p1989),33

ONGOING OR INTERMITTENT LAXATIVE USE	
CATEGORY	Medications/Fluids
TITLE	Opiate-related constipation with intermittent laxative use
DEFINITION	Documented use of laxatives or stool softeners (including but not limited to: Colace, Peri-Colace, Dulcolax, Cephulac, Metamucil, Fleets Enema) while having received at least one opioid in the past 48 hours. This trigger can be recorded based on events occurring before the hospitalization began.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify constipation caused by opiate use which necessitates intermittent laxative use.</p> <ol style="list-style-type: none"> 1) Review the Medication Administration Record (MAR) for the use of opiates. 2) Review the MAR for laxative administration. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for any occurrence of constipation caused by opiate use and the subsequent laxative administration include the daily I/O sheet, the MAR, and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) If the patient is having opiate related constipation that requires the intermittent use of laxatives to treat constipation, this may represent an adverse event. 	
NON-ADVERSE EVENT	
<p>If a patient is placed on laxatives prophylactically or concurrently with the initiation of opiates, there is generally no adverse event. If the patient is not experiencing significant constipation as a consequence of opiate use, it is not an adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>Narcotic-related adverse drug events are among the most common adverse drug events</p>	

in hospitalized children. One study found that there were 5.2 narcotic-related adverse events for every 100 patients.

POTENTIAL ASSOCIATED HARM

- 1) Avoidable pain and discomfort
- 2) Bowel obstruction

CITATIONS

2,14,34

NALOXONE (NARCAN) ADMINISTRATION	
CATEGORY	Medications/Fluids
TITLE	Naloxone (Narcan) administration
DEFINITION	Documented administration of naloxone.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>Naloxone is an opioid antagonist. If naloxone has been used, an overdose of opioids given in the hospital is a frequent finding and would represent an adverse event if the overdose caused harm (e.g., oversedation, respiratory failure, etc.). While minimal episodes of opioid-induced pruritis are not considered adverse events, severe and/or prolonged episodes of pruritis count as adverse events.</p> <p>This trigger is designed to identify an unintended opioid overdose.</p> <ol style="list-style-type: none"> 1) Review the physician orders or the Medication Administration Record (MAR) for naloxone administration. 2) Review the MAR for opioid use prior to the naloxone order. 3) In addition, to help determine preventability, review physician orders, nursing notes, and any intraoperative documentation for evidence of overdose. Also, look at respiratory rates to determine incidence of hypopnea. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>After the trigger is identified, the most common places to identify the signs/symptoms of opioid overdose include the procedure and operative notes, as well as the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) If signs/symptoms of opioid overdose are present (including bradycardia, hypotension, respiratory depression, pallor, sluggish responses) and naloxone is administered, this is likely an adverse event. 	
NON-ADVERSE EVENT	
<ol style="list-style-type: none"> 1) If signs/symptoms of an overdose of opioids are documented on presentation to the hospital (e.g., in the hospital or ER admission note), it is possible that naloxone is being used to treat an illicit opioid (e.g., heroin) overdose or to presumptively treat a 	

patient who presents with a decreased level of consciousness of unclear etiology. In this case, the use of naloxone would not usually be indicative of an adverse event (i.e., an injury due to medical care).

- 2) As with all of the antagonist triggers, if the antagonist (naloxone in this case) is being used as a diagnostic measure, and the effects of a suspected opioid overdose are not reversed, there may not be an adverse event.

PREVALENCE/IMPORTANCE

Opioids are one of the most commonly implicated medications in adverse drug events.

POTENTIAL ASSOCIATED HARM

- 1) Respiratory failure
- 2) Hypotension or bradycardia
- 3) Sedation
- 4) Mortality

CITATIONS

2-8,13-16,35

PATIENT FALL	
CATEGORY	Hospital Care Environment
TITLE	Patient fall
DEFINITION	Patient fall documented in the medical record.
Identifying associated adverse events	
TRIGGER	
<p><i>Trigger Identification Process:</i></p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify injuries due to falls that are a consequence of medical care, or that occur in the hospital.</p> <ol style="list-style-type: none"> 1) Review the nursing notes and progress notes for documentation of falls and any associated injuries. 2) As indicated, review the radiology reports and other follow-up tests. 	
ADVERSE EVENT	
<p><i>Adverse Event Identification Process:</i></p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>A fall may result from medication usage, equipment failure, or a lack of adequate preventive measures. The most common places to identify failures of care include the Medication Administration Record (MAR), the physician orders, and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) If any harm is documented (e.g., bleeding, bruising, fracture, etc.) as a result of a fall that requires additional labs, monitoring, or intervention, this is an adverse event. 2) Falls should be reviewed for causation. 3) A fall that is the result of medical treatment (such as from medications) should be considered an adverse event, even if the fall occurred outside of the hospital. 	
NON-ADVERSE EVENT	
<p>If a fall does not result in an injury, it is not an adverse event. A fall that occurs outside of the hospital is not an adverse event unless medical care contributed to the fall.</p>	
PREVALENCE/IMPORTANCE	
<p>A Joint Commission initiative that emerged in 2005 targeted risk reduction for patient harm resulting from falls. Organizations are required to assess and reassess a patient's risk for falls and develop an action plan to address any identified risks. Beginning in</p>	

2006, hospitals were required to implement a fall reduction program and evaluate the efficacy of the program.

POTENTIAL ASSOCIATED HARM

- 1) Organ injuries
- 2) Mortality

CITATIONS

2,6–8,14(p200),36

INFILTRATIONS: INFILTRATION/PHLEBITIS DOCUMENTATION	
CATEGORY	Hospital Care Environment
TITLE	Infiltrations: Infiltration/extravasation or phlebitis documentation
DEFINITION	<p>The Infusion Nurses Society and Oncology Nursing Society define infiltration as the inadvertent leakage of a non-vesicant solution or medication into the tissue surrounding the intravenous (IV) catheter. Extravasation is the inadvertent leakage of a vesicant medication or solution into the surrounding tissue, where vesicant refers to any medication or fluid with the potential for causing blisters, severe tissue injury, or necrosis.</p> <p>Phlebitis is inflammation of the interior wall of the vein (tunica intima).</p>
Identifying associated adverse events	
TRIGGER	
<p><i>Trigger Identification Process:</i> The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify IV infiltration and related phlebitis.</p> <ol style="list-style-type: none"> 1) Review the nursing notes for IV infiltration. 2) Review the discharge diagnosis codes section for the word "phlebitis." 3) In addition, to help determine preventability, review the clinical notes for comments on the possible omission of appropriate IV site monitoring. 	
ADVERSE EVENT	
<p><i>Adverse Event Identification Process:</i> Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to identify IV infiltration and the signs/symptoms of phlebitis include the daily flow sheet and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) Any IV infiltration that requires additional labs, monitoring, or intervention is an adverse event. 2) Any IV infiltration that contributes to developing phlebitis is an adverse event. <p>Of note, it is possible to have more than one infiltration in a 24-hour period (e.g., one phlebitis due to a left arm IV and a second phlebitis due to a right arm IV). If this occurs,</p>	

document each adverse event separately.

NON-ADVERSE EVENT

IV infiltration or phlebitis is most often an adverse event.

PREVALENCE/IMPORTANCE

The incidence of peripheral vein extravasation has been reported to range from 0.1-6.5%. Phlebitis affects from 27-70% of all patients receiving intravenous therapy.

The early identification of risk factors and intervention upon the first signs and symptoms of infiltrations and phlebitis is critical to the prevention of potentially serious adverse outcomes.

POTENTIAL ASSOCIATED HARM

1) Infection

CITATIONS

2,3,13,37-39

INFILTRATIONS: HYALURONIDASE ADMINISTRATION	
CATEGORY	Hospital Care Environment
TITLE	Infiltrations: Hyaluronidase administration
DEFINITION	Documented use of hyaluronidase in the Medication Administration Record (MAR).
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>Hyaluronidase lowers the viscosity of hyaluronan, thereby increasing tissue permeability. Hyaluronidase is also used for the extravasation of hyperosmolar solutions.</p> <p>This trigger is designed to identify intravenous (IV) infiltration that requires an intervention in order to improve the condition.</p> <ol style="list-style-type: none"> 1) Review the MAR for hyaluronidase administration. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for IV infiltrations and their care include the physician orders and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) If IV infiltration is documented and hyaluronidase is administered, this is an adverse event. It is a harm that caused a medical intervention. <p>Of note, it is possible to have more than one infiltration in a 24-hour period (e.g., one due to a left arm IV and a second due to a right arm IV). If this occurs, document each adverse event separately.</p>	
NON-ADVERSE EVENT	
<p>If hyaluronidase is administered in conjunction with anesthetics for surgical procedures (e.g., ophthalmic surgery), it is a part of care and is not an adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>Literature on wound care management suggests 10-30% of pediatric patients receiving intravenous infusions have intravenous infiltration injuries; 55% of these injuries occurred in neonates. Injuries are more likely to occur in younger patients. Using smaller</p>	

catheter sizes (larger gauges) or “butterfly” catheters (needles) for infusions increases the chance of extravasation of fluid and medication. Injury from extravasation of fluids and medications is directly related to the medication and/or fluid administered.

POTENTIAL ASSOCIATED HARM

- 1) Infection
- 2) Phlebitis

CITATIONS

3,48

PRESSURE ULCER DOCUMENTATION (≥STAGE 2)	
CATEGORY	Hospital Care Environment
TITLE	Pressure ulcer documentation (≥Stage 2)
DEFINITION	Documentation of any pressure ulcer scored as stage 2 or higher.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify a pressure ulcer (or bedsore) scored stage 2 or higher.</p> <ol style="list-style-type: none"> 1) Review the progress and nursing notes for a pressure ulcer ≥stage 2.⁴⁰ 2) In addition, to help determine preventability, review the clinical notes for the possible omission of monitoring or failure to provide appropriate care to prevent pressure ulcers. For example, if the patient is at high risk for developing a pressure ulcer, but the Braden Scale or another similar monitoring tool hasn't been utilized at admission or on daily assessments, this may suggest that the ulcer was preventable. Similarly, if a patient at high risk for developing a pressure ulcer hasn't received the standard of care (e.g., turning the patient every two hours), and develops a pressure ulcer ≥stage 2, this may suggest that the ulcer was preventable. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>Patients who are immobile are at highest risk of developing a pressure ulcer. The risk of developing a pressure ulcer can be determined by using the Braden Scale for Predicting Pressure Ulcer Risk. The scale contains 6 areas of risk: cognitive-perceptual, immobility, inactivity, moisture, nutrition, and friction/shear.</p> <p>If a patient develops a pressure ulcer ≥stage 2 in the hospital or during medical care that occurred prior to hospitalization, it is an adverse event irrespective of preventability (e.g., receiving the standard of care or assessments by utilizing the Braden Scale).</p> <p>The most common places to identify the signs and symptoms of pressure ulcers include the discharge summary and the daily flow sheet, as well as the progress and nursing notes.</p>	

NON-ADVERSE EVENT

A pressure ulcer that is present on admission and was not due to medical care would not be an adverse event, but these are rare.

PREVALENCE/IMPORTANCE

Each year, more than 2.5 million people in the United States develop pressure ulcers. Within acute care hospitals in the United States, the incidence of pressure ulcers is 0.4-38%; within long-term care, 2.2-23.9%; and in home care, 0-17%. There is a much higher rate of pressure ulcers in intensive care settings.

POTENTIAL ASSOCIATED HARM

- 1) Infections
- 2) Mortality

CITATIONS

2,4,5,40,41

EMBOLUS/THROMBUS DOCUMENTATION	
CATEGORY	Hospital Care Environment
TITLE	Embolus/Thrombus documentation
DEFINITION	Documented evidence of a deep vein thrombosis (DVT) or a pulmonary embolism (PE) in the medical record.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify DVTs and PEs.</p> <ol style="list-style-type: none"> 1) Review the discharge summary that documents a DVT or a PE in the diagnosis section. 2) Review the progress and nursing notes for conditions or interventions that may increase the risk of venous clots or PEs (e.g., central lines at the site of the clot; hypercoagulable states) 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>DVT is the formation of a blood clot (thrombus) in a deep vein, predominantly in the legs. Non-specific signs may include pain, swelling, redness, warmth, and engorged superficial veins. PE, a potentially life-threatening complication, is caused by the detachment (embolization) of a clot that travels to the lungs. Together, DVT and PE constitute a single disease process known as venous thromboembolism (VTE).</p> <p>The most common places to identify the signs/symptoms of DVT and PE include the discharge summary and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) A new DVT or PE for a hospitalized patient is generally an adverse event. 2) If the hospitalization occurs due to a DVT or embolus, look for causation outside of the hospital that could be attributed to medical care. This would also represent an adverse event. 	
NON-ADVERSE EVENT	
<p>DVTs and PEs may occur in otherwise healthy individuals, unrelated to medical care, though these are rare in pediatric populations.</p>	

PREVALENCE/IMPORTANCE
VTE incidence in children is low: approximately 1 in 100,000.
POTENTIAL ASSOCIATED HARM
1) Pulmonary embolism 2) Arrhythmia 3) Mortality
CITATIONS
2,4,5,7,14,15,42-45

HEALTHCARE-ASSOCIATED INFECTIONS: POSITIVE <i>C. DIFFICILE</i> TEST	
CATEGORY	Healthcare-Associated Infections
TITLE	Healthcare-associated infections: Positive <i>C. difficile</i> test
DEFINITION	Positive testing for <i>C. difficile</i> .
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify healthcare-associated infections.</p> <ol style="list-style-type: none"> 1) Review the microbiology/lab reports for positive <i>C. difficile</i> testing. 2) Review the orders/Medication Administration Record (MAR) for prior use of antibiotics that could predispose to <i>C. difficile</i> infection. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to identify the signs/symptoms of a <i>C. difficile</i> infection include the microbiology reports, the progress notes, and the nursing notes.</p> <p>If a patient develops a <i>C. difficile</i> infection (documented positive <i>C. difficile</i> testing from the microbiology report) and is being treated for it (most commonly with oral or intravenous metronidazole or with oral vancomycin), it is likely an adverse event, especially if the patient was previously on antibiotics.</p>	
NON-ADVERSE EVENT	
<p>If a patient is positive for <i>C. difficile</i> but shows no symptoms, it may not be an adverse event (asymptomatic colonization).</p>	
PREVALENCE/IMPORTANCE	
<p><i>C. difficile</i> is the most serious cause of antibiotic-associated diarrhea (AAD) and can lead to pseudomembranous colitis, a severe inflammation of the colon, often resulting from the eradication of the normal gut flora by antibiotics.</p>	
POTENTIAL ASSOCIATED HARM	
<ol style="list-style-type: none"> 1) Pseudomembranous colitis 	

- 2) Bowel obstruction
- 3) Peritonitis
- 4) Chronic diarrhea
- 5) Chronic nutritional deficiency
- 6) Mortality

CITATIONS

2,4–8,15,16,46,47

ORAL VANCOMYCIN	
CATEGORY	Healthcare-Associated Infections
TITLE	Oral vancomycin
DEFINITION	Documented administration of oral vancomycin.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify <i>C. difficile</i> infections, which may be treated with oral vancomycin.</p> <ol style="list-style-type: none"> 1) Review the Medication Administration Record (MAR) for oral vancomycin. 2) Review the microbiology/lab report for positive <i>C. difficile</i> testing. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to identify the signs/symptoms of positive <i>C. difficile</i> testing include the microbiology reports, the progress and nursing notes, and the daily I/O record.</p> <p>If there is documented positive <i>C. difficile</i> testing from the microbiology report and the patient is on oral vancomycin, there may be an adverse event, particularly if the patient was previously on antibiotics.</p>	
NON-ADVERSE EVENT	
<p>In the presence of positive <i>C. difficile</i> testing, oral vancomycin administration likely signifies an adverse event (treatment for symptomatic infection). If the patient is manifesting no symptoms of <i>C. difficile</i> infection, however, it may not represent an adverse event (asymptomatic colonization).</p>	
PREVALENCE/IMPORTANCE	
<p><i>C. difficile</i> is the most serious cause of antibiotic-associated diarrhea (AAD) and can lead to pseudomembranous colitis, a severe inflammation of the colon, often resulting from the eradication of the normal gut flora by antibiotics.</p>	

POTENTIAL ASSOCIATED HARM
1) Pseudomembranous colitis 2) Bowel obstruction 3) Peritonitis 4) Chronic diarrhea 5) Chronic nutritional deficiency 6) Mortality
CITATIONS
2,8,13,45–47

HEALTHCARE-ASSOCIATED INFECTIONS: POSITIVE BLOOD CULTURE (ONLY AFTER 48 HOURS FROM ADMISSION)	
CATEGORY	Healthcare-Associated Infections
TITLE	Healthcare-associated infections: Positive blood culture (only after 48 hours from admission)
DEFINITION	Positive blood cultures drawn 48 hours or more after admission. These may be drawn from a venous or arterial line (central or peripheral), by arterial puncture, or by venipuncture.
Identifying associated adverse events	
TRIGGER	
<p><i>Trigger Identification Process:</i></p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify healthcare-associated bacteremia/sepsis, including central line-associated blood stream infections (CLABSI). The Centers for Disease Control and Prevention's definition of CLABSI is a laboratory-confirmed bloodstream infection where a central line or umbilical catheter was in place for >2 calendar days.</p> <ol style="list-style-type: none"> 1) Review the microbiology report for positive blood cultures that are obtained at least 48 hours after admission or transfer. 2) Verify the presence of a central line or an umbilical catheter. 	
ADVERSE EVENT	
<p><i>Adverse Event Identification Process:</i></p> <p>The most common places to identify/verify the healthcare-associated infections include the microbiology report, the admission note, the physician orders, and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) A positive blood culture 48 hours after admission is likely to be an adverse event. 2) A CLABSI is likely to be an adverse event. 	
NON-ADVERSE EVENT	
<p>A positive blood culture that is attributable to another primary infection (e.g., community-acquired pneumonia) would not be an adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>Healthcare-associated infections (HAIs) are a substantial cause of morbidity and mortality. Approximately 1 in every 20 inpatients has an infection related to hospital care. HAIs result in significant financial costs: billions of dollars are spent annually in the U.S.</p>	

to treat infections. Furthermore, HAIs can have devastating emotional and medical consequences, accounting for the loss of tens of thousands of lives each year.

POTENTIAL ASSOCIATED HARM

- 1) Sepsis
- 2) Secondary bacterial infections
- 3) Organ failure
- 4) Mortality

CITATIONS

2-5,8,16,44(p2),48

HEALTHCARE-ASSOCIATED INFECTIONS: POSITIVE URINE CULTURE (ONLY AFTER 48 HOURS FROM ADMISSION)	
CATEGORY	Healthcare-associated infections
TITLE	Healthcare-associated infections: Positive urine culture (only after 48 hours from admission)
DEFINITION	Positive urine culture obtained 48 hours or more after admission.
Identifying associated adverse events	
TRIGGER	
<p><i>Trigger Identification Process:</i></p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify healthcare-associated urinary tract infections (UTIs), including catheter-related UTIs.</p> <ol style="list-style-type: none"> 1) Review the microbiology/lab reports for positive urine culture. 2) To assess the possibility that the UTI is catheter-related, verify that urinary catheter insertion occurred 48 hours prior to collecting the urine culture sample. 	
ADVERSE EVENT	
<p><i>Adverse Event Identification Process:</i></p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>After the trigger is identified, the most common places to identify the signs/symptoms of the urinary tract infections include the physician orders, the microbiology/lab reports, and the progress and nursing notes.</p> <p>A catheter-associated UTI that occurs 48 hours or more after an admission is almost always an adverse event.</p> <p>A non-catheter associated UTI that develops 48 hours or more after admission may be an adverse event.</p>	
NON-ADVERSE EVENT	
<p>A non-catheter associated UTI detected more than 48 hours after admission but apparently unrelated to medical care would not be considered an adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>UTIs in children account for 0.7% of physician office visits and 5-14% of emergency</p>	

department visits every year. The pooled prevalence of UTI from a 1999 study by the American Academic of Pediatrics was 5%.

In adults, UTIs are the second most common healthcare-associated infection, with 80% attributed to an indwelling catheter. The UTIs comprise greater than 15% of infections reported by acute care hospitals. 13,000 deaths per year are attributable to UTIs (mortality rate 2.3%). An estimated 17-69% of the catheter-associated UTIs may be preventable.

POTENTIAL ASSOCIATED HARM

- 1) Acute renal failure
- 2) Urosepsis
- 3) Repeated infection
- 4) Mortality

CITATIONS

2,4,49-52

HEALTHCARE-ASSOCIATED INFECTIONS: POSITIVE RESPIRATORY OR GASTROINTESTINAL (GI) VIRAL TEST (ONLY AFTER 48 HOURS FROM ADMISSION)

CATEGORY	Healthcare-Associated Infections
TITLE	Healthcare-associated infections: Positive respiratory or gastrointestinal (GI) viral test (only after 48 hours from admission)
DEFINITION	Positive testing for a viral pathogen (e.g., antibody testing, PCR, viral culture) for influenza, parainfluenza, adenovirus, respiratory syncytial virus, norovirus, or rotavirus obtained at least 48 hours after admission.

Identifying associated adverse events

TRIGGER

Trigger Identification Process:

The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).

This trigger is designed to identify the following respiratory or gastrointestinal (GI) healthcare-associated viral infections that occur during a hospitalization: influenza, parainfluenza, adenovirus, respiratory syncytial virus, norovirus, and rotavirus.

Review the microbiology/lab reports for positive viral testing (e.g., RSV or Rotavirus testing) 48 hours after admission.

ADVERSE EVENT

Adverse Event Identification Process:

Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.

It can be challenging to differentiate healthcare-associated respiratory viral infections from community-acquired infections. The most common places to look for the evidence of community-acquired viral infections include the admission history and physical (H&P), the admission lab reports, the physician orders, and the progress and nursing notes.

If no clinical signs of infection are documented in the admission H&P and viral testing is positive 48 hours after admission, this may represent an adverse event.

NON-ADVERSE EVENT

If clinical signs or symptoms of viral infection are documented on admission (e.g., in the admission H&P), this may represent a community-acquired viral infection, which would

not represent an adverse event. This may be the case even if viral testing is positive 48 hours or more after admission (e.g., testing not performed initially); if the infection is deemed to be community-acquired, this would not represent an adverse event.

PREVALENCE/IMPORTANCE

Viral infections are a leading cause of hospitalization in pediatrics. Because most are readily transmissible, they are also a leading cause of pediatric healthcare-associated infections.

POTENTIAL ASSOCIATED HARM

- 1) Respiratory distress
- 2) Respiratory failure
- 3) Gastroenteritis
- 4) Mortality

CITATIONS

2,53

SURGICAL SITE INFECTION	
CATEGORY	Healthcare-Associated Infections
TITLE	Surgical site infection (SSI)
DEFINITION	<p>Documentation in the medical record of an SSI.</p> <p>A surgical site infection (SSI) is an infection that occurs after surgery in the part of the body where the surgery took place. The SSI can sometimes be a superficial infection, involving the skin only. Other SSIs are more serious and can involve organs, tissues under the skin, or implanted material.</p>
Identifying associated adverse events	
<p style="text-align: center;">TRIGGER</p> <p>Trigger Identification Process: The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify an SSI, a type of healthcare-associated infection.</p> <ol style="list-style-type: none"> 1) Review the microbiology reports for any positive surgical wound culture. 2) Review the progress and nursing notes for any evidence of an SSI. 	
<p style="text-align: center;">ADVERSE EVENT</p> <p>Adverse Event Identification Process: Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to identify/verify the SSI include the microbiology report, the physician orders, and the progress and nursing notes.</p> <p>If signs/symptoms of an SSI are documented (e.g., increasing redness, swelling, tenderness at the site of recent surgery, fever), it may represent an adverse event, particularly if the nursing or physician notes conclude that the signs and symptoms indicate the presence of an SSI.</p>	
<p style="text-align: center;">NON-ADVERSE EVENT</p> <p>Not all postoperative tenderness/swelling indicates an infection. However, if an SSI is documented, it is by definition an adverse event, whether or not it is determined to be preventable.</p>	

PREVALENCE/IMPORTANCE
SSIs are a major cause of postoperative morbidity, with the mortality of patients with an SSI 2-12 times higher than that of patients without an SSI. SSIs account for \$3-10 billion in direct costs per year according to the Centers for Disease Control and Prevention.
POTENTIAL ASSOCIATED HARM
1) Sepsis 2) Peritonitis or other deep tissue/organ infection 3) Organ failure 4) Mortality
CITATIONS
4,54,55

HOSPITAL READMISSION WITHIN 30 DAYS	
CATEGORY	Hospital Transfers/Outcomes
TITLE	Hospital readmission within 30 days
DEFINITION	Any unplanned admission to the hospital following transfer/discharge out of the hospital within the prior 30 days.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The purpose of this trigger is to identify readmissions, which are sometimes the result of an adverse event.</p> <ol style="list-style-type: none"> 1) For all patients, determine whether they are readmitted to the hospital within 30 days of the index hospitalization. 2) Do not include planned readmissions. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to identify any potential adverse events that contributed to readmission to the hospital include the discharge summary from the index admission and the progress and nursing notes.</p> <p>In addition, review admission documents for the second hospitalization to determine whether readmission has occurred as a result of an adverse event. Examples of adverse events that might lead to readmission include postoperative infections, adverse drug events, diagnostic mishaps, or other complications of therapy, but the list of possibilities is broad.</p>	
NON-ADVERSE EVENT	
<p>Many readmissions are not the result of an adverse event. If there is no evidence of harm due to medical care leading to the readmission, there is no adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>Overall, 6.5% of children had unplanned readmissions to the hospital within 30 days of discharge in one study. Two-thirds of readmissions were in children with at least one chronic condition; for certain medical conditions, readmission rates were as high as 23%. An investigation of the epidemiology of 15-day pediatric readmissions found that at least 13% of readmissions to a tertiary children's medical center were due to complications of medical care, though the true numbers may be even higher.</p>	
POTENTIAL ASSOCIATED HARM	
<ol style="list-style-type: none"> 1) Infections 	

- 2) Adverse drug events
- 3) Other complications of therapy
- 4) Mortality

CITATIONS

2–5,16,43,44,56–59

ANY CODE OR ARREST, OR RAPID RESPONSE TEAM ACTIVATION	
CATEGORY	Hospital Transfers/Outcomes
TITLE	Any code or arrest, or rapid response team activation
DEFINITION	Any Code Blue calls, any cardiac or respiratory arrest or any documented rapid response team activation that occurs in any area of the hospital.
Identifying associated adverse events	
TRIGGER	
<p><i>Trigger Identification Process:</i></p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any adverse event prior to, during, or after a code, arrest or rapid team response.</p> <ol style="list-style-type: none"> 1) Review the following documents to look for documentation of any code, arrest, or rapid response team activation: the physician orders, intensive care unit (ICU) transfer notes, Rapid Response Team notes, respiratory therapy notes, the progress and nursing notes, and the discharge summary. 	
ADVERSE EVENT	
<p><i>Adverse Event Identification Process:</i></p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for any adverse event related to a code, arrest, or rapid team activation include the physician orders, the ICU notes, the discharge/transfer summary, and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) Events leading up to the code, arrest, or rapid response activation will need to be reviewed to identify any possible adverse events. 2) For patients in the ICU requiring emergency intubation or resuscitation, the traditional "Code Blue" may not be called, but these events should be reviewed in this trigger category. 3) Investigate any medications administered and procedures performed within a timeframe that may have contributed to or resulted in the event. Evaluate the case for documentation of delays in administration of needed therapy that may have led to the event. 	
NON-ADVERSE EVENT	
Rapid Response Team activation, Code Blue calls, codes, or arrests, may be the result	

of underlying disease progression. If medical care did not contribute to an incident, it should not be classified as an adverse event.

PREVALENCE/IMPORTANCE

Analysis of data collected by the Child Health Corporation of America from 2003 to 2006 revealed that sentinel events (severe adverse events) involving “failed escalation of care” accounted for 16% of all events reported by the 19 contributing hospitals.

POTENTIAL ASSOCIATED HARM

- 1) Respiratory arrest
- 2) Mortality

CITATIONS

2–5,8,13,14,16,43,44(p20),58–60

ALL INPATIENT DEATHS	
CATEGORY	Hospital Transfers/Outcomes
TITLE	All inpatient deaths
DEFINITION	All inpatient deaths should be investigated for any associated adverse events.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any adverse events associated with an unexpected death.</p> <ol style="list-style-type: none"> 1) Review the discharge summary. 2) Review the progress and nursing notes to gather information regarding the circumstances of death. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for the clues to identify unexpected death include the discharge summary, the death note, the physician orders, the Medication Administration Record (MAR), the lab reports, and the progress and nursing notes.</p> <p>If the death is contributed to by a medication error, delayed escalation of care, adverse events from any surgery or procedure, or other aspects of medical care (whether the death appears to be preventable or not), this is an adverse event.</p>	
NON-ADVERSE EVENT	
<p>If death is an expected outcome of a disease or traumatic injury, and medical care did not unintentionally contribute to the death, this should not be considered an adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>Pediatric wards care for dying patients who differ widely by age and medical conditions. The relative medical complexity of hospitalized pediatric patients has increased dramatically over the past two decades, and children with complex chronic conditions have higher rates of death than other children.</p>	

POTENTIAL ASSOCIATED HARM

- 1) Healthcare-associated infections, adverse drug events, or other adverse events may precede a death due to an adverse event (cascade of events).

CITATIONS

2,3,5(p20),13,43(p20),44,58,59,61,62

DROP OF HEMOGLOBIN OR HEMTOCRIT OF >25% IN LESS THAN 24 HOURS	
CATEGORY	Surgical
TITLE	Drop of hemoglobin (Hgb) or hematocrit (Hct) of >25% in less than 24 hours
DEFINITION	Hgb or Hct drops >25% should be investigated for possible bleeding related to hospital care (e.g. anticoagulation) or procedural complication.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any adverse event related to blood loss of >25%.</p> <ol style="list-style-type: none"> 1) Review the lab report for drop of Hemoglobin (Hgb) or Hematocrit (Hct) of >25% in less than 24 hours. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for the signs/symptoms of blood loss potentially associated with a procedure or the use of anticoagulants include the physician orders, procedure notes, the Medication Administration Record (MAR), the lab reports, the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) Signs/symptoms of sudden blood loss may include pallor, tachycardia, cool extremities, hypotension, bruising, or bleeding. If related to medical care, this may represent an adverse event. 2) Blood loss and drop of Hgb and Hct of >25% within 24 hours that is associated with anti-coagulant use may be an adverse event. 3) Likewise, blood loss associated with a procedure may be an adverse event. 	
NON-ADVERSE EVENT	
<p>Bleeding associated with an underlying disease process to which medical care did not contribute may not be an adverse event. For patients at the end of life (do not resuscitate) on comfort care measures, use of narcotics is routine. Even if the narcotics are thought to possibly contribute to death, this would not generally be considered an adverse event.</p>	

PREVALENCE/IMPORTANCE

Clinical symptoms of blood loss may not be present until 10–20% of total whole-blood volume is lost. Children with blood loss may compensate for prolonged periods of time, resulting in maintenance of normal blood pressure despite hypovolemia. Children initially show tachycardia without loss of blood pressure, followed by a rapid drop in blood pressure as decompensation occurs.

POTENTIAL ASSOCIATED HARM

- 1) Exposure to blood products
- 2) Blood borne infections
- 3) Shock
- 4) Mortality

CITATIONS

2–5,8,16,63

MECHANICAL VENTILATION >48 HOURS POSTOPERATIVELY	
CATEGORY	Surgical
TITLE	Mechanical ventilation >48 hours postoperatively
DEFINITION	Patient is on mechanical ventilation at any time >48 hours after surgery has ended.
Identifying associated adverse events	
TRIGGER	
<p><i>Trigger Identification Process:</i></p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify intraoperative or postoperative adverse events that might have contributed to mechanical ventilation occurring >48 hours postoperatively.</p> <ol style="list-style-type: none"> 1) Review the postoperative ventilation history to assess if ventilation occurred at any time >48 hours after surgery ended. 2) Exclude ventilator-dependent patients; baseline need for ventilation should be documented in the preoperative anesthesia assessment/evaluation or the admission history and physical examination. 	
ADVERSE EVENT	
<p><i>Adverse Event Identification Process:</i></p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for intraoperative or postoperative adverse events that might lead to a prolonged need for ventilation include the anesthesia note, the operating room (OR) order sheet, the Medication Administration Record (MAR), the OR/anesthesia flow sheet, the OR summary, the discharge summary, the progress notes, and the respiratory and nursing notes.</p> <ol style="list-style-type: none"> 1) If there is any concern for oversedation during surgery, this may represent an adverse event. 2) Suspected airway trauma (e.g., laryngeal edema caused by traumatic intubations or bleeding during the intubation) may represent an adverse event. 3) Positive respiratory cultures on the microbiology report may be an adverse event. 4) Prolonged ventilation may also be due to sepsis or surgical complications, which may be adverse events. 	
NON-ADVERSE EVENT	
<p>If a congenital airway malformation is the cause for delayed extubation, this may not be an adverse event. Extended periods of intubation may be a normal course of postoperative care for some major surgeries (e.g., major cardiac surgeries, airway</p>	

operations).

PREVALENCE/IMPORTANCE

Mechanical ventilation that occurs >48 hours postoperatively may be the result of respiratory complications but it also may represent intraoperative complications.

POTENTIAL ASSOCIATED HARM

- 1) Respiratory Distress
- 2) Respiratory Failure
- 3) Mortality

CITATIONS

5(p2),44,64

OPERATIVE TIME >6 HOURS (NON-CARDIAC PATIENTS)	
CATEGORY	Surgical
TITLE	Operative time >6 hours (non-cardiac patients)
DEFINITION	All operative cases whose operating room (OR) times exceed 6 hours; exclude spinal fusion and cardiac surgery patients.
Identifying associated adverse events	
TRIGGER	
<p><i>Trigger Identification Process:</i></p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any intraoperative adverse event which might have contributed to prolonged OR time (>6 hours).</p> <ol style="list-style-type: none"> 1) Review the OR flow sheet or the anesthesia note for the time of incision and closure. 	
ADVERSE EVENT	
<p><i>Adverse Event Identification Process:</i></p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>A wide range of adverse events may contribute to prolonged OR time, including but not limited to: surgical complications, anesthesia complications, or other adverse drug events.</p> <p>The most common places to identify potential intraoperative adverse events that might have contributed to prolonged surgical time include the OR note, the anesthesia note, the OR physician order, the surgical summary, the Medication Administration Record (MAR), and the progress and nursing notes.</p>	
NON-ADVERSE EVENT	
<p>Surgery may last for >6 hours due to the complexity of the case; prolonged surgery alone is not an adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>Intraoperative complications are a leading type of adverse event in adults.</p>	

POTENTIAL ASSOCIATED HARM

- 1) Infection
- 2) Organ injury
- 3) Bleeding
- 4) Adverse drug event
- 5) Mortality

CITATIONS

2,5,43(p20),44

INTRAOPERATIVE EPINEPHRINE, NOREPINEPHRINE OR PHENYLEPHRINE (NON-CARDIAC PATIENTS)

CATEGORY	Surgical
TITLE	Intraoperative epinephrine, norepinephrine or phenylephrine (non-cardiac patients)
DEFINITION	Use of bolus or continuous infusion of epinephrine, norepinephrine, or phenylephrine in IV form; exclude cardiac surgery patients, or patients being cooled intentionally.

Identifying associated adverse events

TRIGGER

Trigger Identification Process:

The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).

This trigger is designed to identify any life threatening intraoperative adverse event.

- 1) Review the OR notes, the anesthesia notes, and the Medication Administration Record (MAR) for bolus or continuous IV infusion of epinephrine, norepinephrine, or phenylephrine to non-cardiac surgery patients during the intraoperative period.
- 2) If these medications were given to non-cardiac surgery patients intraoperatively, this is a positive trigger.

ADVERSE EVENT

Adverse Event Identification Process:

Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.

Cases where patients require support from vasopressors may represent unintended intraoperative outcomes. These include excess bleeding or a lack of fluid resuscitation. The most common places to look for potential intraoperative adverse events include the OR note, the anesthesia note, the MAR, the OR summary, and the OR physician orders.

- 1) If evidence of excessive bleeding is documented, and the patient received any of the three drugs intraoperatively, this may represent an adverse event.
- 2) If there is evidence of hypotension, and the patient received any of the three drugs intraoperatively, this may represent an adverse event.
- 3) The need for pressors may also be prompted by hypotension, an adverse reaction to anesthetic agents, which may represent an adverse event.

NON-ADVERSE EVENT

Cases where the use of vasopressors is standard of care would not be adverse events.

These include, but are not limited to, cardiac surgery patients and spinal fusion cases.

PREVALENCE/IMPORTANCE

Pressors are used in cases of moderate to severe hypotension, usually only if fluid resuscitation alone is inadequate.

POTENTIAL ASSOCIATED HARM

- 1) Hypotension
- 2) Cardiac arrest
- 3) Cardiac arrhythmia
- 4) Mortality

CITATIONS

3,5,44(p200),65

RETURN TO SURGERY	
CATEGORY	Surgical
TITLE	Return to surgery
DEFINITION	A return to surgery within the same admission.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any intraoperative adverse event, including retained foreign body, bleeding/hematoma, or another complication that necessitates a return to surgery within the same admission.</p> <ol style="list-style-type: none"> 1) Review the diagnostic code/clinical notes for a repeat surgery within the same admission excluding planned stepwise surgical procedures. 2) Surgeries and procedures that happen in places other than the operating room may still count towards the trigger. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for an adverse event that requires a return to surgery includes the second OR summary, the anesthesia note, and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) If the reason for the return to surgery is to remove a retained foreign body, this is an adverse event. 2) If the reason for the return to surgery is to correct postoperative bleeding, or to remove a hematoma or address another surgical complication, this is an adverse event. 	
NON-ADVERSE EVENT	
<p>Planned returns to surgery would not be an adverse event.</p>	
PREVALENCE/IMPORTANCE	
<p>Unplanned return to the operating room often represents a complication of surgery, but may occur for a wide variety of reasons.</p>	

POTENTIAL ASSOCIATED HARM

- 1) Bleeding
- 2) Hypotension
- 3) Organ injury
- 4) Mortality

CITATIONS

2-5,13,44,58,59,66

CHANGE IN PROCEDURE	
CATEGORY	Surgical
TITLE	Change in procedure
DEFINITION	The procedure indicated on the postoperative note is different from the procedure planned in the preoperative notes or documented in the surgical consent.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any intraoperative adverse event that necessitates a change in procedure.</p> <ol style="list-style-type: none"> 1) Review the preoperative anesthesia assessment note and the surgical consent form, and make certain that both include the identical surgical procedure. 2) Review the immediate postoperative and operating room (OR) notes or perioperative anesthesia note for any change in the actual surgical procedure. If there is any discrepancy between the actual surgical procedure and the planned one, this is a positive trigger. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for the reasons for the change of a planned surgical procedure include the OR note, the anesthesia note, the OR summary, and the diagnosis codes.</p> <ol style="list-style-type: none"> 1) If the change in a planned surgical procedure was due to surgical complications caused by an intraoperative complication (e.g., organ injury, excessive bleeding), a thromboembolic or cardiac event, a device or instrument failure, or other surgical complication, this may represent an adverse event. 2) If the change was due to a wrong-sided surgery, this is an adverse event. 	
NON-ADVERSE EVENT	
<p>If the change was due to an unexpected discovery of an in-operable condition (e.g., total metastasis of malignancy), this may not be an adverse event. Unanticipated findings</p>	

requiring a change in diagnoses may or may not be an adverse event.

PREVALENCE/IMPORTANCE

The overall prevalence of changes of surgical procedures from the planned one has not been well-published.

POTENTIAL ASSOCIATED HARM

- 1) Bleeding
- 2) Organ injury
- 3) Hematoma
- 4) Hypotension
- 5) Mortality

CITATIONS

4,5,44,58

READMISSION TO ICU WITHIN 24 HOURS AFTER DISCHARGE/TRANSFER	
CATEGORY	NICU/PICU
TITLE	Readmission to ICU within 24 hours after discharge/transfer
DEFINITION	Any admission to any of the intensive care units (ICUs) following transfer/discharge out of an ICU within the prior 24 hours.
Identifying associated adverse events	
<p style="text-align: center;">TRIGGER</p> <p>Trigger Identification Process: The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any adverse event that necessitates readmission to the ICU within 24 hours of the time of discharge/transfer out of the ICU.</p> <ol style="list-style-type: none"> 1) Review the discharge summary prior to the readmission to the ICU and the course since ICU discharge to verify that the time lapse between the transfer/discharge from the ICU to readmission to the ICU is less than 24 hours. 	
<p style="text-align: center;">ADVERSE EVENT</p> <p>Adverse Event Identification Process: Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for the potential reasons for the readmission to the ICU include the ICU admission note, the discharge/transfer summary from the ICU immediately preceding the readmission, the physician orders, and the progress and nursing notes.</p> <p>Patients may be readmitted to the ICU for a wide variety of reasons, but such admissions often represent premature de-intensification of care. Healthcare-associated infections may also necessitate readmission.</p> <ol style="list-style-type: none"> 1) If the reason for the readmission is due to episodes of new fever or potential signs of infection, this may represent an adverse event. 2) If the cause of readmission to the ICU is for additional respiratory or cardiovascular support, this may represent an adverse event. 	
<p style="text-align: center;">NON-ADVERSE EVENT</p> <p>Planned readmissions would not be an adverse event. Readmission to an ICU within 24 hours may occur even with appropriate care due to the progression of underlying disease, and may not be an adverse event.</p>	

PREVALENCE/IMPORTANCE

In a study of adults, hospital death rates were 2-10 times higher for readmitted patients than for those who survived an ICU admission and were never readmitted. ICU readmissions occur for many reasons.

POTENTIAL ASSOCIATED HARM

- 1) Healthcare-associated infections
- 2) Sepsis
- 3) Respiratory Distress
- 4) Hypotension
- 5) Cardiovascular disease
- 6) Mortality

CITATIONS

3–5,8,67

TRANSFER TO HIGHER LEVEL OF CARE	
CATEGORY	NICU/PICU
TITLE	Transfer to higher level of care
DEFINITION	All transfers from an acute care area to an intensive care unit or intermediate care unit ("step-up unit") should be considered a trigger.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process:</p> <p>The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any event that necessitates a transfer to a higher level of care.</p> <ol style="list-style-type: none"> 1) Review the transfer or progress notes for reasons for the transfer to a neonatal or pediatric intensive care unit (NICU/PICU) or other higher level of care setting. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process:</p> <p>Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>The most common places to look for the reasons for the transfer and the potentially missed warning signs for the need to escalate care include the lab reports, the Medication Administration Record (MAR), and the progress and nursing notes.</p> <ol style="list-style-type: none"> 1) There are a wide variety of possible reasons for transfer to a higher level of care. Transfers for which preceding medical care contributed may be considered adverse events. 	
NON-ADVERSE EVENT	
<p>Progression of underlying disease resulting in a transfer to a higher level of care may not be an adverse event.</p> <p>Planned admissions from operating rooms or procedural areas to a higher level of care count towards the trigger but are not adverse events.</p>	
PREVALENCE/IMPORTANCE	
<p>Airway abnormality, anesthetic factors, and intraoperative hypoxia are risk factors associated with an unplanned NICU/PICU admission among pediatric surgical patients. Although preventable events contribute significantly to unplanned PICU admissions, they</p>	

constitute an opportunity for quality improvement programs.

POTENTIAL ASSOCIATED HARM

- 1) Healthcare-associated infection
- 2) Sepsis
- 3) Respiratory distress
- 4) Hypotension
- 5) Mortality

CITATIONS

2-7,43,44,58,59,68

UNPLANNED ENDOTRACHEAL EXTUBATION	
CATEGORY	NICU/PICU
TITLE	Unplanned endotracheal extubation
DEFINITION	Any extubation not planned by the clinical team; these may be associated with smaller patients (neonatal intensive care unit [NICU] patients) and challenges with sedation, secretions, or lack of restraints. The unplanned extubation is the adverse event. Tracheostomy patients should be excluded.
Identifying associated adverse events	
TRIGGER	
<p>Trigger Identification Process: The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).</p> <p>This trigger is designed to identify any unplanned extubation in the NICU/pediatric intensive care unit (PICU).</p> <ol style="list-style-type: none"> 1) Review the NICU/PICU notes for an unplanned/accidental extubation. 	
ADVERSE EVENT	
<p>Adverse Event Identification Process: Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.</p> <p>Securing and maintaining an endotracheal tube is necessary for safe airway management. Unplanned extubations put the patient at high risk for harm.</p> <p>The most common places to look for any unplanned/accidental extubations include the daily NICU/PICU note, the nursing and respiratory therapy notes, and the physician orders.</p> <ol style="list-style-type: none"> 1) All unplanned extubations that require interventions are adverse events. 	
NON-ADVERSE EVENT	
Unplanned extubations that occur without any harm to the patient and have no need for reintubation or other emergent interventions would not generally be considered as adverse events.	
PREVALENCE/IMPORTANCE	
Historically, rates of unplanned extubations of 1 per 100 ventilated days were considered	

within the national standards, acknowledging that all unplanned extubations are unacceptable. However, recent evidence shows that much lower rates are attainable.

POTENTIAL ASSOCIATED HARM

- 1) Airway injury
- 2) Prolonged ventilation days
- 3) Mortality

CITATIONS

2,3,5,8,13,16,44,69

FAILED ENDOTRACHEAL EXTUBATION (REINTUBATION WITHIN 24 HOURS OF PLANNED EXTUBATION)

CATEGORY	NICU/PICU
TITLE	Failed endotracheal extubation (reintubation within 24 hours of planned extubation)
DEFINITION	Any reintubation within 24 hours of the initial extubation. Tracheostomy patients should be excluded.

Identifying associated adverse events

TRIGGER

Trigger Identification Process:

The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).

This trigger is designed to identify a failed extubation in the neonatal intensive care unit/pediatric intensive care unit (NICU/PICU).

- 1) Review the respiratory therapy or the NICU/PICU notes for a reintubation within 24 hours of the planned extubation.

ADVERSE EVENT

Adverse Event Identification Process:

Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.

A failed extubation represents additional procedures and ventilator days. An appropriate assessment of extubation readiness is needed, but not sufficient to predict the success of an extubation.

The most common places to look for the potential causes/reasons for the failed extubation include the NICU/PICU notes, the nursing and respiratory therapy notes, the procedure notes, any radiologic studies reports, and the progress notes.

- 1) Unplanned extubations with reintubations likely represent adverse events.
- 2) If a reintubation occurs within 24 hours from the initial extubation, even after passing the extubation readiness test, this may still represent an adverse event if the child is extubated with excess sedation, a high oxygen requirement, or respiratory distress.
- 3) If an airway injury is the potential cause of the extubation failure, this may represent an adverse event.

NON-ADVERSE EVENT

A planned extubation and reintubation would not be an adverse event.

If a patient experiences an extubation failure, but appeared to have been ready for extubation by all signs, this may not represent an adverse event.

PREVALENCE/IMPORTANCE

A contemporary failed extubation rate, risk factors, and consequences of extubation failure in PICUs have been studied, but there is no globally established extubation failure rate that covers all diseases. Based on a 16-site PICU study, the major findings regarding extubation failures include: a) extubation failure is in part disease-specific; b) preexisting respiratory conditions predispose to extubation failure; and c) admission acuity scoring does not affect extubation failure. Patients experiencing an extubation failure had a longer pre-extubation intubation time, a longer PICU length of stay, and a higher mortality rate than patients who did not experience an extubation.

POTENTIAL ASSOCIATED HARM

- 1) Permanent airway injury
- 2) Mortality

CITATIONS

3,5,69

RACEMIC EPINEPHRINE ADMINISTRATION (PATIENTS MECHANICALLY VENTILATED WITHIN LAST 24 HOURS)

CATEGORY	NICU/PICU
TITLE	Racemic epinephrine administration (patients mechanically ventilated within last 24 hours)
DEFINITION	Any use of racemic epinephrine within 24 hours of endotracheal extubation.

Identifying associated adverse events

TRIGGER

Trigger Identification Process:

The first time a trigger is identified, it should be recorded. Any instances of this same trigger appearing within the following 24 hours should be treated as part of the initial trigger and should not be documented separately. 24 hours after a trigger is identified, the next appearance of the same trigger should be treated as a new occurrence and documented separately (only one occurrence of the same trigger should be documented per period of 24 hours).

This trigger is designed to identify any airway injury in the neonatal intensive care unit/ pediatric intensive care unit (NICU/PICU). A patient must have been mechanically ventilated within the last 24 hours prior to racemic epinephrine administration to qualify for this trigger.

- 1) Review the Medication Administration Record (MAR) or respiratory therapy documentation for racemic epinephrine administration.
- 2) Review the respiratory therapy notes or the nursing notes for evidence of the patient being on mechanical ventilation within 24 hours prior to the racemic epinephrine administration.

ADVERSE EVENT

Adverse Event Identification Process:

Unintended physical injury resulting from or contributed to by medical care that requires additional monitoring, treatment, or hospitalization, or that results in death.

Racemic epinephrine can treat airway edema and may be associated with an airway injury following an intubation, extubation, or airway manipulation.

The most common places to look for any potential airway injuries following an intubation, extubation, or airway manipulation include the respiratory notes, the procedure notes, and the nursing notes.

- 1) If traumatic intubation or repeated intubation has been documented, and the patient received racemic epinephrine within 24 hours of mechanical ventilation, this may represent an adverse event.

NON-ADVERSE EVENT

If racemic epinephrine is administered for other reasons, for example, viral croup, this may not be an adverse event.

PREVALENCE/IMPORTANCE

In young children, the most serious and immediate complication of extubation is laryngeal edema; the incidence of post-extubation stridor in the PICU is approximately 2-25%. Aerosolized epinephrine is an effective treatment for both infective and extubation stridor.

POTENTIAL ASSOCIATED HARM

- 1) Chronic airway injury
- 2) Mortality

CITATIONS

2,70

References

1. Holbrook AM, Pereira JA, Labiris R, McDonald H, Douketis JD, Crowther M, Wells PS. Systematic overview of warfarin and its drug and food interactions. *Arch Intern Med*. 2005;165(10):1095-1106. doi:10.1001/archinte.165.10.1095.
2. *Pediatric Patient Safety Measurement Tool (PPSMT) Pilot Toolkit*. Children's Hospital Association; 2012.
3. Matlow AG, Baker GR, Flintoft V, Cochrane D, Coffey M, Cohen E, Cronin CMG, Damignani R, Dubé R, Galbraith R, Hartfield D, Newhook LA, Nijssen-Jordan C. Adverse events among children in Canadian hospitals: the Canadian Paediatric Adverse Events Study. *CMAJ Can Med Assoc J J Assoc Medicale Can*. 2012;184(13):E709-E718. doi:10.1503/cmaj.112153.
4. The Paediatric Trigger Tool - NHS Institute for Innovation and Improvement. http://www.institute.nhs.uk/safer_care/paediatric_safer_care/the_paediatric_trigger_tool.html. Accessed July 7, 2014.
5. Griffin FA, Resar RK. *IHI Global Trigger Tool for Measuring Adverse Events (Second Edition)*. Institute for Healthcare Improvement; 2009.
6. Rozich JD, Haraden CR, Resar RK. Adverse drug event trigger tool: a practical methodology for measuring medication related harm. *Qual Saf Health Care*. 2003;12(3):194-200. doi:10.1136/qhc.12.3.194.
7. Institute for Healthcare Improvement: IHI Trigger Tool for Measuring Adverse Drug Events. <http://www.ihl.org/resources/Pages/Tools/TriggerToolforMeasuringAdverseDrugEvents.aspx>. Accessed July 7, 2014.
8. Institute for Healthcare Improvement: IHI Intensive Care Unit (ICU) Adverse Event Trigger Tool. <http://www.ihl.org/resources/Pages/Tools/ICUAdverseEventTriggerTool.aspx>. Accessed July 7, 2014.
9. Devarajan P. Pediatric Acute Kidney Injury: Different From Acute Renal Failure But How And Why. *Curr Pediatr Rep*. 2013;1(1):34-40. doi:10.1007/s40124-012-0003-3.
10. Duzova A, Bakkaloglu A, Kalyoncu M, Poyrazoglu H, Delibas A, Ozkaya O, Peru H, Alpay H, Soylemezoglu O, Gur-Guven A, Bak M, Bircan Z, Cengiz N, Akil I, Ozcakar B, Uncu N, Karabay-Bayazit A, Sonmez F, Turkish Society for Pediatric Nephrology Acute Kidney Injury Study Group. Etiology and outcome of acute kidney injury in children. *Pediatr Nephrol Berl Ger*. 2010;25(8):1453-1461. doi:10.1007/s00467-010-1541-y.
11. Vachvanichsanong P, McNeil E, Dissaneewate S, Dissaneewate P, Chanvitan P, Janjindamai W. Neonatal acute kidney injury in a tertiary center in a developing country. *Nephrol Dial Transplant Off Publ Eur Dial Transpl Assoc - Eur Ren Assoc*. 2012;27(3):973-977. doi:10.1093/ndt/gfr477.
12. acute renal failure (ARF) - General Practice Notebook. <http://www.gpnotebook.co.uk/simplepage.cfm?ID=-227868663>. Accessed July 7, 2014.

13. Sharek PJ, Horbar JD, Mason W, Bisarya H, Thurm CW, Suresh G, Gray JE, Edwards WH, Goldmann D, Classen D. Adverse events in the neonatal intensive care unit: development, testing, and findings of an NICU-focused trigger tool to identify harm in North American NICUs. *Pediatrics*. 2006;118(4):1332-1340. doi:10.1542/peds.2006-0565.
14. Takata GS, Mason W, Taketomo C, Logsdon T, Sharek PJ. Development, testing, and findings of a pediatric-focused trigger tool to identify medication-related harm in US children's hospitals. *Pediatrics*. 2008;121(4):e927-e935. doi:10.1542/peds.2007-1779.
15. Classen DC, Pestotnik SL, Evans RS, Burke JP. Description of a computerized adverse drug event monitor using a hospital information system. *Hosp Pharm*. 1992;27(9):774, 776-779, 783.
16. Resar RK, Rozich JD, Classen D. Methodology and rationale for the measurement of harm with trigger tools. *Qual Saf Health Care*. 2003;12(suppl 2):ii39-ii45. doi:10.1136/qhc.12.suppl_2.ii39.
17. Goldstein SL, Kirkendall E, Nguyen H, Schaffzin JK, Bucuvalas J, Bracke T, Seid M, Ashby M, Foertmeyer N, Brunner L, Lesko A, Barclay C, Lannon C, Muething S. Electronic Health Record Identification of Nephrotoxin Exposure and Associated Acute Kidney Injury. *Pediatrics*. 2013;132(3):e756-e767. doi:10.1542/peds.2013-0794.
18. Galley HF. Can acute renal failure be prevented? *J R Coll Surg Edinb*. 2000;45(1):44-50.
19. Naesens M, Kuypers DRJ, Sarwal M. Calcineurin inhibitor nephrotoxicity. *Clin J Am Soc Nephrol CJASN*. 2009;4(2):481-508. doi:10.2215/CJN.04800908.
20. U.S. National Library of Medicine. Phenytoin: MedlinePlus Drug Information. MedlinePlus. <http://www.nlm.nih.gov/medlineplus/druginfo/meds/a682022.html#overdose>. Published May 1, 2009. Accessed June 25, 2014.
21. PHENYTOIN TOXICITY. <http://www.emjournal.net/htdocs/pages/art/45-phtox.html>. Accessed July 7, 2014.
22. Oxcarbamazepine (Drug) - Detailed Information - DistilBio: The Life Sciences Graph Search Engine. DistilBio. <http://distilbio.com/show/drug/Oxcarbamazepine>. Published 2013. Accessed June 25, 2014.
23. American Academy of Pediatrics Subcommittee on Hyperbilirubinemia. Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. *Pediatrics*. 2004;114(1):297-316.
24. Neonatal jaundice | Guidance and guidelines | NICE. <http://www.nice.org.uk/guidance/cg98>. Accessed July 7, 2014.
25. Mehta N, Ozick L, Gbadehan E. Drug-Induced Hepatotoxicity. Medscape. <http://emedicine.medscape.com/article/169814-overview>. Published December 13, 2012. Accessed June 25, 2014.
26. Lynch T, Price A. The effect of cytochrome P450 metabolism on drug response, interactions, and adverse effects. *Am Fam Physician*. 2007;76(3):391-396.

27. Blumenthal D, Brunton L, Parker K, Lazo J, Buxton I. *Goodman and Gilman's Pharmacological Basis of Therapeutics Digital Edition*. McGraw-Hill Professional; 2005.
28. Dickerman MJ, Jacobs BR, Vinodrao H, Stockwell DC. Recognizing hypoglycemia in children through automated adverse-event detection. *Pediatrics*. 2011;127(4):e1035-e1041. doi:10.1542/peds.2009-3432.
29. Agarwal S, Classen D, Larsen G, Tofil NM, Hayes LW, Sullivan JE, Storgion SA, Coopes BJ, Craig V, Jaderlund C, Bisarya H, Parast L, Sharek P. Prevalence of adverse events in pediatric intensive care units in the United States. *Pediatr Crit Care Med J Soc Crit Care Med World Fed Pediatr Intensive Crit Care Soc*. 2010;11(5):568-578. doi:10.1097/PCC.0b013e3181d8e405.
30. Woods D, Thomas E, Holl J, Altman S, Brennan T. Adverse events and preventable adverse events in children. *Pediatrics*. 2005;115(1):155-160. doi:10.1542/peds.2004-0410.
31. Levinson DR. *Adverse Events in Hospitals: Methods for Identifying Events*. Washington, DC: Office of the Inspector General, Department of Health and Human Services; 2010.
32. Seger DL. Flumazenil--treatment or toxin. *J Toxicol Clin Toxicol*. 2004;42(2):209-216.
33. Höjer J, Baehrendtz S, Gustafsson L. Benzodiazepine poisoning: experience of 702 admissions to an intensive care unit during a 14-year period. *J Intern Med*. 1989;226(2):117-122.
34. High Risk Medication Assessment Tools - Hospital Quality Institute. <http://www.hqinstitute.org/post/high-risk-medication-assessment-tools>. Accessed July 7, 2014.
35. Mc Donnell C. Opioid medication errors in pediatric practice: Four years' experience of voluntary safety reporting. *Pain Res Manag J Can Pain Soc*. 2011;16(2):93-98.
36. The Joint Commission. *Improving America's Hospitals: The Joint Commission's Annual Report on Quality and Safety*; 2007.
37. Paquette V, McGloin R, Northway T, Dezorzi P, Singh A, Carr R. Describing Intravenous Extravasation in Children (DIVE Study). *Can J Hosp Pharm*. 2011;64(5):340-345.
38. Yakir Rottenberg ZGF. Recurrent infusion phlebitis induced by cyclosporine. *Ann Pharmacother*. 2005;38(12):2071-2073. doi:10.1345/aph.1E209.
39. Kagel EM, Rayan GM. Intravenous catheter complications in the hand and forearm. *J Trauma*. 2004;56(1):123-127. doi:10.1097/01.TA.0000058126.72962.74.
40. National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, Pan Pacific Pressure Injury Alliance. *Prevention and Treatment of Pressure Ulcers: Quick Reference Guide*. Perth, Australia: Cambridge Media; 2014.
41. Baranoski S. Pressure Ulcer Reduction and Prevention Project Outcome Congress and Celebration; Pressure Ulcers: What we all need to know.

42. Rosendaal F, van Beek E, Büller H, Oudkerk M. *Deep Vein Thrombosis and Pulmonary Embolism*. John Wiley & Sons; 2009.
43. Baker GR, Norton PG, Flintoft V, Blais R, Brown A, Cox J, Etchells E, Ghali WA, Hébert P, Majumdar SR, O'Beirne M, Palacios-Derflingher L, Reid RJ, Sheps S, Tamblyn R. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. *CMAJ Can Med Assoc J J Assoc Medicale Can*. 2004;170(11):1678-1686.
44. Griffin FA, Classen DC. Detection of adverse events in surgical patients using the Trigger Tool approach. *Qual Saf Health Care*. 2008;17(4):253-258. doi:10.1136/qshc.2007.025080.
45. de Wet C, Bowie P. The preliminary development and testing of a global trigger tool to detect error and patient harm in primary-care records. *Postgrad Med J*. 2009;85(1002):176-180. doi:10.1136/pgmj.2008.075788.
46. Ryan KJ, Ray CG. In: *Sherrie Medical Microbiology*. 4th ed. McGraw-Hill Medical; 2003:322-324.
47. Curry JA. Pseudomembranous Colitis. Medscape. <http://misc.medscape.com/pi/iphone/medscapeapp/html/A226645-business.html>. Accessed June 25, 2014.
48. Prevent Health Care-Associated Infections (HAIs) | Health.gov (ODPHP). http://health.gov/hai/prevent_hai.asp. Accessed July 7, 2014.
49. Saint S, Chenoweth CE. Biofilms and catheter-associated urinary tract infections. *Infect Dis Clin North Am*. 2003;17(2):411-432.
50. Klevens RM, Edwards JR, Richards CL, Horan TC, Gaynes RP, Pollock DA, Cardo DM. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep Wash DC 1974*. 2007;122(2):160-166.
51. Umscheid C, Mitchell M, Agarwal R, Williams K, Brennan P. *Mortality from Reasonably-Preventable Hospital Acquired Infections, Included in Written Testimony by the Society of Healthcare Epidemiology of America For The Committee On Oversight And Government Reform Hearing on Healthcare-Associated Infections: A Preventable Epidemic*. Washington, D.C.; 2008.
52. Freedman AL, Urologic Diseases in America Project. Urologic diseases in North America Project: trends in resource utilization for urinary tract infections in children. *J Urol*. 2005;173(3):949-954. doi:10.1097/01.ju.0000152092.03931.9a.
53. Respiratory Syncytial Virus Infection. June 2014. <http://emedicine.medscape.com/article/971488-overview>. Accessed July 7, 2014.
54. DeHaas D. Perioperative Care of the Patient Undergoing Colorectal Surgery. April 2012.
55. Scott D. *The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention*. CDC; 2009. http://www.cdc.gov/hai/pdfs/hai/scott_costpaper.pdf.

56. Berry JG, Toomey SL, Zaslavsky AM, Jha AK, Nakamura MM, Klein DJ, Feng JY, Shulman S, Chiang VW, Chiang VK, Kaplan W, Hall M, Schuster MA. Pediatric readmission prevalence and variability across hospitals. *JAMA J Am Med Assoc*. 2013;309(4):372-380. doi:10.1001/jama.2012.188351.
57. Gay JC, Hain PD, Grantham JA, Saville BR. Epidemiology of 15-Day Readmissions to a Children's Hospital. *Pediatrics*. 2011;127(6):e1505-e1512. doi:10.1542/peds.2010-1737.
58. Thomas EJ, Studdert DM, Burstin HR, Orav EJ, Zeena T, Williams EJ, Howard KM, Weiler PC, Brennan TA. Incidence and types of adverse events and negligent care in Utah and Colorado. *Med Care*. 2000;38(3):261-271.
59. Wilson RM, Runciman WB, Gibberd RW, Harrison BT, Newby L, Hamilton JD. The Quality in Australian Health Care Study. *Med J Aust*. 1995;163(9):458-471.
60. Hayes LW, Dobyns EL, DiGiovine B, Brown A-M, Jacobson S, Randall KH, Wathen B, Richard H, Schwab C, Duncan KD, Thrasher J, Logsdon TR, Hall M, Markovitz B. A multicenter collaborative approach to reducing pediatric codes outside the ICU. *Pediatrics*. 2012;129(3):e785-e791. doi:10.1542/peds.2011-0227.
61. Burns KH, Casey PH, Lyle RE, Bird TM, Fussell JJ, Robbins JM. Increasing prevalence of medically complex children in US hospitals. *Pediatrics*. 2010;126(4):638-646. doi:10.1542/peds.2009-1658.
62. Feudtner C, Christakis DA, Zimmerman FJ, Muldoon JH, Neff JM, Koepsell TD. Characteristics of deaths occurring in children's hospitals: implications for supportive care services. *Pediatrics*. 2002;109(5):887-893.
63. Hypovolemic Shock Pathophysiology, Symptoms, Signs, Treatment | eHealthStar. <http://www.ehealthstar.com/hypovolemia/hypovolemic-shock>. Accessed July 7, 2014.
64. Karmarkar S, Varshney S. Tracheal extubation. *Contin Educ Anaesth Crit Care Pain*. 2008;8(6):214-220. doi:10.1093/bjaceaccp/mkn036.
65. Girardi LN, Barie PS. Improved survival after intraoperative cardiac arrest in noncardiac surgical patients. *Arch Surg Chic Ill 1960*. 1995;130(1):15-18; discussion 19.
66. Prim MP, De Diego JI, Jimenez-Yuste V, Sastre N, Rabanal I, Gavilan J. Analysis of the causes of immediate unanticipated bleeding after pediatric adenotonsillectomy. *Int J Pediatr Otorhinolaryngol*. 2003;67(4):341-344.
67. Rosenberg AL, Watts C. Patients readmitted to ICUs* : a systematic review of risk factors and outcomes. *Chest*. 2000;118(2):492-502.
68. da Silva PSL, de Aguiar VE, Fonseca MCM. Risk factors and outcomes of unplanned PICU postoperative admissions: a nested case-control study. *Pediatr Crit Care Med J Soc Crit Care Med World Fed Pediatr Intensive Crit Care Soc*. 2013;14(4):420-428. doi:10.1097/PCC.0b013e3182720fab.
69. Kurachek SC, Newth CJ, Quasney MW, Rice T, Sachdeva RC, Patel NR, Takano J, Easterling L, Scanlon M, Musa N, Brill R, Wells D, Park GS, Penfil S, Bysani KG, Nares

MA, Lowrie L, Billow M, Chiochetti E, Lindgren B, Scanlon M. Extubation failure in pediatric intensive care: a multiple-center study of risk factors and outcomes. *Crit Care Med*. 2003;31(11):2657-2664. doi:10.1097/01.CCM.0000094228.90557.85.

70. Sinha A, Jayashree M, Singhi S. Aerosolized L-epinephrine vs budesonide for post extubation stridor: a randomized controlled trial. *Indian Pediatr*. 2010;47(4):317-322.

Appendix D. Primary Review Form

Admission Date:	
Discharge Date:	
Length of Stay:	
Age at admission:	yrs (if >3 years)
	mos (if >3 mos)
	days (if <3 mos)
Sex:	<input type="checkbox"/> Male
	<input type="checkbox"/> Female
	<input type="checkbox"/> NR
Race:	1, White
	2, Black or African American
	3, Asian
	4, Native Hawaiian or other Pacific Islander
	5, American Indian or Alaska Native
	9, NR
Ethnicity:	0, Not of Hispanic, Latino, or Spanish origin
	1, Hispanic, Latino, or Spanish origin
	9, NR
Insurance Type:	<input type="checkbox"/> Medicaid
(check all that apply)	<input type="checkbox"/> Medicare
	<input type="checkbox"/> Private Insurance
	<input type="checkbox"/> No Insurance
	<input type="checkbox"/> Self Pay
	<input type="checkbox"/> NR

Hospital Service:	1, General Medicine
(at admission)	2, Medical Specialty, Specify:
	3, General Surgery
	4, Surgical Specialty, Specify:
	5, Neurology
	6, Intensive Care
	7, Other, Specify:
Discharge Diagnoses:	6 most important codes
(Primary) #1	
#2	
#3	
#4	
#5	
#6	

Procedure Codes:	6 most important codes
(Primary) #1	
#2	
#3	
#4	
#5	
#6	
Discharge Disposition	1, Discharged to home
	2, Discharged/transferred to another short term hospital
	3, Discharged/transferred to a rehab hospital or a short-term nursing facility
	4, Discharged/transferred to hospice facility
	5, Discharged/transferred to another type of institution, Specify:
	6, Discharged/transferred to home under care of organized home health services organization (including hospice)
	7, Left against medical advice or discontinued care
	8, Expired
	9, Other, specify:

Any triggers?	Yes/No
IF YES	
Which triggers?	
#1	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#2	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#3	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#4	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#5	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#6	(Select from dropdown menu of all triggers)
Date of trigger:	

Lab value (if applicable):	
#7	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#8	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#9	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#10	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#11	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#12	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#13	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#14	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#15	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#16	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#17	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#18	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#19	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#20	(Select from dropdown menu of all triggers)

Date of trigger:	
Lab value (if applicable):	
#21	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#22	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#23	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#24	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#25	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#26	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#27	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#28	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#29	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	
#30	(Select from dropdown menu of all triggers)
Date of trigger:	
Lab value (if applicable):	

Number of suspected AEs:	
Comments:	

Appendix E. Suspected Adverse Event Form
(1 per event)

Incident ID:	
Date of Harm:	
Setting where harm occurred:	1, Emergency Department
	2, Operating Room
	3, Intensive Care Unit
	4, Step-down / Intermediate Care Unit
	5, Hospital Ward
	6, Harm Occurred Prior to Admission in Another Hospital or in the Outpatient Setting
	7, Harm Occurred in This Hospital During Prior Admission or ER Visit
	8, Other, Specify:
	9, NR
Primary hospital service at time of harm:	1, General Medicine
	2, Medical Specialty, Specify:
	3, General Surgery
	4, Surgical Specialty, Specify:
	5, Neurology
	6, Intensive Care
	7, Other, Specify:

<p>Descriptive information briefly describing patient, including relevant admitting diagnoses. Describe suspected harm, including period leading up to, during and following the incident. Please emphasize data that helps determine if:</p> <p>1) reported episode that was due to medical care (as opposed to underlying disease process); and</p> <p>2) anything else to help you describe this event.</p> <p>Example: 67yo woman with a history of hypertension and insulin-dependent diabetes who was admitted with a myocardial</p>	

<p>infarction. On hospital day 6 she received an inadvertent 10-fold overdose of morphine which led to hypopnea and low blood pressure. She required narcan and the event prolonged her hospital stay. No permanent harm.</p>	

Did a particular trigger or triggers help identify the harm?	Yes/No
IF YES	
Which trigger(s)?	
<input type="checkbox"/>	INR >6
<input type="checkbox"/>	Serum creatinine doubling
<input type="checkbox"/>	Nephrotoxins (aminoglycosides, cyclosporine, tacrolimus, vancomycin) and rising creatinine
<input type="checkbox"/>	Elevated drug levels (anti-epileptics): phenytoin (> 30 mcg/ml)
<input type="checkbox"/>	Elevated drug levels (anti-epileptics): oxcarbamazepine (> 45 mcg/ml)
<input type="checkbox"/>	Total bilirubin >25 mg/dL (less than 28 days old)
<input type="checkbox"/>	Hepatotoxic medications and elevated liver enzymes (AST, ALT)
<input type="checkbox"/>	Hypoglycemia (2 mmol/l or 40 mg/dl)
<input type="checkbox"/>	Abrupt medication stop
<input type="checkbox"/>	Flumazenil administration
<input type="checkbox"/>	Ongoing or intermittent laxative use
<input type="checkbox"/>	Naloxone (Narcan) administration
<input type="checkbox"/>	Patient fall
<input type="checkbox"/>	Infiltrations: infiltration/phlebitis documentation
<input type="checkbox"/>	Infiltrations: hyaluronidase administration
<input type="checkbox"/>	Pressure ulcer documentation (> stage 2)
<input type="checkbox"/>	Embolus/Thrombus
<input type="checkbox"/>	Healthcare-associated infections: positive C. difficile test
<input type="checkbox"/>	Oral vancomycin
<input type="checkbox"/>	Healthcare-associated infections: positive blood Cx (only after 48 hours from admission)
<input type="checkbox"/>	Healthcare-associated infections: positive urine Cx (only after 48 hours from admission)

<input type="checkbox"/>	Healthcare-associated infections: Nosocomial Viral Respiratory Infection (only after 48 hours from admission)
<input type="checkbox"/>	Surgical site infection
<input type="checkbox"/>	Hospital readmission within 30 days
<input type="checkbox"/>	Any code or arrest, or rapid response team activation
<input type="checkbox"/>	All inpatient deaths
<input type="checkbox"/>	Drop of Hbg or Hct of > 25% in less than 24 hours
<input type="checkbox"/>	Mechanical ventilation greater than 48 hours post-operatively
<input type="checkbox"/>	Operative time > 6 hours (non-cardiac patients)
<input type="checkbox"/>	Intra-operative epinephrine, norepinephrine or neosynephrine (non-cardiac patients)
<input type="checkbox"/>	Return to surgery
<input type="checkbox"/>	Change in procedure
<input type="checkbox"/>	Readmission to ICU within 24 Hours from discharge/transfer
<input type="checkbox"/>	Transfer to higher level of care
<input type="checkbox"/>	Unplanned endotracheal extubation
<input type="checkbox"/>	Failed endotracheal extubation (reintubation within 24 hrs of planned extubation)
<input type="checkbox"/>	Racemic epinephrine administration (patients mechanically ventilated within last 24 hours)

Harm Severity Level:	1, E: Temporary harm to the patient and required intervention
	2, F: Temporary harm to the patient and required initial or prolonged hospitalization
	3, G: Permanent Harm to the patient
	4, H: Intervention required to sustain life
	5, I: Patient death
Was the harm preventable?	1, Definitely preventable
	2, Probably preventable
	3, Probably not preventable
	4, Definitely not preventable
What was the immediate follow-up response during the 2 hours after the harm?	<input type="checkbox"/> Additional monitoring
(Check all that apply)	<input type="checkbox"/> Change in current medical treatment (eg. Increase dosage, decrease dosage, or stop current medication)

	<input type="checkbox"/> Additional (new) medical treatment (eg. Naloxone for oversedation, D10 (dextrose) for insulin excess, transfusion for procedure related hemorrhage)
	<input type="checkbox"/> Additional procedures
	<input type="checkbox"/> Additional test(s)
	<input type="checkbox"/> Additional consults (describe service/specialty and number of consults)
	<input type="checkbox"/> No change
	<input type="checkbox"/> Other, describe:
Harm Category	<input type="checkbox"/> Medication-related, specify meds:
	<input type="checkbox"/> Procedure-related, specify procedure:
	<input type="checkbox"/> Related to therapy / care other than medication or procedure, specify:
	<input type="checkbox"/> Related to diagnostic testing / data gathering, specify test/exam
	<input type="checkbox"/> Nosocomial infection, describe:
	<input type="checkbox"/> Fall, describe fall:
	<input type="checkbox"/> Other harm category, specify:
Specific Harm Code:	

Specific Harm Codes		
Cardiovascular		
	101	Cardiac Arrest
	102	Hypotension
	103	Hypertension
	104	Low cardiac output
	105	Shock (non-cardiogenic) (hypotension and oliguria or altered sensorium or peripheral hypoperfusion)
	106	Arrhythmias / Conduction Abnormality (new VT, VF, AF, SVT, bradycardia or heart block)
	108	Myocardial infarction/ischemia (ECG changes and/or increased troponin or CK-MB)
	109	Pulmonary edema (Increased [A-a] O ₂ gradient or new CXR clinical findings or PCWP≥18)
	110	Peripheral (extremity) ischemia (absent pulses or skin color and temperature changes)
	199	Other cardiovascular , Specify:
Respiratory		

201	Acute respiratory failure (RR elevated or depressed))
202	Respiratory distress, not acute failure
203	Pneumothorax/hemothorax/SQ air
204	Barotrauma
205	Atelectasis (CXR findings with increased [A-a] O ₂ gradient)
206	Bronchospasm
207	Aspiration (witnessed, with or without CXR changes)
208	Pulmonary Embolus
209	Post extubation stridor
210	R mainstem bronchus intubation
212	Unplanned extubation
213	Reintubation within 24 hrs of planned extubation
299	Other Respiratory, Specify: (note: ventilator-associated pneumonia and other pneumonia is under infections section)
Renal/Fluids/Endocrine	
301	Fluid overload (new CHF, severe edema or increased [A-a] O ₂ gradient associated with IV fluids)
302	Dehydration / Oliguria (urine output <0.5cc/kg TBW > 4 hrs; or CVP < 5 or PAWP < 8 with signs of dehydration)
303	Acute renal failure (increased Creat > 50% with or without oliguria)
304	Metabolic acidosis (HCO ₃ < 20)
305	Metabolic alkalosis (HCO ₃ > 30)
306a	Adrenal insufficiency (Low baseline or ACTH stimulation test cortisol and / or responds to corticosteroid Rx)
306b	Hyperglycemia
307	Hypoglycemia
308	Hyperkalemia
399	Other Renal / Fluids / Endocrine, Specify:
Hematologic	
401	Hemorrhage (Hct ↓ > 5% or needs RBC transfusions)
402	Thromboembolic event - venous
403	Thromboembolic event - arterial

	404	Hematoma
	499	Other Hematologic, Specify:
Gastrointestinal		
	501	Nausea / vomiting
	502	Diarrhea
	503	Constipation
	504	Gastric distension
	505	Pancreatitis
	506	Jaundice / hepatic insult (elevated bilirubin/elevated ALT and/orAST)
	507	Ileus
	599	Other GI, Specify
Neurologic		
	601	Oversedation (drug related)
	602	Delirium / Encephalopathy
	603	Seizures
	604	CVA / Intracerebral hemorrhage
	605	Paralysis / Neuromuscular blocker excess
	606	Obtundation (not drug-related)
	607	Inadequate sedation/anxiolysis
	608	Inadequate analgesia
	609	Withdrawal symptoms
	699	Other neurologic, Specify:
Infectious		
	701	Central line-associated blood stream infection
	702	Sepsis/bacteremia unrelated to catheter
	703	Ventilator-associated pneumonia
	704	Nosocomial pneumonia, not ventilator-related
	705	Catheter-associated UTI
	706	Hospital-acquired viral illness
	707	Surgical site infection
	708	Endometritis
	709	C difficile colitis
	799	Other hospital-acquired infection, Specify:
Surgical / Obstetrical		
	801	Post-operative hemorrhage
	802	Post-operative hematoma
	803	Laceration or other injury of organ
	804	Unplanned removal of organ due to intra-operative injury
	805	Vascular injury

806	Nerve injury
807	Surgical anastomosis failure
808	Wound dehiscence
809	Retained foreign instrument or sponge
810	Failed procedure (e.g., need for revision)
811	Unplanned return to surgery
812	Uterine rupture
813	Major placental abruption
814	Unplanned / emergency hysterectomy
815	Fetal / neonatal complications associated with delivery (e.g. stillbirth, birth trauma, dystocia, unplanned NICU admission)
899	Other surgical or obstetrical, Specify:
Other Categories	
901	Hypothermia (Temperature < 35° C)
902	Pyrexia (Temperature > 39° C)
903	Alcohol or drug withdrawal
904	Allergic Reaction (e.g. rash, hives, anaphylaxis)
905	Fall
906a	Pressure Ulcer
906b	Death
907	Rash (non-allergic)
908	Line Complication
909	Tube complication (chest tube, foley, etc.)
999	Other harm type not listed above, Specify:
Comments:	

Appendix F. Secondary Review Form A
(1 per event)

Incident ID:	
Did patient suffer harm due to medical care?	
Should the adverse event be split into multiple harms?	
Number of suspected harms:	

Following questions repeat for each suspected harm	
Harm Severity Level:	1, E: Temporary harm to the patient and required intervention
	2, F: Temporary harm to the patient and required initial or prolonged hospitalization
	3, G: Permanent Harm to the patient
	4, H: Intervention required to sustain life
	5, I: Patient death
Was the harm preventable?	1, Definitely preventable
	2, Probably preventable
	3, Probably not preventable
	4, Definitely not preventable

If harm was preventable, select one best error category:	
A. Medication-related	1, Wrong medication
	2, Wrong dose
	3, Wrong set limits or administered outside set limits (ordered and/or policy limits)
	4, Wrong rate
	5, Wrong concentration / preparation error
	6, Wrong patient
	7, Wrong duration
	8, Wrong frequency
	9, Known allergy to medication
	10, Drug-drug interaction
	11, Wrong time of day
	12, Omitted medication
	13, Med order not discontinued
	14, Duplicate order / med
	15, Wrong route
	16, Other medication error, describe:

Aa. If harm due to medication: name of drug most likely to have caused the harm:	
B. Procedure-related	1, Wrong procedure performed
	2, Necessary procedure not performed
	3, Wrong site (e.g., wrong-side surgery or procedure)
	4, Wrong patient
	5, Needed equipment or supplies not available
	6, Failure to check equipment
	7, Defective equipment or supplies
	8, Delay in provision or scheduling of service
	9, Inadequate patient preparation
	10, Other procedural error, describe:
C. Related to a therapy/care other than a medication or a procedure. Therapy type:	1, Physical Therapy/Occupational Therapy
	2, Respiratory Therapy
	3, Other therapy, describe:
Ca. If related to therapy:	1, Wrong therapy/care
	2, Necessary therapy/care not performed
	3, Wrong site
	4, Wrong patient
	5, Needed equipment or supplies not available
	6, Failure to check equipment
	7, Defective equipment or supplies
	8, Delay in provision or scheduling of service
	9, Inadequate patient preparation
	10, Other procedural error, describe:
D. Diagnosis-related (delayed, incorrect, or omitted diagnosis)	1, Failure to obtain complete and accurate data from patient history and physical exam
	2, Failure to use indicated tests
	3, Failure to follow-up test results
	4, Failure to act expeditiously on results of tests or findings
	5, Misinterpretation of data obtained from history and physical
	6, Misinterpretation of test results
	7, Other diagnostic error, describe:
E. Nosocomial Infection	1, Catheter-related blood stream infection
	2, Sepsis/bacteremia unrelated to catheter
	3, Ventilator-associated pneumonia
	4, Nosocomial pneumonia, not ventilator-related
	5, Hospital-acquired UTI

	6, Hospital-acquired viral illness
	7, Other hospital-acquired infection, describe:
F. Fall	1, Fall from bed/crib
	2, Fall from chair / wheelchair
	3, Fall while ambulating
	4, Other fall, describe:
G. Other Category	1, Describe other error type:

If harm due to medication, select the category of the drug	
A. Cardiovascular	1, Beta-blockers
	2, Antiarrhythmic
	3, ACE inhibitor
	4, IV Vasodilator
	5, IV Vasoconstrictor / pressor
	6, Inotrope
	7, Diuretic
	8, Digoxin
	9, Other antihypertensive agent
	10, Ca channel blockers
	11, Other CV category, Specify:
B. CNS/Pain/Anxiety	1, Non-narcotic analgesic
	2, Narcotics analgesic
	3, Muscle relaxant
	4, Sedative/anxiolytic
	5, Intravenous anesthetic
	6, Anti-seizure
	7, Other CNS agents
	8, Other CNS/P/A category, Specify:
C. Infectious Disease	1, Antiviral
	2, Antifungal
	3, Antibiotic
	4, Other ID category, Specify:
D. Intravenous Treatments	1, IVF
	2, Electrolyte concentration
	3, Blood products (RBC, plates, FFP)
	4, Colloids (albumin, hetastarch)
	5, Other IV category, Specify:
E. Gastrointestinal	1, TPN
	2, GI-H2 blocker/PPI
	3, Other GI category, Specify

F. Respiratory	1, Inhaled beta agonists
	2, Ipratropium
	3, Inhaled Steroids
	9, Other respiratory category, Specify:
G. Anticoagulant	1, Heparin
	2, LMW Heparin (e.g. Lovenox)
	3, Warfarin (Coumadin)
	4, Thrombolytic agent
	9, Other anticoagulant category, Specify:
H. Other Categories	2, G IIb/IIIa inhibitor
	3, Antitumor
	4, Diabetes
	5, Antidepressant
	6, Antipsychotic
	8, Immunosuppressants
	9, Steroids (non-inhaled)
	10, Diagnostic agent (eg. contrast dye)
	11, Antihistamine
	12, Other category, Specify:
Comments:	

Appendix G. Secondary Review Form B
(1 per event)

Incident ID:	
Did patient suffer harm due to medical care?	
Should the adverse event be split into multiple harms?	
Number of suspected harms:	

Following questions repeat for each suspected harm	
Harm Severity Level:	1, E: Temporary harm to the patient and required intervention
	2, F: Temporary harm to the patient and required initial or prolonged hospitalization
	3, G: Permanent Harm to the patient
	4, H: Intervention required to sustain life
	5, I: Patient death
Was the harm preventable?	1, Definitely preventable
	2, Probably preventable
	3, Probably not preventable
	4, Definitely not preventable
Comments:	

Appendix H. Consensus Form
(1 per event)

Incident ID:	
Did patient suffer harm due to medical care?	
Should the adverse event be split into multiple harms?	
Number of suspected harms:	

Following questions require secondary reviewer consensus	
Incident the harm corresponds to:	
Consensus: Was there harm?	
Consensus: Harm Severity Level	1, E: Temporary harm to the patient and required intervention
	2, F: Temporary harm to the patient and required initial or prolonged hospitalization
	3, G: Permanent Harm to the patient
	4, H: Intervention required to sustain life
	5, I: Patient death
Consensus: Was the harm preventable?	1, Definitely preventable
	2, Probably preventable
	3, Probably not preventable
	4, Definitely not preventable

If harm was preventable, select one best error category:	
A. Medication Related	1, Wrong medication
	2, Wrong dose
	3, Wrong set limits or administered outside set limits (ordered and/or policy limits)
	4, Wrong rate
	5, Wrong concentration / preparation error
	6, Wrong patient
	7, Wrong duration
	8, Wrong frequency
	9, Known allergy to medication
	10, Drug-drug interaction
	11, Wrong time of day
	12, Omitted medication
	13, Med order not discontinued
	14, Duplicate order / med

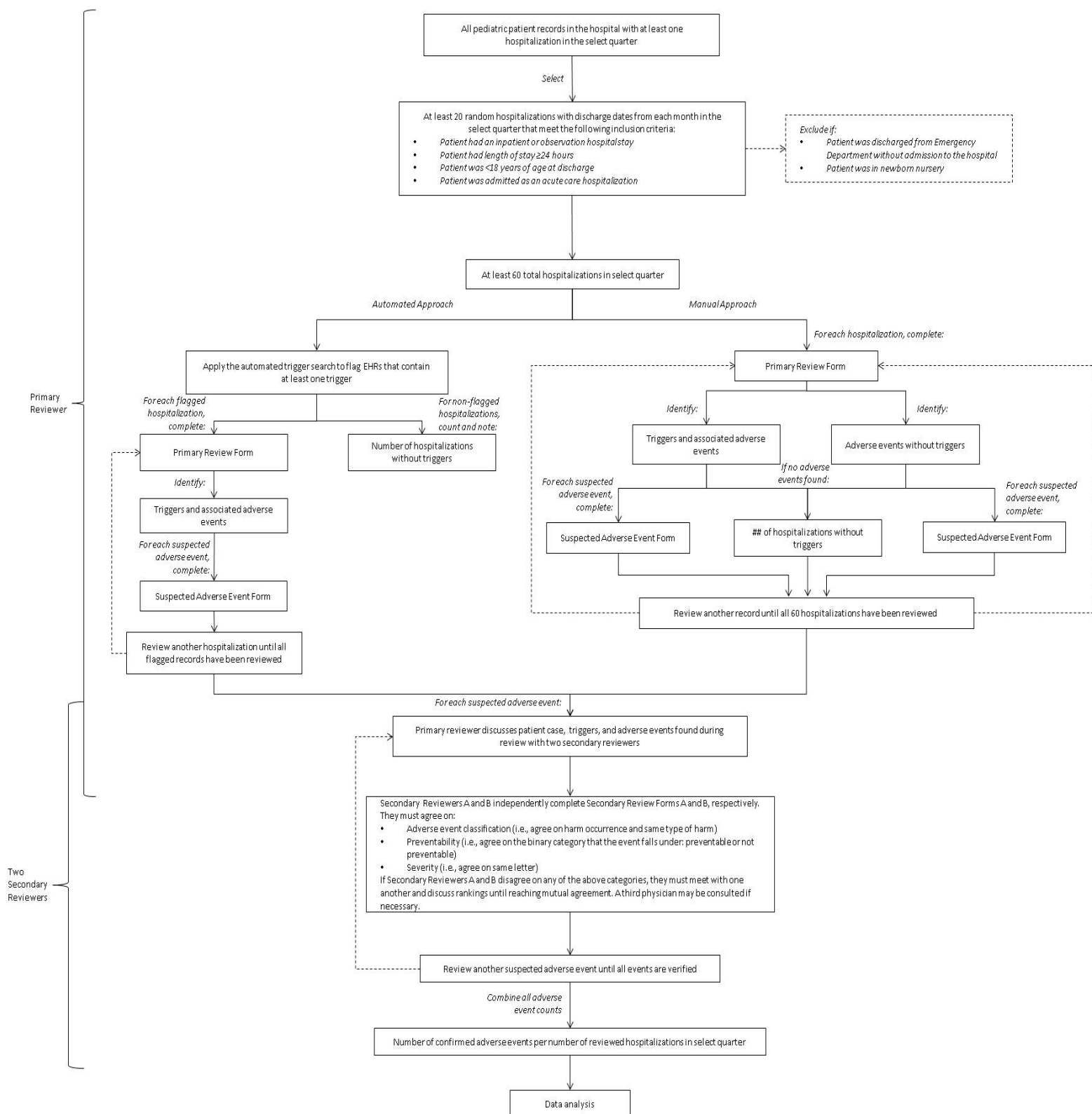
	15, Wrong route
	16, Other medication error, describe:
Aa. If harm due to medication: name of drug most likely to have caused the harm:	
B. Procedure-related	1, Wrong procedure performed
	2, Necessary procedure not performed
	3, Wrong site (e.g., wrong-side surgery or procedure)
	4, Wrong patient
	5, Needed equipment or supplies not available
	6, Failure to check equipment
	7, Defective equipment or supplies
	8, Delay in provision or scheduling of service
	9, Inadequate patient preparation
	10, Other procedural error, describe:
C. Related to a therapy/care other than a medication or a procedure. Therapy type:	1, Physical Therapy/Occupational Therapy
	2, Respiratory Therapy
	3, Other therapy, describe:
Ca. If related to therapy:	1, Wrong therapy/care
	2, Necessary therapy/care not performed
	3, Wrong site
	4, Wrong patient
	5, Needed equipment or supplies not available
	6, Failure to check equipment
	7, Defective equipment or supplies
	8, Delay in provision or scheduling of service
	9, Inadequate patient preparation
	10, Other procedural error, describe:
D. Diagnosis-related (delayed, incorrect, or omitted diagnosis)	1, Failure to obtain complete and accurate data from patient history and physical exam
	2, Failure to use indicated tests
	3, Failure to follow-up test results
	4, Failure to act expeditiously on results of tests or findings
	5, Misinterpretation of data obtained from history and physical
	6, Misinterpretation of test results
	7, Other diagnostic error, describe:
E. Nosocomial Infection	1, Catheter-related blood stream infection
	2, Sepsis/bacteremia unrelated to catheter
	3, Ventilator-associated pneumonia
	4, Nosocomial pneumonia, not ventilator-related

	5, Hospital-acquired UTI
	6, Hospital-acquired viral illness
	7, Other hospital-acquired infection, describe:
F. Fall	1, Fall from bed/crib
	2, Fall from chair / wheelchair
	3, Fall while ambulating
	4, Other fall, describe:
G. Other Category	1, Describe other error type:

If harm due to medication, select the category of the drug	
A. Cardiovascular	1, Beta-blockers
	2, Antiarrhythmic
	3, ACE inhibitor
	4, IV Vasodilator
	5, IV Vasoconstrictor / pressor
	6, Inotrope
	7, Diuretic
	8, Digoxin
	9, Other antihypertensive agent
	10, Ca channel blockers
	11, Other CV category, Specify:
B. CNS/Pain/Anxiety	1, Non-narcotic analgesic
	2, Narcotics analgesic
	3, Muscle relaxant
	4, Sedative/anxiolytic
	5, Intravenous anesthetic
	6, Anti-seizure
	7, Other CNS agents
	8, Other CNS/P/A category, Specify:
C. Infectious Disease	1, Antiviral
	2, Antifungal
	3, Antibiotic
	4, Other ID category, Specify:
D. Intravenous Treatments	1, IVF
	2, Electrolyte concentration
	3, Blood products (RBC, plates, FFP)
	4, Colloids (albumin, hetastarch)
	5, Other IV category, Specify:
E. Gastrointestinal	1, TPN
	2, GI-H2 blocker/PPI
	3, Other GI category, Specify

F. Respiratory	1, Inhaled beta agonists
	2, Ipratropium
	3, Inhaled Steroids
	9, Other respiratory category, Specify:
G. Anticoagulant	1, Heparin
	2, LMW Heparin (e.g. Lovenox)
	3, Warfarin (Coumadin)
	4, Thrombolytic agent
	9, Other anticoagulant category, Specify:
H. Other Categories	2, G IIb/IIIa inhibitor
	3, Antitumor
	4, Diabetes
	5, Antidepressant
	6, Antipsychotic
	8, Immunosuppressants
	9, Steroids (non-inhaled)
	10, Diagnostic agent (eg. contrast dye)
	11, Antihistamine
	12, Other category, Specify:
Comments:	

Appendix I. Flowchart for the GAPPS Method



Appendix J. GAPPS Training Videos

The five GAPPS training videos can be found at the following

link: <http://www.childrenshospital.org/research-and-innovation/research/centers/center-of-excellence-for-pediatric-quality-measurement-cepqm/cepqm-measures/global-tool-of-patient-safety/training-videos>

Appendix K. GAPPS Training Records (Unannotated)

The training for GAPPS is provided in stages. After watching the first training video, trainees are asked to apply GAPPS to 10 example pediatric medical records. While the training records follow the real structure of an actual pediatric hospital, reviewers should keep in mind that the medical records in their institution may use different ordering, abbreviations, and formatting. Consequently, trainees are advised not to focus on the structure or organization of the training records but rather in what scenarios adverse events occur and on what types of information to look for to identify triggers or adverse events. Trainees are encouraged to learn to sample a variety of medical records and be able to identify adverse events with a high degree of reliability.

This section contains ten hospitalization records that should be reviewed prior to attending GAPPS Training Session Two. During the training session, two expert reviewers will talk through all the charts, what areas of the record to pay attention to, and how to use triggers as clues when searching for adverse events. Since there are two versions of the training charts — unannotated hospitalization documents and hospitalization documents with highlighted triggers, key lessons, and adverse events — trainees are advised to use the version of the charts that they find best fits their preferences and learning styles.

A few notes:

- All training charts are fictitious and have no bearings on patients current or past. The charts are supposed to be used for training purposes only.
- The annotated charts can be referred to as many times as necessary for trainees who want to brush up on the GAPPS methodology after undergoing training.
- Both prospective primary and physician reviewers should review these charts to familiarize themselves with the GAPPS methodology.

GLOBAL ASSESSMENT OF PEDIATRIC PATIENT SAFETY TRIGGER TOOL TRAINING RECORD #1

Note Type: Discharge Summary
 Date: May 10, XX 11:15 EDT
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: HADDAD MD, PhD, MARK on May 10, XX 09:41 EDT
 Verified by: TIPTON MD, TARA on June 03, XX 15:41 EDT
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 5/10/XX

*** Final Report ***

DR. BRITNEY FISCHER
 455 WISTERIA LANE
 XXXX, CHICAGO IL USA

Encounter Number XXXX
 Date of Birth Sept 03, XX
 Age 15 years 8 months old
 Gender Male

Your patient, Isaiah Akers, was admitted to County General Hospital on 03/16/XX to the General Pediatrics Firm Floor D Service. The principal admission diagnosis was "RESPIRATORY FAILURE". Consultations during the hospitalization included Speech Pathology, Neurology, Respiratory Therapy, Psychiatry, and Gastroenterology.

Isaiah was discharged on 05/10/XX. The principal discharge diagnosis was "L PNA AND L PLEURAL EFFUSION WITH ASSOCIATED ARDS" which was noted to be resolved. Other discharge diagnoses included "TRISOMY 21" which was noted to be unchanged, "S/P CARDIAC ARREST ON 03/16/XX" which was noted to be resolved, "HYPOTHYROIDISM" which was noted to be unchanged, "SEIZURE DISORDER" which was noted to be unchanged, "SEDATION WEAN" which was noted to be unchanged, and "DECONDITIONING" which was noted to be improved.

There were no recent laboratory results before discharge. There are no tests pending at discharge.

There were no complications during the hospitalization.

Discharge medications:

- * LEVOTHYROXINE: 75 MCG VIA G TUBE DAILY
- * KEPPRA: 475 MG VIA G TUBE BID
- * GLYCERIN SUPPOSITORY: 1 SUPP PR AS NEEDED FOR CONSTIPATION
- * OCULAR LUBRICANT: OPTH 1 APP EVERY 2HR PRN FOR DRY EYES
- * ACETAMINOPHEN: 650MG PR Q4HRS PRN PAIN/FEVER
- * ACETAMINOPHEN: 650MG PGT Q4HRS PRN PAIN/FEVER
- * SODIUM CHLORIDE NEBULIZED: 3ML INHALED Q 4HOURS PRN FOR SECRETIONS
- * RISPERIDONE: 0.125 MG GTUBE Q LUNCH
- * RISPERIDONE: 0.375MG VIA G TUBE Q AM
- * IPRATROPIUM: 0.5MG NEBULIZED TID
- * EUCERIN: 1 APP EVERY TWO HOURS PRN
- * CLONAZEPAM: 0.75MG QAM, 1MG QLUNCH, 1.5MG QPM
- * ALBUTEROL MDI: 2 PUFFS EVERY 4HOURS AS NEEDED FOR WHEEZING
- * RISPERIDONE: 0.375 MG VIA G TUBE Q BEDTIME
- * CLONIDINE PATCH: 200 MCG / DAY WEEKLY FRIDAY
- * BENZOTROPINE: 0.5 MG G TUBE BID
- * LORAZEPAM: 2 MG VIA G TUBE Q 4 HOURS

- * PANTOPRAZOLE: 40 MG VIA G-TUBE DAILY
- * POLYETHYLENE GLYCOL 3350: 17 GRAMS VIA G TUBE DAILY
- * PYRIDOXINE: 50 MG VIA G TUBE DAILY
- * SENNA: VIA G TUBE BEDTIME
- * MELATONIN: 3 MG VIA G TUBE BEDTIME PRN INSOMNIA
- * ZOLPIDEM: 10 MG VIA G TUBE BEDTIME PRN INSOMNIA

Discharge diet:

NUTREN 1.0 AT 80ML/HR WITH WATER AT 15ML/HR FOR 24HRS/DAY TO GIVE
~1920KCAL/DAY, 1.4 G PROTEIN/KG AND 1990ML FREE WATER/DAY

We gave the following instructions to Isaiah and his family:

IF PATIENT HAS RECURRENT RESPIRATORY DISTRESS, INCREASED WORK OF
BREATHING, INCREASED LETHARGY, OR ANY OTHER CONCERNS PLEASE CALL DOCTOR OR
COME TO THE HOSPITAL.

There were no scheduled County General Hospital appointments at discharge.

The discharging provider wrote the following lines regarding this
hospitalization:

Isaiah is a 15 y.o. male with Trisomy 21, seizure disorder and hypothyroidism
and general baseline good health who presented to the PICU as a transport
from Chicago Hope Hospital for increased respiratory distress in the setting
of worsening pneumonia. En route to County General Hospital, he developed
hypotension requiring aggressive fluid resuscitation. When he arrived in the
PICU he had worsening respiratory distress with a failed attempt at NIPPV. In
the setting of induction for emergent intubation, the ETT was inadvertently
inserted into patient's esophagus and he developed a bradycardic arrest,
required 6 minutes of chest compressions and multiple doses of epinephrine
with recovery of spontaneous circulation. He was started on pressors of epi
and dopa and required aggressive ongoing fluid resuscitation. An emergency
CT was also performed due to dilated, nonreactive pupils and poor neuro exam
despite no sedative medications s/p arrest. Head CT was read as normal. He
had ongoing electrolyte derangements, high ventilatory support, and high
pressor requirements.

PMH: Trisomy 21, GERD, G-tube, s/p Nissen, hypothyroidism, aspiration on
liquids

ICU Hospital course per system:

NEURO: Escalating on sedation given increased agitation requiring morphine
and midazolam drips and eventually a clonidine patch. Improved neuro exam
with appropriate responses to care and appropriate agitation, moving all 4
extremities. Continued on keppra and followed daily inpatient by the
neurology ICU consult service. Brain MRI to evaluate post-arrest damage was
read as no change from previous with no sign of stroke or hemorrhage. He was
transferred to the ICP with plans for ongoing sedation wean.

RESP: He was intubated and developed ARDS like physiology. Developed pleural
effusion on left with also likely LLL consolidation, continue with chest PT;
chest tube was placed for effusion. He was eventually extubated to non-
invasive ventilation prior to transfer to the ICP.

CV: Initial ECHO with moderate to severely depressed function with improved
function on the most recent ECHO. Required pressor support and also received
stress dose steroids after low baseline cortisol and borderline low cortisol

stimulation response on 3/24, since then able to wean significantly on dopamine. S/p epinephrine gtt. Off all pressors prior to transfer to the ICP.

F/GI: Initially on PN and IL, advanced to Gtube feeds prior to transfer.

Endocrine: Continue home levothyroxine, received stress dose steroids restarted on 3/24 as noted above.

HEME: INR elevated with fibrinogen 650. Treated with Vit K, no evidence of bleeding. Smear review showed evidence of significant infection. HIT panel was negative - while pending had held heparin out of all fluid, now restarted. Transient thrombocytopenia now improving most likely secondary to sepsis and acute infection.

ID: Initiated on broad-spectrum antibiotics - no pathogen identified. At the time of transfer, he was on Azithromycin day 5/10, zosyn day 9/10 course. Vancomycin dc'd on 3/23 for decreased likelihood of MRSA. Influenza negative. Plan for total of 10 day course of Zosyn and 10 day course of azithromycin but can be discontinued if urine legionella returns negative.

ICP Course (4/30 - 5/03)

CV: HD stable, no concerns during ICP Course

Resp: Isaiah was initially on BiPAP 12/7 while sleeping and was subsequently weaned to CPAP 5 while sleeping on 5/01, then to RA overnight on 5/02, with normal VBGs. He continued to need frequent suctioning for desats down to 70s and 80s, at times as frequently as q30 minutes for a 2 hour period. He was transferred to the floor with plans for ongoing monitoring off oxygen and ongoing suctioning and chest PT.

FEN/GI: Initially on Nutren 1.0 Continuous feeds per his GT. He has a history of a swallow study that cleared him for pureed foods in small amounts, however he was kept NPO due to some difficulty swallowing and pocketing yogurt with initial attempts to take PO on 4/30. Nissen intact on upper GI via Gtube. He was subsequently transitioned to bolus feeds in the daytime on 5/02 which he tolerated well, but kept overnight on continuous due to increased secretions with bolus feeds.

ID: S/p broad spectrum coverage for presumed aspiration PNA (empiric Vancomycin, Zosyn and azithromycin), in setting of ARDS and septic physiology. No active ID issues at the time of transfer.

Endo: Continued levothyroxine at home dose. S/p stress steroids x 2 (during ICU course), with no concern for adrenal insufficiency

Neuro: Seizures stable on Keppra (LEV), which carries many behavioral side-effects for him but has made a huge difference in seizure control, and he is on several medications to improve these. He remains on Risperidone as per home regimen. Pyridoxine has been added as per Neurology/Psychiatry for Keppra rage with good effect. Ativan weaned by 0.5mg/dose every other day (ON EVEN DAYS) to a dose of 5.5 q4 hrs prior to transfer to floor 9S. Plan is, once the total daily dose of 13 to 26 mg per day is reached then the patient will then resume his Clonazepam regimen of 0.75 mg q AM, 1 mg midday, and 1.5 mg at bedtime. The Ativan will then continue to wean to off.

Psych/behavior: Patient needed sitter when family not at bedside; not aggressive but very low functioning. Many of his home medications were

unaltered during his stay in the ICP: melatonin at bedtime, risperidone & pyridoxine for side effects of Keppra. He was monitored for agitation as the lorazepam was weaned down and showed no signs/symptoms of withdrawal.

Other: PT and OT performed co-therapy to work on gross motor skills/deconditioning from prolonged bedrest. RT followed along as well.

Floor Course (05/03 to 05/10)
CV: Stable, no issues.

Resp: Isaiah initially required frequent chest PT and suctioning upon arrival to the floor. Pulmonary was consulted given the severity of this Pulmonary insult. They recommended GI consult to consider the functional integrity of the Nissen, recommended Atrovent, ongoing chest PT, and Pulmonary follow-up at discharge. Over the first 48hrs the suctioning requirements decreased with improvement in his oxygenation. He was stable overnight on room air without need for supplemental oxygen over the entire course of his floor stay. At time of transfer he was being suctioned 2-3x per day.

GI/FEN: Isaiah was transferred from the ICP on near continuous gtube feeds (3hrs on, 1hr off x 4 cycles during the day and then continuous overnight). These were adjusted to full continuous feeds per nutrition recs for increased water and caloric goals. At the time of discharge the family was adjusting his feed rate to allow him several hours off during the day. His goal intake per nutrition was: Nutren 1.0 at 80ml/hr with water at 15ml/hr for 24hrs/day to give ~1920kcal/day, 1.4 g pro/kg and 1990ml free water/day. Can be run faster if he tolerates it. GI consult was obtained and recommended gastric emptying study which the parents declined due to concerns for possible aspiration. Follow-up will be in GI clinic and the clinic should call the parents for an appointment. Clinic phone number is XXX-XXX-XXXX. Isaiah was kept NPO over the entire floor course given concerns for ongoing oromotor dysfunction (though he did pass an MBS), with plan for ongoing evaluation of his oral feeding abilities as an outpatient.

Endocrine: His levothyroxine was continued without issue.

Neuro: His Ativan wean was continued at a decrease of the every 4 hour dose by 0.5mg every other day. When his Ativan dose was reduced to a total of 24mg per day he was transitioned back to his home clonazepam (3.25mg per day total = 13mg Ativan) plus 12mg of Ativan (2mg q 4 hours) per Neurology's recommendations. He is also on clonidine 200mcg patch at the time of transfer. His ongoing sedation wean plan is as follows: Continue to wean the Ativan by 0.5mg per dose every other day on even days (next wean 3/22 to 1.5mg q 4 hours). When Ativan is weaned completely off for 5 days, wean Clonidine off. Reduce to a single 100mcg patch for 1 week, and then discontinue completely. Please contact Dr. Charles Xavier (XXX-XXX-XXXX) for further assistance if needed. Dr. Tipton was in email communication with Isaiah's primary neurologist, Dr. Zhang, and Dr. Xavier to communicate this sedation wean. Additionally, Isaiah continued on his home neuropsychiatric medications at unchanged doses.

Dispo: We worked with the patient care coordinator and Isaiah's family, and ultimately felt that a rehab placement would be optimal for Isaiah's ongoing suctioning, sedation wean, and intensive PT and OT needs. In the meantime, we continued to work with the family and home care companies to arrange in home services.

Isaiah was accepted and transferred to St. Hugh's for ongoing care and recovery from this critical illness. Dr. Tipton spoke with the accepting physician, Dr. Max Eisenhardt to communicate the three major goals of rehab 1) reconditioning 2) sedation wean and 3) advancement of feeding regimen as tolerated. Dr. Tipton also spoke with Isaiah's primary care physician, Dr. Fischer, to discuss Isaiah's floor hospital course, discharge and rehab planning, and planned follow-up as outlined above. Family was comfortable with plans for transfer.

Thank you for allowing us to participate in the care of your patient, and for continuing to refer your patients to County General Hospital.

Attending Physician: Tara Tipton, Phone XXX-XXX-XXXX

Discharging Provider: Mark Haddad, Pager (XXX) XXX-XXXX

IdNote Type: PICU Admission Attending MD
 Date: March 16, XX 04:26 EST
 Status: Auth (Verified)
 Subject: PICU Attending Admission Note
 Created by: NELSON RN, SOPHIA on March 16, XX 04:26 EST
 Verified by: NELSON RN, SOPHIA on March 16, XX 04:26 EST
 Encounter info: XXXX, Hospital, Inpatient, 3/16/XX - 5/10/XX

PICU Attending Admission Note Entered On: 03/16/XX 04:46 EST
Performed On: 03/16/XX 04:26 EST by PATEL MD, NEIL

Attending Admission Note

The patient was admitted to the ICU for: Respiratory failure

Diagnosis and History: Isaiah is a 15 y.o. young man with trisomy 21 who was transferred to County General Hospital from Chicago Hope Hospital with severe respiratory distress. Transported on non-rebreather with sats in the 90's. Patient was agitated and hypoxic and rapidly decompensated upon arrival to the PICU. A rapid sequence intubation was performed. An endotracheal tube was inadvertently placed in the esophagus and not immediately recognized. Patient had extreme hypoxia that led to bradycardic arrest following the intubation with return of spontaneous circulation 6 minutes after epinephrine and chest compressions. Blood pressure fluctuated over the next hour with multiple doses of epinephrine required and eventually placed on epinephrine drip with stable pulses and blood pressures.

Patient was admitted from: Outside facility

. : I have received a handoff from Dr. Zhang, attending physician at the time of transfer.

. : I have personally performed a physical exam

Pertinent Findings Include: Intubated on intermittent sedation.

Pupils 3 mm bilaterally and sluggishly reactive.

Lungs with moderate aeration and coarse rhonchi left more than right.

Abdomen soft

. : I have reviewed the available laboratory data and diagnostic imaging studies

Significant results include: infiltrate left lung on CXR

WBC count 18 with 27% bands prior to admission.

Supervision of Care:

As the patient's attending physician in the intensive care unit, I have personally reviewed the medical record, including available consultant's notes, laboratory reports and imaging data. I have supervised the house staff and fellows in formulation of the treatment plan and directed decision-making.

My assessment is that the patient is in: Critical Condition

Our plan is to: Support blood pressure and perfusion with epinephrine drip.

Continue ventilatory support for respiratory failure.

Continue broad-spectrum antibiotics to cover likely pneumonia.

Communication with: Family

. : CVL and central Aline placed during resuscitation.

. : I, the critical care attending physician in the ICU, have been immediately available to provide full attention to the patient at the bedside and have spent a minimum of 30 min providing direct care-not inclusive of teaching-to this critically ill patient.

Initial Critical Care (1st hr)>60 months: E&M Code XXXX

Critical Care (Subsequent) > 60 months XXXX: 90 minutes

PATEL MD, NEIL - 03/16/XX 04:26 EST

Note Type: ICU Admission Nursing
 Date: March 16, XX 06:28 EST
 Status: Auth (Verified)
 Subject: ICU Admission Nursing Note
 Created by: NELSON RN, SOPHIA on March 16, XX 06:28 EST
 Verified by: NELSON RN, SOPHIA on March 16, XX 06:28 EST
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 5/10/XX

* Final Report *

ICU Admission Nursing Note Entered On: 03/16/XX 07:03 EST

Performed On: 03/16/XX 06:28 EST by NELSON RN, SOPHIA

ICU Admission Nursing Note

Past Medical History: Trisomy 21, seizure disorder, nissen fundus with g-tube, hypothyroid, GERD

Recent Events: 3/15/XX Having URI symptoms with fever so parents brought him to primary care practitioner, who sent him home on Zithromax. Patient vomiting later in evening and having increased trouble breathing. Parent brought patient to Chicago Hope ED in which his RA O2 saturations were 84%. Patient was placed on nonrebreather, CXR obtained showing LLL pneumonia. Chicago Hope transport team called to bring patient to County General. During transport patient became hypotensive, requiring 2.5 liter NS bolus and the initiation of dopamine to 10mcg/kg/hr. On arrival, patient was agitated, attempting to get out of bed, unable to keep blow by, nonrebreather, or CPAP on face. His O2 saturations were in the 70-80's. Attempted CPAP without success. Patient was given dextrose bolus for agitation with no effect. He continued to be agitated and his airway remained unprotected. At this time, Dr. Patel and Dr. Kaylan decided to intubate the patient for airway protection. The patient was given ketamine and rocuronium in preparation for intubation. Dr. Kaylan initially had some difficulty intubating his patient, initially placing the (ETT?) in the esophagus on the first attempt. During intubation, patient had extreme hypoxia leading to a **bradycardic arrest**. Patient was determined to have no pulse, CPR started with 3 rounds of epinephrine given. A pulse was established again. Fluid boluses started. The patient intermittently lost his pulse and required CPR with epinephrine boluses throughout each 3 hour period. Epinephrine drip started after central access was established. A femoral a-line placed. A chest x-ray obtained showed white out on left side.

Review of System: Neuro: Patient received a total of 3mg of midazolam for agitation along with dex bolus prior to intubation. No sedation meds required post bradycardic arrest. Patient pupils initially fixed post bradycardic arrest, but then PERRLA 4/3 sluggishly reactive. Dr. Kaylan and Dr. Andrew made aware. Patient appearing obtunded. Patient has known seizure disorder. No seizure meds given overnight. No seizure activity noted.

Resp: Patient was intubated by Dr. Kaylan. Patient intubated with 6.5 cuffed ETT, retaped 26 at lip overnight. Current settings. Pressure SIMV 21/8 PS 10 rate 24 100% FIO2. LS slightly course with fair aeration throughout. R>L. TV 6-8cc/kilo. ET 20's. O2 saturations 94-98%.

CV: Afebrile tmax 99. Patient was placed on cooling blanket for short period to keep goal core temps 34-36 per Dr. Andrew. HR 110's-150's. NSR. Patient currently on epinephrine drip at 0.4mcg/kg/min, and dopamine at 20mcg/kg/hr to keep goal mean arterial pressures greater than 70. Pt cap refill 4-5 secs. plus two pulses uppers and plus one pulse lowers. ECHO obtained overnight by cardiology. Triple lumen femoral line placed by Dr. Patel. PIV in right hand and left ac. Current IVF D5NS with 20kcl/liter running at 100ml/hr. Electrolytes currently being replaced please see lab section for further charting.

GI/GU: Abdomen soft and rounded. BSx4 absent. Patient with one large stool prior to intubation. Mickey Gtube intact, drainage bag placed for venting prior to intubation. Foley placed overnight. Patient voiding 3c/kilo/hr.

Skin: Mouth extremely dry, cracked, mouth cares completed. Gtube site appears reddened and excoriated. Dad states this appeared at baseline.

Social: Dad at bedside throughout hypoxic, bradycardic arrest, mom at bedside post arrest. Both updated several times by this RN and Dr. Andrew. Mom and Dad both appear weepy. Catholic priest called to bedside this morning per parents' request. Patient was oriented to unit and its rules. We will continue to provide emotional support and reassurance as needed.

NELSON RN, SOPHIA - 03/16/XX 06:28 EST

Note Type: Neurology Consultation
 Date: March 16, XX 12:01 EST
 Status: Auth (Verified)
 Subject: Neurology ICU Consult
 Created by: HOFF MD, JACOB A on March 16, XX 10:40 EST
 Verified by: HOFF MD, JACOB A on March 17, XX 11:40 EST
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 5/10/XX

* Final Report *

Requesting physician (name and service): Floor D County General Medical ICU

Name of neurology attending staffing the consult: Dr. Jacob Hoff

Reason for consultation: Concern for hypoxic brain injury after 6 minute pulseless arrest

History of Present Illness:

Isaiah is a 15-year-old ambidextrous male with trisomy 21, history of infantile spasms and epilepsy (generalized tonic seizures) who was admitted yesterday with suspected pneumonia and hemodynamic instability. He had had cough, runny nose, and increased work of breath for the past 1-2 days. He was intubated today at 2 AM for worsening respiratory status. During this intubation attempt, the ETT was inadvertently placed in the esophagus. During intubation, he endured extreme hypoxia and he became bradycardic, followed by cardiac arrest. He was in pulseless arrest for 6 minutes, during which time chest compressions and epinephrine were administered. He had return of circulation, but shortly thereafter, had 2 subsequent brief episodes of pulses arrest, each lasting less than 1 minute. Lactate was 15. At 6 AM today, he was noted by the PICU team to have fixed and dilated pupils. Non-contrast head CT was obtained, which did not show evidence of ischemic injury. He is not currently receiving sedation. He received ketamine and rocuronium at the time of intubation, and Ativan 4 mg IV around 6 AM this morning, in addition to keppra IV, for seizure coverage while he is NPO. He continues to receive dopamine and epinephrine gtt for blood pressure instability. His most recent sodium is 150. He has been hypothermic, with recent T of 91.

According to his mother, he is non-verbal at baseline but can follow some basic commands. He is able to walk.

He is on klonopin and keppra for seizure management, and is followed by Dr. Nathan Zhang. His mother reports that he has had good seizure control for the past 2 months, with the exception of last week, when he sustained a generalized tonic clonic seizure the day after receiving his flu vaccine. She states that this was one of his more severe seizure episodes.

Past Medical History:

Infantile spasms
 Generalized seizures: tonic
 Trisomy 21
 Hypothyroidism
 h/o pancreatitis

Family Medical History:

Non-contributory to current illness.

Active Medication Orders

Scheduled Medications

azithromycin (azithromycin IV) 500 mg IV 1time Stop: 03/16/XX 11:05 *Com
 azithromycin (azithromycin IV) 250 mg IV 4 dose Q24hr Stop: 03/20/XX 00:14
 hydrocortisone 32 mg IV Q8hr Last admin: 32 mg IV (03/16/XX 09:00)
 levetiracetam 500 mg IV BID Last admin: 500 mg IV (03/16/XX 08:57)
 levothyroxine 40 mcg IV Q24hr *Com Last admin: 40 mcg IV (03/16/XX 10:42)
 oseltamivir 75 mg GTUBE 5 day BID Stop: 03/22/XX 06:00 *Com

piperacillin-tazobactam (Zosyn) 4,125 mg IV Q6hr *Com Last admin: 4,125 mg IV (03/16/XX 09:00)
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) 20 mEq ICU-IV 1time Stop: 03/16/XX 11:01

*Com

ranitidine 60 mg IV Q8hr Last admin: 60 mg IV (03/16/XX 08:57)
 vancomycin 750 mg IV Q8hr *Com Last admin: 750 mg IV (03/16/XX 06:10)

PRN Medications

lidocaine-tetracaine topical (Synera topical film) 2 film TOP 1time PRN Procedure(s) *Com
 midazolam 5.5 mg ICU-IV Q1hr PRN Agitation *Com
 morphine (morphine IV) 5.5 mg ICU-IV Q1hr PRN Pain Last admin: 5 mg ICU-IV (03/16/XX 11:23)

Continuous Medications/Fluids

D5W 1/2NS 500 mL + sodium ACETATE, IVF 37.5 mEq + potassium CHLORIDE, IVF 10 mEq + potassium PHOSPH IV

DOPamine [20.00 mcg/kg/min] + D5W *Com
 epinephrine [0.50 mcg/kg/min] + D5W *Com
 insulin regular [0.01 unit/kg/hr] + NS *Com

Additional Medications Admin within last 24 hours (or since 03/15 12:01)

dexmedetomidine (dexmedetomidine.) Last admin: 55 mcg IV Loading Dose (03/16/XX 00:08)
 hydrocortisone Last admin: 55 mg IV (03/16/XX 02:00)
 lorazepam (Ativan) Last admin: 4 mg IV (03/16/XX 06:01)
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) *Com Last admin: 11 mEq IV (03/16/XX 05:56)
 potassium PHOSPHATE (potassium PHOSPHATE dose (CVL)) *Com Last admin: 15 mmol IV (03/16/XX 06:20)
 sodium chloride 0.9% (NS bolus) Last admin: 500 mL ICU-IV (03/16/XX 08:00)

*Com: Order comment exists. Consult Order Profile or MAR for details

Allergies: Tegretol (Rash)

Physical Examination:

General: Intubated, non-responsive
 CVS: regular rate and rhythm, no murmur, rubs or gallops
 Resp: CTAB in anterior lung fields
 Abd: soft, non-distended
 Ext: WWP, 2+ DP pulses

Neurological

Eyes closed. No spontaneous eye opening. No eye opening with pressure to supraorbital area. PERRL 6->5. Eyes midline and conjugate. No oculocephalic reflex on dolls maneuver. Absent corneal reflex bilaterally. Gag not assessed. No spontaneous movement. No withdrawal to noxious stimuli in the extremities. Biceps, patellar, and ankle reflexes 2+. Toes downgoing.

Labs (Reported 03/15/XX 12:01 - 03/16/XX 12:01)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
03/16 10:18	148	2.32 C	112 H	15 C	23 H	1.1 H	330 H
03/16 07:00	148	2.21 C	111	12 C	26 H	1.2 H	304 H
03/16 04:30	150 H	1.75 C	112 H	12 C	26 H	1.2 H	177 H
03/16 03:35	150 H	1.76 C	113 H	14 C	26 H	1.1 H	121 H
03/16 01:25	140	2.93 C	111	15 C	29 H	1.4 H	108 H

Chem	Ca	Mg	Phos
03/16 10:18	7.8 L	2.0	2.0 L

03/16 07:00	7.5 L	2.1	2.3 L
03/16 04:30	7.6 L	2.0	1.8 L
03/16 03:35	7.5 L	1.9	1.3 C
03/16 01:25	7.8 L	1.9	3.9

LFTs	AST	ALT	Bili T	Bili D	ALK	ALB	LDH
03/16 10:18	73 H	49 H	1.1	0.6 H	83	3.5	
03/16 07:00	66 H	45 H	0.7	0.3	109	2.7 L	351 H
03/16 01:25	27	23	0.3	0.1	94	2.0 L	193

CBC	WBC	HBG	HCT	PLT
03/16 10:18	19.57 H	14.5 H	42.6 H	118 K L
03/16 04:30	22.50 H	16.0 H	47.3 H	210 K
03/16 03:35	21.17 H	15.3 H	45.8 H	231 K
03/16 01:25	17.75 H	12.7	38.9	227 K

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
03/16 10:18	18.1 H	1.77 H	31.9	427 H	549 H	
03/16 04:30	19.7 H	1.94 H	30.8	504 H	617 H	
03/16 01:25	16.8 H	1.63 H	31.5		423 H	

Micro Results: Updates since 03/16 12:01. Collection date displayed.

Viral DFA Respiratory: (Nasopharyngeal Swab) 03/16. **Final Report:** No antigen detected by DFA. This specimen was tested for RSV, Influenza A/B, Adenovirus and Parainfluenza 1,2,and 3.

Diagnostic Studies:

Head CT 03/16/XX: Cortical ribbon appears intact without obscuration of the grey white border. Basal ganglia appear normal signal. No midline shift. 4th ventricle appears patent without compression.

Assessment & Recommendations:

Isaiah is a 15 y.o. male with Trisomy 21 and seizure disorder, admitted for probable pneumonia/sepsis with hemodynamic instability, who sustained a 6 minute episode of pulseless arrest during airway intubation at 2 AM today, followed by 2 subsequent brief episodes of cardiac arrest thereafter. During intubation, his endotracheal tube was inadvertently placed in his esophagus and not immediately recognized. Neurology team consulted when patient was thought to have fixed and dilated pupils at 6 AM. Exam is consistent with a comatose state, without sedative agents on board, but pupils are in fact reactive at this time (08:30 AM). Head CT does not show overt evidence of ischemic injury or cerebral edema.

He is at risk for hypoxic ischemic related brain injury, including cerebral edema, and current exam is suggestive of this. He will require close monitoring. Neurological exams are limited because of his deficits, but pupils should be checked at least hourly.

Recommendations as follows:

1. Frequent serial neurological exams, with hourly pupil checks. If pupils become fixed, then patient should have repeat stat head CT, and page Neuro ICU resident.
2. ICP/hypoxic injury precautions:
 - keep HOB elevated above 30 degrees
 - Maintain sodium above 150, using hypertonic saline and/or mannitol if necessary.
 - Maintain pCO₂ <35
 - Maintain euthermia

3. Continue AED coverage with keppra 500 mg IV BID. Hold benzo and other sedating medications at this time. If patient has evidence of clincial seizure activity, administer Ativan 2 mg IV x1, or versed drip.
4. As per Dr. Hoff, Neurology ICU attending, please consult Neurosurgery with regard to placement of a bolt to monitor ICP pressures.
5. MRI brain when patient stable for travel

Eve Okafor MD
Neurology Resident

Neuro ICU Attending
Exam above carried out by myself and Dr. Okafor. Agree with assessment and plan as above.

Jacob A Hoff, MD

Note Type: Cardiology Consultation
 Date: March 20, XX 20:56 EST
 Status: Modified
 Created by: DELGADO MD, MAYA C on March 20, XX 21:02 EST
 Verified by: DELGADO MD, MAYA C on March 20, XX 21:02 EST
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 5/10/XX

*** Final Report ***
Document Contains Addenda

Requesting physician/service: Floor D PICU/Wazowski

Reason for consultation: 15 y.o. with Down syndrome, pneumonia, septic/hypovolemic shock. Arrest last week required CPR. Patient remains on inotropes, though weaning. Intubated, with low vent settings.

Noted to have some irregular and slower heart rates today; asked to review EKG for concerns of heart block.

Active Medication Orders

Scheduled Medications

azithromycin 500 mg PO daily
 levetiracetam 500 mg IV BID Last admin: 500 mg IV (03/20/XX 09:30)
 levothyroxine 40 mcg IV Q24hr *Com Last admin: 40 mcg IV (03/20/XX 10:29)
 nystatin 5 mL Swish/Swab Q6hr Last admin: 5 mL Swish/Swab (03/20/XX 14:10)
 piperacillin-tazobactam (Zosyn) 4,125 mg IV Q6hr *Com Last admin: 4,125 mg IV (03/20/XX 14:23)
 ranitidine 60 mg IV Q8hr Last admin: 60 mg IV (03/20/XX 18:54)
 vancomycin 750 mg IV Q12hr *Com Last admin: 750 mg IV (03/20/XX 06:55)

PRN Medications

acetaminophen 650 mg PO Q4hr PRN Fever/Pain *Com Last admin: 650 mg PO (03/18/XX 22:30)
 calcium gluconate (calcium GLUCONATE dose (CVL)) 500 mg IV Q6hr PRN Other - See Order Comments
 *Com Last admin: 500 mg IV (03/17/11 10:39)
 lidocaine (lidocaine (buffered) 1% (local anesthesia) order in mL) 0.5 mL ID 3 dose Q1min PRN Procedure(s)
 *Com Last admin: 0.5 mL ID (03/19/XX 12:15)
 lidocaine-prilocaine topical (Emla topical cream) 2.5 g TOP Q3hr PRN Procedure(s) *Com
 midazolam 2.5 mg ICU-IV Q1hr PRN Agitation *Com Last admin: 2.5 mg ICU-IV (03/20/XX 19:10)
 morphine (morphine IV) 3.85 mg ICU-IV Q1hr PRN Pain Last admin: 3.85 mg ICU-IV (03/20/XX 19:57)
 ocular lubricant (ocular lubricant ointment) 1 appl OPTH Q2hr PRN Dry eyes Last admin: 1 appl OPTH (03/18/XX 11:23)

Continuous Medications/Fluids

DOPamine [2.00 mcg/kg/min] + D5W *Com Last rate: 20 mcg/kg/min
 epinephrine [0.03 mcg/kg/min] + D5W *Com Last rate: 0 mcg/kg/min
 fat emulsion 20%, intravenous 432 mL 432 mL IV *Com
 midazolam infusion [0.07 mg/kg/hr] + D5W *Com Last rate: 0 mg/kg/hr
 morphine infusion [0.07 mg/kg/hr] + D5W *Com Last rate: 0 mg/kg/hr
 Parenteral Nutrition 1,440 mL 1,440 mL

Additional Medications Admin within last 24 hours (or since 03/19 20:57)

azithromycin (azithromycin IV) Last admin: 250 mg IV (03/20/XX 11:36)
 hydrocortisone *Com Last admin: 7.25 mg IV (03/20/XX 00:41)
 metoclopramide (Reglan) Last admin: 2.5 mg IV (03/20/XX 09:04)
 midazolam Last admin: 2.75 mg ICU-IV (03/19/XX 18:00)
 morphine (morphine IV) Last admin: 2.75 mg ICU-IV (03/19/XX 17:45)
 potassium CHLORIDE *Com Last admin: 20 mEq ICU-IV (03/20/XX 08:00)
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) *Com Last admin: 11 mEq IV (03/16/XX

05:56)

vecuronium Last admin: 5.5 mg ICU-IV (03/20/XX 13:50)

Labs (Reported 03/19/XX 20:57 - 03/20/XX 20:57)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
03/20 15:00	153 H	3.18 L	115 H	29	23 H	1.0	80
03/20 06:20	154 H	2.67 C	116 H	30	25 H	1.0	122 H
03/20 02:00	154 H	2.85 C	116 H	31 H	25 H	1.0	107 H

Chem	Ca	Mg	Phos
03/20 15:00	8.2	2.1	3.2
03/20 02:00	8.7	2.2	2.5 L

CBC	WBC	HBG	HCT	PLT
03/20 15:00	7.88	11.4	34.8	50 K C
03/20 02:00	10.74 H	11.8	34.2	46 K C

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
03/20 15:00	11.3	1.06		531 H	540 H	
03/20 02:00	11.6	1.10	31.8	570 H	614 H	

Diagnostic Imaging:

EKG (03/20): Sinus arrhythmia with occasional sinus slowing and probable junctional escape. Low amplitude P waves. No heart block noted.

Echo (03/20): Trivial tricuspid regurgitation. Right ventricular pressure ~ 27 mm Hg plus the right atrial v-wave. No mitral regurgitation.

No aortic stenosis or regurgitation. No pulmonary stenosis or regurgitation. Mild biventricular dysfunction. No pericardial effusion.

Assessment & Recommendation:

No evidence of heart block; appears to have sinus rhythm.

Improved ventricular function, consistent with typical course for myocardial depression secondary to sepsis. Agree with continuing to wean inotropes as tolerated.

Maya Delgado
Cardiology Fellow

Seen with Dr. E Pierce, Cardiology Attending

Addendum by PIERCE MD, ERIK R on March 22, XX 04:25 EST (Verified)

Attending: Patient evaluated, ECG reviewed, Echo reviewed, and discussion with ICU staff. I agree with the above findings and recommendations.

Erik Pierce MD

Note Type: Pediatrics Admission MD
 Date: May 03, XX 13:14 EDT
 Status: Auth (Verified)
 Subject: ICP Accept Note
 Created by: HADDAD MD, PhD, MARK on May 03, XX 13:21 EDT
 Verified by: HADDAD MD, PhD, MARK on May 04, XX 02:21 EDT
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 05/10/XX

* Final Report *

History of Present Illness: Isaiah is a 15 y.o. male with T21 and seizure disorder with multiple past admissions for pneumonia who was transferred to County General ICU from Chicago Hope Hospital on 03/16 for worsening pneumonia. He had a difficult course which included accidental insertion of ETT into esophagus initially, followed by cardiac arrest, hypotension requiring pressors, ARDS, and prolonged wean from mechanical ventilation. He is transferred to Floor D PICU from the ICP where he recently weaned from BiPAP to CPAP and came off nighttime CPAP on 5/02 to 5/03 with good morning VBG. He has returned to full feeds of Nutren + water (105mL/hr Nutren + 13mL/hr water 3hrs on/1hr off during the day and 90mL/hr Nutren + 10mL/hr water continuous overnight). He is currently cleared for purees via modified barium, but family is holding until in better physical shape as he did not tolerate well in ICP. He continues on his Synthroid for hypothyroidism. He is s/p antibiotics for PNA. The last active issue for him is a sedative wean.

Past Medical History: Trisomy 21, GERD, G-tube, s/p Nissen, hypothyroidism, aspiration on liquids

Active Medication Orders

Scheduled Medications

benztropine 0.5 mg GTUBE BID Last admin: 0.5 mg GTUBE (05/03/XX 06:27)
 clonidine (clonIDINE TTS-1 patch [2 patches = 200 mcg/day]) clonIDINE TTS-1 patch [2 patches = 200 mcg/day] *Com
 clonidine patch check 1 check TOP Q12hr Last admin: 1 check TOP (05/03/XX 06:00)
 levetiracetam 475 mg GTUBE BID Last admin: 475 mg GTUBE (05/03/XX 06:27)
 levothyroxine 75 mcg GTUBE daily *Com Last admin: 75 mcg GTUBE (05/03/XX 10:02)
 lorazepam 5.5 mg GTUBE Q4hr Last admin: 5.5 mg GTUBE (05/03/XX 10:02)
 pantoprazole (PANToprazole) 40 mg GTUBE daily *Com Last admin: 40 mg GTUBE (05/03/XX 10:02)
 polyethylene glycol 3350 (MiraLax) 17 g GTUBE daily *Com Last admin: 17 g GTUBE (05/03/XX 08:07)
 pyridoxine 50 mg GTUBE daily Last admin: 50 mg GTUBE (05/02/XX 20:10)
 risperidone 0.375 mg GTUBE QAM Last admin: 0.375 mg GTUBE (05/03/XX 06:27)
 risperidone 0.375 mg GTUBE bedtime Last admin: 0.375 mg GTUBE (05/02/XX 20:10)
 risperidone 0.125 mg GTUBE QLunch Last admin: 0.125 mg GTUBE (05/03/XX 10:02)
 senna 10 mL GTUBE bedtime *Com Last admin: 10 mL GTUBE (05/02/XX 20:10)

PRN Medications

acetaminophen 650 mg PR Q4hr PRN Fever/Pain *Com Last admin: 650 mg PR (04/07/XX 16:26)
 acetaminophen 650 mg PO Q4hr PRN Fever/Pain *Com Last admin: 650 mg PO (04/14/XX 06:30)
 aerochamber (Aerochamber (large mask)) 1 EA MDI daily PRN Per nursing assessment
 albuterol (albuterol CFC free 90 mcg/inh inhalation aerosol) 2 puff MDI Q4hr PRN Respiratory Distress *Com
 Last admin: 2 puff MDI (05/02/XX 14:06)
 emollients, topical (Aquaphor topical ointment) 1 appl TOP Q4hr PRN Dry skin *Com
 emollients, topical (Eucerin topical cream) 1 appl TOP Q2hr PRN Dry skin *Com
 glycerin (glycerin Supp Adult) 1 supp PR daily PRN Constipation Last admin: 1 supp PR (05/01/XX 10:14)
 melatonin 3 mg GTUBE bedtime PRN Insomnia Last admin: 3 mg GTUBE (04/27/XX 20:42)
 ocular lubricant (ocular lubricant ointment) 1 appl OPTH Q2hr PRN Dry eyes Last admin: 1 appl OPTH (03/18/XX 11:23)
 zolpidem 10 mg GTUBE bedtime PRN Insomnia Last admin: 10 mg GTUBE (04/27/XX 19:28)

Allergies: Tegretol (Rash)

Social History: Cared for by parents and a cousin, one of whom is usually at the bedside.

Examination:

Gen: lying in bed, awake, playing with toy
 HEENT: dysmorphic facies, dry mouth and lips, no thrush noted
 Neck: full ROM
 Resp: CTA BL
 CV: rrr, nml s1, s2, no murmur
 Abd: soft, ntnd, mild g-tube erythema, no HSM
 Ext: wwp, good pulses, no edema

Basic Vital Signs

Vitals Signs since (05/02 13:15)	24 h min	24 h max	Most recent (Time)
Temperature	35.6	36.7	36.7 (11:58)
Heart Rate	55	96	76 (11:58)
BP Systolic	83	101	101 (11:58)
Diastolic	44	60	56 (11:58)
Respiratory Rate	14	20	20 (11:58)
Oxygen Saturation (SPO2)	78%	99%	97% (11:58)
Percent FiO2	0.21	0.21	0.21 (11:58)

Labs: VBG (Post-CPAPfree night) 7.40/42

Admission Diagnoses:

1. T21
2. Pneumonia
3. GERD
4. Hypothyroidism
5. Sedation wean
6. Seizures

Assessment and Plan: 15 y.o. male with T21 and seizure disorder who is transferred from step down unit having a prolonged and severe (cardiac arrest) ICU course for presumed pneumonia (despite negative BCx). He is now improving. Isaiah is off all ventilatory support, back on full g-tube feeds and s/p antibiotics, and is weaning on sedation.

1. CV: S/p pressors in ICU, 2 rounds stress-dose steroids, echo with mildly decreased function (3/20) resolved by repeat echo 3/31.
 - Continuous monitoring

2. Resp: Last night of CPAP was 5/01, with trial off on 5/02. Follow-up VBG good.
 - Aggressive pulmonary toilet with frequent (q 2-3 hr) suctioning
 - Pulmonary consult - repeat admissions for PNA/ARDS
 - PRN albuterol

3. FEN/GI: now on full feeds via G-tube. Passed modified barium, ok for purees, hold off for now.
 - Nutren + water (105mL/hr Nutren + 13mL/hr water 3hrs on/1hr off during the day and 90mL/hr nutren + 10mL/hr water continuous overnight)
 - Miralax and PRN glycerin suppository for h/o constipation
 - Last electrolytes 5/01 normal

4. Endocrine: hypothyroidism. S/p stress dose steroids, but no underlying adrenal insufficiency
- Continue synthroid at home dosing
5. Heme: no recent blood products. Last H/H 5/01 normal.
6. ID: s/p antibiotics. Blood cultures all negative. Afebrile.
7. Neuro: Post-arrest MRI with no acute changes. Patient was ambulatory before admission. On morphine, midazolam, and clonidine in ICU. Now weaning on Ativan. Has clonidine patch. Keppra for seizures. Will need to restart home clonazepam (used for "Keppra rage") when Ativan partially weaned (see below). Neuro following and recs appreciated re: weaning.
- Continue Keppra for seizures (no seizures in ICU)
- Continue clonidine patch until Ativan weaned
- Wean Ativan: 0.5mg every other day (even days). 5/02 weaned to 5.5mg q 4hrs. Will restart clonazepam (0.75mg qAM, 1mg at noon, 1.5mg qPM) when total daily dose is 13-26mg of Ativan (now 33mg/day)
- continue pyridoxine
- PT for reambulation
8. Psych: On risperdone. PRN melatonin and zolpidem for insomnia. Psych following. Appreciate recs.
9. Dispo: When at respiratory baseline, tolerating feeds, weaned off Ativan back to home clonazepam, and ambulating better.

Dr. Mark Haddad

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #2**

Note Type: Discharge Summary
 Date: September 03, XX 00:00 EDT
 Status: Auth (Verified)
 Subject: Discharge Order Form
 Verified by: QUINTANA PNP, STEPHANIE on September 03, XX 00:00 EDT
 Encounter info: XXXX, Sacred Heart Hospital, Documents, 8/29/XXXX - 9/3/XXXX

*** Final Report ***

ATTENDING PHYSICIAN: Dr. KYLIE BACA

DATE OF BIRTH: 09/24/XX

ADMITTED: 08/29/XX

HOUSE OFFICER:

STEPHANIE QUINTANA

ADMITTING DIAGNOSIS:

LEAKING LUMBAR WOUND

PRINCIPAL DIAGNOSIS:

LEAKING LUMBAR WOUND

SECONDARY DIAGNOSES:

NONE

PRINCIPAL PROCEDURE:

NONE

COMPLICATIONS:

NONE

SUMMARY OF HOSPITAL COURSE:

see dictation per resident

DISCHARGE DISPOSITION:

ROUTINE DISCHARGE

DIET:

REGULAR DIET FOR AGE

LISTED ALLERGIES:

NONE LISTED

MEDICATIONS:

MULTIVITAMIN

1 TAB DAILY

VITAMIN D

PER HOME DOSE

ACETAMINOPHEN

325MG PO Q 4HR PRN PAIN

SPECIAL INSTRUCTIONS:

KEEP OVERALL ACTIVITY LEVEL LOW, LIMIT RUNNING, JUMPING, PUSHING, PULLING OR LIFTING UNTIL FOR AT LEAST 2 WEEKS.

REPORT S/S OF WOUND INFECTION; REDNESS, SWELLING, DRAINAGE AT SITE, FEVER, VOMITING OR ANY PARENTAL CONCERNS TO NEUROSURGERY

F/U IN SPINA BIFIDA CLINIC IN ONE MONTH

PATIENT/FAMILY EDUCATION:

UNSCHEDULED AND EXTERNALLY SCHEDULED APPOINTMENTS:

OREGANO CLINIC

DR TABUCHI

CALL TO SCHEDULE FOR ONE MONTH

TESTS PENDING AT DISCHARGE:

BLOOD CULTURE PRELIM RESULTS NEGATIVE

CONSULTATIONS:

PHYSICAL THERAPY

REFERRING/PRIMARY CARE PHYSICIAN :

DISCHARGING HOUSE OFFICER:

STEPHANIE QUINTANA (BY ELECTRONIC SIGNATURE 09/03/XX)

Note Type: Emergency MD
 Date: August 29, XX 21:43 EDT
 Status: Modified
 Subject: Other
 Created by: TIZAZU MD, MPH, AMARE on August 29, XX 21:52 EDT
 Verified by: TIZAZU MD, MPH, AMARE on August 30, XX 05:41 EDT
 Encounter info: Sacred Heart Hospital, Inpatient, 8/29/XX - 9/3/XX

*** Final Report ***

Document Has Been Updated

Other

Patient: **VARSHNEY, ADITYA**
 Age: **7 years** Sex: **Male** DOB: **9/24/XX**
 Associated Diagnoses: **Disruption of Internal Operation (Surgical) Wound**
 Author: **TIZAZU MD, MPH, AMARE**

Basic Information

Time seen: Immediately upon arrival.
History source: Mother, father.

History of Present Illness

7 y.o. boy with tethered cord, s/p untethering on 8/8/XX, presents with slow leakage of clear fluid from his surgical site since 8 pm today. He has otherwise been at his neurological baseline. No headache, no fever, no mental status changes, no visual changes, no vomiting. On 8/20/XX he was seen in Neurosurgery clinic for a follow-up visit because his mother was concerned that there was a bulge at the surgical site; on exam this appeared to have resolved. He has a history of myelomeningocele repaired at birth, a history of VP shunt (now disconnected), and spastic diplegia, and lacks bowel or bladder control at baseline.

Review of Systems

Constitutional symptoms: denies fever.
Eye symptoms: denies recent vision problems.
ENMT symptoms: denies ear pain.
Respiratory symptoms: denies shortness of breath.
Cardiovascular symptoms: denies chest pain.
Gastrointestinal symptoms: no abdominal pain.
Genitourinary symptoms: Negative except as documented in HPI.
Musculoskeletal symptoms: no Neck pain.
Neurologic symptoms: no headache.
Psychiatric symptoms: Negative except as documented in HPI.
Endocrine symptoms: Negative except as documented in HPI.
Hematologic/Lymphatic symptoms: Negative except as documented in HPI.
Allergy/immunologic symptoms: Negative except as documented in HPI.
Additional review of systems information: All other systems reviewed and otherwise negative.

Health Status

Allergies: .

Allergic Reactions (All)

Severity not Documented

Chocolate- Diarrhea.

Lactose intolerance- Diarrhea.

Medications: had been taking ditropan; discontinued this past week due to headaches.

Past Medical/ Family/ Social History

Medical history

Neurological: cerebral palsy, spina bifida, tethered cord.

Physical Examination

Vital signs: Vital Signs,

8/29/XX 21:00 EDT

Temperature	35.4 DegC	LOW
Temperature Route	Tympanic	
Heart Rate	80 bpm	
Pulse Source	Apical	
Respiratory Rate	24 br/min	
Systolic Blood Pressure	111 mmHg	
Diastolic Blood Pressure	69 mmHg	
Blood Pressure Method	Automated	
Blood Pressure Location	Left upper	

8/29/XX 20:59 EDT

Temperature	35.4 DegC	LOW
Temperature Route	Tympanic	
Systolic Blood Pressure	111 mmHg	
Diastolic Blood Pressure	69 mmHg	
Blood Pressure Method	Automated	
Blood Pressure Location	Left upper	
Vital Signs Posture	Sitting	

Measurements.

8/29/XX 21:00 EDT

Weight	22.000 kg
Weight for calculation	22.000 kg

8/29/XX 20:59 EDT

Weight	22.000 kg
--------	-----------

General: Alert. cooperative. smiling. interacting. playing.

Skin: Warm. dry. pink. intact.

Head: Normocephalic. atraumatic.

Neck: Supple

Eye: Pupils are equal, round and reactive to light. extraocular movements are intact. normal conjunctiva. no discharge.

Ears, nose, mouth and throat: Oral mucosa moist. No pharyngeal erythema or exudate.

Cardiovascular: Regular rate and rhythm. No murmur.

Respiratory: Lungs are clear to auscultation

Back: 1x small drop of clear fluid leaking from surgical site

Chest wall

Gastrointestinal: Soft. Nontender. Non distended.

Genitourinary

Neurological: Alert. CN II-XII intact. neuro exam at baseline with minimal movement of RLE and small movements or LLE.

Psychiatric: Cooperative. appropriate mood & affect.

Medical Decision Making

7 y.o. boy with cord tethering on 8/8/XX presents with likely CSF leak from surgical site. Asymptomatic and neurologically at baseline. Admit to neurosurgery for MRI and surgical exploration.

Impression and Plan

Complaint of Disruption of Internal Operation (Surgical) Wound (ICD9 998.31, Discharge, Medical)

Plan

Condition: Unchanged.

Disposition: Admit: Neurosurgery.

Addendum

Teaching-Supervisory Addendum-Brief

I participated in the following activities of this patient's care: the medical history, the physical exam, medical decision making.

I personally performed: supervision of the patient's care, the medical history, the physical exam.

The case was discussed with: the resident.

Evaluation and management service: I agree with the evaluation and management decisions made in this patient's care.

Results interpretation: I agree with the study interpretation in this patient's care.

Notes: 7 yo hx spinabifida, hydrocephalus, recent spinal surgery for tethered cord several weeks ago today parents noted clear fluid from suture lines. No fevers acting well otherwise here for evaluation. Details of hx as above. On exam is afebrile well appearing, EOMI, PERRL, chest is CTA, there is RRR no murmur, the belly is soft and non-tender, the suture line on back is intact minimal erythema. There is bilateral weakness of the lower extremities which is at baseline per parents. Seen by neurosurgery. Plan is for MRI then admission for possible exploration and repair. I have verified that the neurosurgical attending is aware of the patient and agrees with the plan.

I have transferred care to my colleague Dr. Bennett.

Amare Tizazu,

No events while waiting transfer to the floor. TR Bennett, MD

Note Type: Nursing Admission Assessment.
 Date: August 30, XX 01:15 EDT
 Status: Auth (Verified)
 Subject: Nursing Admission Assessment
 Created by: MARTINEZ RN, PAULA T on August 30, XX 01:15 EDT
 Verified by: MARTINEZ RN, PAULA T on August 30, XX 01:15 EDT
 Encounter info: XXXX, Sacred Heart Hospital, Inpatient, 8/29/XX - 9/3/XX

Nursing Admission Assessment Entered On: 08/30/XX 01:21 EDT
Performed On: 08/30/XX 01:15 EDT by MARTINEZ RN, PAULA T

Weights and Measurements

Initial Measures Documented on Flowsheet : Yes

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Patient Profile

Admitted From: ER

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Contact Info During Admission Grid

<i>Name :</i>	Pooja Varshney	Prashanth Varshney
<i>Relationship :</i>	Mother	Father
<i>Cell Phone :</i>	XXX XXX-XXXX	XXX XXX-XXXX
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Individuals Living with Patient Grid

<i>Name :</i>	Sister
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Languages : English

Interpreter Needed - Patient : No

Interpreter Needed - Parent : No

MARTINEZ, RN PAULA T - 08/30/XX 01:15 EDT

Specialist Grid

<i>Name :</i>	F O'Connor	A Uribe	D Metz	B Hayes
<i>Specialty :</i>	neurosurg	uro	CCS	ortho
<i>Location :</i>	SHH	SHH	SHH	SHH
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

<i>Name :</i>	L Douglas
<i>Specialty :</i>	primary
<i>Location :</i>	SHH
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Allergy History

Allergies (Active)

Chocolate

Estimated Onset Date: Unspecified ; *Reactions:* Diarrhea ;
Created By: DOUGHERTY RN, KAREN B ; *Reaction Status:*
Active ; *Substance:* Chocolate ; *Updated By:* DOUGHERTY
RN, KAREN B ; *Reviewed Date:* 08/29/XX 21:43 EDT

Lactose intolerance

Estimated Onset Date: Unspecified ; *Reactions:* Diarrhea ;
Created By: DOUGHERTY RN, KAREN B ; *Reaction Status:*
Active ; *Substance:* Lactose intolerance ; *Updated By:*
DOUGHERTY RN, KAREN B ; *Reviewed Date:* 08/29/XX 21:43
EDT

Latex

Estimated Onset Date: Unspecified ; *Created By:* MARTINEZ
RN, PAULA T ; *Reaction Status:* Active ; *Substance:* Latex ;
Type: Allergy ; *Updated By:* MARTINEZ RN, PAULA T ;
Reviewed Date: 08/30/XX 01:16 EDT

Transfusion History

Transfusion History : No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Communicable Disease Screening

Mumps Exposure History

Chicken Pox : No known exposure, Immunized/Had illness

Measles : No known exposure, Immunized/Had illness

Mumps : No known exposure, Immunized/Had illness

Pertussis : No known exposure, Immunized/Had illness

Rubella : No known exposure, Immunized/Had illness

Other : No known exposure, Immunized/Had illness

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Immunizations Current : Yes

Precautions for Current Encounter : Standard Precautions Only

Antibiotic Resistant Organism - Patient : No

Antibiotic Resistant Organism - Family Member : No

TB (exposure) : No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Pain Review

Pain Questions answered by : Patient with Parent/Guardian

Painful Experiences : Yes

Painful experiences text : past procedures

Pain Relief : Acetaminophen like drug (Tylenol)

Patient In Pain Now : No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Reason for Admission/ Past Medical History

Arrival Time to Floor : 08/30/XX 01:05 EDT

Admitting Location : Floor C-5

Reason for Admission : CSF leak

Past Medical History : 7 year old myelo with shunt placed at birth. Untethering done 8/8/XX, returns with clear drainage from wound.

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

General Med/Surg History

Chief Complaint : repair leak

History of Present Illness - Parent : leakage noted today when getting up to bathroom

Concerns About Hospitalization : none

Suggestions for Care - Parent : no

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Past Surgical History Grid

<i>Surgery Description :</i>	Other: closure of spina bifida	Other: hydrocephalus shunt
<i>Surgery Date :</i>	9/24/XX	x2 first week of life
<i>Comment :</i>	OSH ?Michigan	
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Fall Risk Screen

Patient Greater than 1 Year Old : Yes
Length of Hospital Stay : 1-4 days (0)
IV/ Heparin Lock : Yes (0)
PT/OT- Recent Past, Current, Near Future : Yes (1)
Anti-Seizure Medications- For Any Reason : No (0)
Acute/Chronic Ortho/Musculoskeletal Dx : Yes (1)
History of Fall Within the Past Month : No (0)
Fell During This Hospitalization : No (0)
Fall Risk Total Score : 2
Education Completed : Yes

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Suicide Risk Screen

Current Behavioral/Emotional Treatment : No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Functional Health Patterns- Part 1

Diet : Regular, Age Appropriate

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Nutritional Screen

Failure to Thrive : No
Malnutrition : No
Eating Disorder : No
Metabolic Disease : No
New Onset DM : No
Special formula > 24 Kcal/oz : No
NPO >3 days prior to admission? : No
Multiple food allergies - 2 or more : No
TPN Feedings : No
Significant Weight Loss or Weight Gain : No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Nutrition/Metabolic Details : Open
Toileting Pattern : Straight catheter
Elimination Details : Open
Problems Sleeping : None
Sleep/Rest Details : Open

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Bathing : Self
Dressing : Self
Mobility : Self
Feeding : Self
Toilet : Assist

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Activity/Exercise Details : Open

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Functional Screen

New Weakness, Atypical Movement, Deformity : No

Parent States Level Not Age Appropriate : No
Cardiopulmonary Issues Requiring PT : No
Fracture Risk Screen Risk Factors : Cerebral palsy or myelomeningocele
Fracture Risk Screen Total Score : 1

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Functional Health Patterns- Part 2

Patient a Newborn and Never Been Home : No
Speech Issues : No
Hearing Issues : No
Visual Issues : No
Cognitive/Perceptual Details : Open
Adult Staying with Child at Hospital : parent
Threats of Harm : No
Coping Stress Details : Open

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Substance Use

Tobacco Use/Exposure : None
Substance Use/Exposure : None

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Value Belief Pattern

Religious/Spiritual Preference : Unable to collect
Chaplaincy Visit During Stay : No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Discharge Planning Needs

Formal/Informal Support Systems at Home : Yes
Any Existing Services at Home? : No
New/Additional Services Needed at Home : No
Tracheostomy : No
Medical/Surgical Devices Used at Home : No
Car Seat Child Under the Age of 8 Years : Yes, under 8 years old
Education Needs For Discharge : Defer to service, Discharge instructions, Disease process, Equipment, Medications, Pain management, Rehab techniques, Wound care
Learning Style - Patient : Explanation from parent/guardian
Learning Style - Parent/Guardian : Verbal explanation/instruction, Written explanation/instruction

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Admission Checklist

Physical Assessment Complete : Yes
Pressure Ulcer Present Upon Arrival : No
Informant : Mother, Father
Consent Signed : Yes
Advanced Directive in Chart : No
Parent ID Obtained : Yes
Unit Overview/Handouts Provided : No
Visitor Policy Reviewed : Yes

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Problem List

Diagnoses (Active)

Disruption of Internal Operation (Surgical) Wound *Date:* 08/29/XX ; *Diagnosis Type:* Discharge ; *Confirmation:* Complaint of ; *Clinical Dx:* Disruption of Internal Operation (Surgical) Wound ; *Classification:* Medical ; *Clinical Service:* Non-Specified ; *Code:* ICD-9-CM ; *Probability:* 0 ; *Diagnosis Code:* 998.31

Other *Date:* 08/29/XX ; *Diagnosis Type:* Reason For Visit ; *Confirmation:* Complaint of ; *Clinical Dx:* Other ; *Classification:* Medical ; *Clinical Service:* Emergency medicine ; *Code:* SNOMED CT ; *Probability:* 0 ; *Diagnosis Code:* 124502016

Nutrition/Metabolic Pattern

Appetite : Good

Feeding Ability : Self

Swallowing Difficulty : None

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Elimination Pattern

Voiding Difficulties : Other: intermittent straight cath, 5xday

Stooling Difficulties : Other: incontinent

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Sleep/Rest Pattern

Where Does Child Sleep : Bed

Does Child Sleep Alone : Yes

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Activity/Exercise Pattern

Ambulatory Devices History : Other: AFOs

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Cognitive/Perceptual Pattern

Cognitive Developmental Concerns : No

Special Learning Needs : None

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Coping Stress Tolerance Pattern

Stressors : None

Adequate Support Systems Available : Yes

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Car Seat Safety Screen

Parent/Guardian Available : Yes

Car Seat Yes or No : Yes

Car Seat New : Yes

Car Seat Crash : No

Car Seat Leaving : No

Car Seat Information : No

Car Seat Request : No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Note Type: Neurosurgery Consultation
 Date: August 30, XX 00:38 EDT
 Status: Modified
 Subject: Neurosurgery Consultation in ED
 Created by: GOLDSTEIN MD, FRANK on August 30, XX 00:40 EDT
 Verified by: GOLDSTEIN MD, FRANK on August 30, XX 00:40 EDT
 Encounter info: XXXX, Sacred Heart Hospital, Inpatient, 8/29/XX - 9/3/XX

*** Final Report ***
Document Contains Addenda

REQUESTING PHYSICIAN/SERVICE: ER

PHYSICIAN/ATTENDING REQUESTING CONSULT: Addison

REASON FOR CONSULT/VISIT: Leaking wound

DATE OF VISIT: 08/29/XX

PRESENTING COMPLAINT: Leaking wound

HISTORY OF PRESENT COMPLAINT:

This is a delightful 7YO RHM well known to our service. Briefly, he had myelomeningocele closed at birth and had undergone placement of a ventriculoperitoneal shunt in the first week of life. He has had most of his care at either All Saints Hospital in Michigan or in Indiana where the family had lived previously. He did not appear to be shunt dependent pre-operatively. A spine MRI demonstrated no hydromyelia aside from a small distal syrinx near the tethered end of his spinal cord.

His pre-operative symptoms included some signs directly related to a distally tethered spinal cord; including a mild scoliosis of around 20 degrees, some mild interning of one foot, and a change in his gait which was marked by increased waddling with his exaggerated Trendelenburg type of gait. Urodynamic studies have demonstrated direct evidence of ongoing lower motor neuron loss which was felt to be virtually pathognomonic for distal tethering. He had pre-operative diminished sensation in his groin and buttocks as well as difficulty sensing when he needed to urinate or move his bowels. Indeed, he was self-catheterizing at home with the help of his parents. It was elected to proceed with untethering of the spinal cord. The MRI scan had demonstrated what appeared to be a tightly tethered distal cord with a dorsal spinal cord plastered up against the last intact lamina rostral to the spina bifida defect and a distal syrinx.

He was admitted for detethering on August 8-12. He had an uncomplicated surgery and a routine hospital stay. Post-op outpatient follow-up August 20 demonstrated some swelling about the incision-site, but no drainage or indication of infection. In fact, the wound looked to be healing well. He has continued to do well in the post-operative period per his parents present at the bedside in the ER. In fact, his level of activity may be too high at times as they have had to try and limit his activity. He has been running around without his braces and running up and down the steps at home and even has had an occasional fall onto his bottom. Both parents were excited

following surgery when he was able to communicate the sensation of needing to void or have a BM, but they feel that lately he has not been able to tell them as frequently. Additionally, he had 2-3 days of headache earlier in the week associated with some nausea, but it is difficult for them to say in hindsight whether there was any positionality to them although Aditya does note they improved when he awoke from napping with them. Earlier this evening for the first time, while he was straining to use the bathroom, the family noticed clear fluid leaking from incision worse with straining. They called into the hospital and I asked them to come in to the ER. They deny any headache for the last 2 days, back pain, fever, chills or vomiting and his strength and bowel/bladder function are as above.

PAST MEDICAL HISTORY AND REVIEW OF SYSTEMS:

1. L3-4 spina bifida.
2. Hydrocephalus s/p VPS in XX year
3. Right hip dysplasia.
4. Scoliosis.
5. tethered cord s/p detethering 8/8/XX
6. neurogenic bladder retention requiring straight catheterization at home

Active Medication Orders

PRN Medications

lidocaine-tetracaine topical (Synera topical film) 1 film TOP 1time PRN Procedure(s) *Com

*Com: Order comment exists. Consult Order Profile or MAR for details

Allergies: **Unclassified:** Chocolate (Diarrhea), Lactose intolerance (Diarrhea)

IMMUNIZATIONS: UTD

SOCIAL AND FAMILY HISTORY: Lives at home with both parents and older sister. Home schooled.

PHYSICAL EXAMINATION:

alert, awake and oriented

CN grossly intact

No signs of meningismus

No drift of upper extremities

lower extremity exam in detail (R/L):

hip flexors 4+/4+

knee extensors 4/4

dorsiflexors 1/4-

plantarflexors 1/1

sensation diminished in the groin and over the buttocks to PP/LT with some reconstitution distally over the calves/shins and minimally in the feet L>R.

reflexes are trace bilaterally

toes downgoing

wound looks intact

healing well without evidence of infection

no obvious drainage on inspection

on palpation there are multiple small areas of clear fluid drainage in drops that worsen slowly after I sit Aditya up. There is no tenderness, major swelling or erythema and multiple sutures are still present and intact.

No Lab Results

No Micro Results in past 24 hours

DIAGNOSTIC STUDIES:

ASSESSMENT: 7 YO M, recent detethering procedure 8/8/XX with approximately 3 hour history of leaking incision; neurologically likely at baseline to slightly improved per patient's parents. Impression is that of pseudomeningocele versus subcutaneous seroma versus persistent CSF leak without evidence of superficial infection or CNS involvement. Given that the patient has known deficit in the area that may be affected by any possible fluid collection it is prudent to obtain imaging. The wound will likely need to be over sewn versus revised and in the interim we will obtain imaging, draw labs, observe neurologically.

PLAN:

- admit to Neurosurgery Floor C-3
- MRI L spine +/- Gad
- pre-op labs
- NPO overnight
- neuro obs
- will hold abx for now
- lay flat
- may require bedside oversewing of the wound (will dose pre-procedural abx for this)

I did discuss this plan with the neurosurgery senior resident on call who in turn discussed the plan with Dr. Baca and this document reflects his evaluation and plan of care. This information was communicated to the family and all questions were answered. The emergency room staff was told of our evaluation and plan of care; everyone verbalized understanding and agreement with this plan.

Frank Goldstein MD
Neurosurgery

ATTENDING NOTE:

Addendum by BACA MD, KYLIE P on August 30, XX 07:57 EDT (Verified)

Agree with plan and management entirely. The sutures placed this morning by Dr. Goldstein seem to be holding well, no leak. Spoke with Dr. Tabuchi, who prefers keeping him flat through weekend. I discussed the issues in detail with parents, who understand well what is at stake and agree with plan. KPB

Note Type: Neurosurgery Inpatient MD
 Date: September 03, XX 06:52 EDT
 Status: Auth (Verified)
 Created by: BERGSTRAND MD,GISELLE on September 03, XX 06:52 EDT
 Verified by: TABUCHI MD, AKIO on September 03, XX 10:00 EDT
 Encounter info: XXXX,Sacred Hospital, Inpatient, 8/29/XX - 9/3/XX

*** Final Report ***

INTERVAL HISTORY: No overnight events.

Extended Vital Signs

Vitals Signs since (09/02 06:51)	24 h min	24 h max	Most recent (Time)
Temperature	35.5	37.1	35.5 (03:00)
Temperature Route			Axillary (03:00)
Heart Rate	64	94	68 (03:00)
Respiratory Rate	18	20	18 (03:00)
Systolic Blood Pressure	103	114	103 (03:00)
Diastolic Blood Pressure	41	62	50 (03:00)
Mean Arterial Pressure (Device)			73 *09/02 10:00*
Blood Pressure Location			Left lower (03:00)
Blood Pressure Method			Automated (03:00)
Vital Signs Posture			Supine (03:00)
Observations/Comments			playroom *09/02 14:00*

No Lab Results

No Micro Results in past 24 hours

DIAGNOSTIC STUDIES:

Input/Output (Daily totals are 0:00-23:59)

I&O	09/02/XX - 09/02/XX	09/03/XX as of 06:51
In: PO	1080	0
In: enteral total	1080	0
In: TOTAL	1080	0
Out: urine	675	0
Out: TOTAL	675	0
Balance: TOTAL	405	0

Active Medication Orders

Scheduled Medications

docusate 50 mg PO BID Last admin: 50 mg PO (08/31/XX 07:52)
 senna 5 mL PO BID *Com Last admin: 5 mL PO (08/31/XX 07:52)

PRN Medications

acetaminophen 325 mg PO Q4hr PRN Fever/Pain *Com Last admin: 325 mg PO (09/01/XX 11:25)
 bisacodyl 5 mg PR daily PRN Constipation

lidocaine-tetracaine topical (Synera topical film) 1 film TOP 1time PRN Procedure(s) *Com
morphine (morphine IV) 2.2 mg IV Q4hr PRN Pain Last admin: 2 mg IV (08/30/XX 02:30)

Continuous Medications/Fluids

D5W NS 1,000 mL + potassium CHLORIDE, IVF 20 mEq IV *Com Last admin: 55 mL IV (08/30/XX 07:59)

*Com: Order comment exists. Consult Order Profile or MAR for details

PHYSICAL EXAM: AVSS

sleeping but awoke easily

EOMI

FSM

maex4

I/C/D/I.

ASSESSMENT & PLAN: This is a 7 yr old with CSF leak s/p recent detheling. He also has a h/o myelomeningocele.

Clinically he is doing well with no s/o CSF leak. Our plan is as follows:

--Continue mobilization

--d/c later today once patient seen by Dr Tabuchi

ASSESSMENT & PLAN:

ATTENDING NOTE:

Aditya has been up and around now for 2 days, after several days of being flat. He remains without headache or any sign of leak. In the upright position there is no palpable subcutaneous fluid collection and no fullness. There is no hint of leak. He feels great, wants to go home, and has had no fever. They will go home today with the understanding that if there is another episode of leakage we will plan to take him to surgery for exploration and repair.

Akio Tabuchi MD
Attending Neurosurgeon

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #3**

Note Type: Discharge Summary
Date: June 31, XX 08:00 EDT
Status: Auth (Verified)
Subject: Discharge Summary
Created by: GUSTAFSON PA, NATALIE M on June 30, 20XX 10:40 EDT
Verified by: BARR MD, RON C on July 12, 20XX 13:19 EDT
Encounter info: XXXX, Community General Hospital, Inpatient, 6/26/XX - 6/31/XX

*** Final Report ***

DATE OF ADMISSION: 06/26/XX.

DATE OF DISCHARGE: 06/31/XX.

SERVICE: Otolaryngology.

ATTENDING PHYSICIAN: Barr, Ron C, MD.

HISTORY OF PRESENTING ILLNESS: This 14-year-old presents to the emergency room complaining of left neck pain that began four days ago. She also reports fever for a few days with maximum temperature of 101F. She complains of fatigue and myalgias in the legs and arms. She was seen at an outside hospital two days prior to admission, where a CT scan showed a 1 x 1.5 fluid accumulation in the left sternocleidomastoid muscle area. At that time, her white blood cell count was 14, and Monospot testing was negative. She was sent home on oral antibiotics and was followed up by her pediatrician, who referred her to the Community General Hospital Emergency Department for evaluation. Of note, the patient had recently returned from a 3-week trip to Costa Rica and did not take malaria prophylaxis.

MEDICAL HISTORY: Noncontributory.

SURGICAL HISTORY: Tympanostomy tube placement.

ALLERGIES: NO KNOWN DRUG ALLERGIES.

SOCIAL HISTORY: She lives at home with her family.

FAMILY HISTORY: Noncontributory.

PHYSICAL EXAMINATION: Temperature 36.4C, pulse 90, respiratory rate 18, blood pressure 109/56.

General appearance -- She is in no acute distress and is well developed and well nourished.

HEENT -- Normocephalic, atraumatic. Tympanic membranes are intact. No tonsillar enlargement or exudate. No oral mucosal lesions. No stridor. Neck is supple, with the left side over the sternocleidomastoid area showing edema and mild warmth but no erythema or induration. There is mild tenderness to palpation.

HOSPITAL COURSE: The patient was started on intravenous vancomycin and intravenous Unasyn. An otolaryngology consultation was obtained, and a CT

scan of the neck was performed, demonstrating left posterior neck abscess. After reviewing the CT scan, the decision was made to perform needle drainage of the neck abscess. A small amount of thick pus was collected and sent for culture. Wound cultures demonstrated scant skin flora and a few Staphylococcus aureus. After needle drainage of the abscess, the patient was transferred to the surgical floor and continued on intravenous antibiotics with continued monitoring.

Despite being on antibiotics, the patient continued to have daily fevers, so a repeat ultrasound was obtained on 06/28/XX. The ultrasound suggested phlegmon with no definitive abscess seen in the left posterior neck area. The decision was made to continue intravenous antibiotics and watch for improvement. An Infectious Disease consult was also obtained. On 06/29/XX, the patient again spiked with a maximum temperature of 38.7C. Due to relatively slow clinical improvement, the decision was made to bring the patient back to the operating room for incision and drainage of the area. The area was incised, and pus was drained. Please see the operative note for details. Wound cultures were sent, and a Penrose drain was placed to facilitate drainage in the postoperative period. The patient slowly began to clinically improve. Drain output decreased, and the drain was discontinued on postoperative day #2 after the incision and drainage. She was transitioned to oral antibiotics and was deemed ready for discharge home on 06/31/XX. A ten-day course of oral Augmentin will continue.

DISPOSITION: Home.

CONDITION ON DISCHARGE: Good.

DISCHARGE INSTRUCTIONS: The parents were advised to return to the emergency department if the patient develops fever, increased drainage from the neck site, decreased range of motion of the neck, or any worsening clinical symptoms.

DISCHARGE MEDICATIONS:

1. Augmentin 500 milligrams by mouth three times per day.
2. Tylenol with Codeine one tablet by mouth every four to six hours as needed for pain.

FOLLOW UP: The patient is to follow up with her PCP in one for removal of sutures.

Note Type: ED Note
 Date: June 26, XX 07:45 EDT
 Status: Auth (Verified)
 Subject: ED Note
 Verified by: LOMBARDI MD, ANTHONY on June 27, XX 14:04 EDT
 Encounter info: XXXX, Community General Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

Patient seen: 08:15 Patient walked into the emergency department.
 Historian: patient and her mother CC: neck pain HPI: 14 year old female presents left-sided neck pain that started 4 days ago and fever x 3 days peaking around 101 F. She also reports fatigue, myalgias in her legs and somewhat in her arms, substernal chest pain with inspiration, and dark-yellow urine this morning (believes was well-hydrated). Was seen 2 days ago at Sidwinder Hospital, where CT showed 1x1.5 cm accumulation of fluid (presumed abscess) in left SCM; wbc was 14000 and monospot negative. She was seen this morning by her pediatrician, who referred her here recommending evaluation by ORL. No respiratory difficulty, throat pain, trouble swallowing, or other complaint. She returned last week from a 3-week trip to Costa Rica in which she travelled to both coasts; she did not take malaria prophylaxis.

ROS: rash on buttocks from "wet bathing suit," otherwise all systems negative except those noted in HPI.

PMH: tympanostomy tubes, otherwise unremarkable MEDICATIONS: Augmentin 500/125 x 48 hrs, Motrin last at 7:30 am ALLERGIES: NKDA IMMUNIZATIONS: UTD SH: lives with family, just back from CR

PE: T 36.4, P 90, RR 18, BP 109/56, Wt 50.3 APPEARANCE: Well nourished, well developed, flushed face, in no acute distress. SKIN: No rashes or lesions besides bug bites on legs. HEAD: Normocephalic, atraumatic. EYES: PERRL. EOMI. No conjunctival injection. EARS: TM's intact. Light reflex normal. No retraction or perforation.

MOUTH & THROAT: No tonsillar enlargement. No pharyngeal erythema or exudate. No stridor. NECK: Supple. Left side of neck over SCM larger than right with mild warmth, no erythema, no induration, mild pain, not well-defined. NODES: No cervical or axillary lymph node enlargement. CHEST: Lungs clear to auscultation bilaterally. CARDIOVASCULAR: Normal S1, S2. No rubs, murmurs or gallops. ABDOMEN: Slight tenderness of the RUQ, no rebound tenderness or guarding. Not distended. Soft. No masses. No hepatomegaly or splenomegaly. NEUROLOGIC: grossly intact

RESULTS:

Creatinine	0.6	Total Protein	
6.5		0.1	ALT
41 H	Bilirubin, Direct	3.4	Alkaline
Phosphatase	98	AST (Aspartate Aminotransferase)	
25	Bilirubin, Total	0.4	ESR
(Erythrocyte Sedimentation Rate)	43 H	Hematocrit	
35.6	Hemoglobin	12.5	Platelet
255	Mononucleosis Screen, Rapid	Negative	C-Reactive
Protein	6.70 H	Eosinophil	

8 H	Absolute Neutrophil Count	10.07 H	Lymphocyte
5 L	Cells Counted, Manual Differential	100	Morphology
Comment	Normal	Atypical Lymphocyte	
3	Absolute Lymphocyte Count	0.64 L	Monocyte
5	Left Shift	Absent	
Neutrophil/Band	79 H	Absolute Eosinophil Count	
1.02 H			

TREATMENT: Patient treated with acetaminophen and ibuprofen for pain, and given a 500 mL bolus of fluid I&D of neck abscess performed by ORL - a small amt of thick pus was collected. Aerobic and anaerobic cultures, AFB, fungal culture, and gram stain were sent, along w/ MRSA-specific culture. Lab results noted above. CT revealed abscess/fluid collection between muscles of left neck with surrounding lymphadenopathy. Radiology report pending. The patient remained stable while in the ED. This patient appears to have an abscess of undetermined etiology. She reports no history of trauma to the neck, and her skin barrier has remained intact around the site of abscess. Besides the most common causes of abscesses - and PCP's covering colleague notes that neck abscesses are more likely to be MRSA than in other sites - more uncommon etiologies such as tuberculosis and fungal infection need to be considered because of patient's recent travel history. Given the patient's clinical presentation and epidemiology, her neck soft-tissue mass is very unlikely to be neoplastic.

DISPOSITION/PLAN: Admitted to ORL in stable condition. Discussed w/ Dr. Elizondo from Waubonsie Pediatrics, covering for PCP Dr. Layla Ali

ASSESSMENT: 1. Abscess. 682.9.

ATTENDING XXXX. I reviewed the history above notable for continued neck pain and swelling. On my exam, Aubrey had minimal tenderness along her sternocleidomastoid on the left but no discrete mass. WBC was 12.7K. ESR 43. Mono negative. CT scan showed a collection measuring 1 x 2 cm under the SCM muscle. Aspirated by ORL and sent for culture. Transfer of care to ORL attending verbally in ED.

Note Type: Nursing Admission Assessment.
 Date: June 26, XX 19:40 EDT
 Status: Auth (Verified)
 Subject: Nursing Admission Assessment
 Created by: WILLIAMS RN, NEVAEH G on June 26, XX 20:09 EDT
 Verified by: WILLIAMS RN, NEVAEH G on June 26, XX 20:09 EDT
 Encounter info: XXXX, Community General Hospital, Inpatient, 6/26/XX - 6/31/XX

Nursing Admission Assessment Entered On: 6/26/XX 20:16 EDT
Performed On: 6/26/XX 19:40 EDT by WILLIAMS RN, NEVAEH G

Weights and Measurements

Initial Measures Documented on Flowsheet: Yes

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Patient Profile

Admitted From: ER

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Contact Info During Admission Grid

<i>Name:</i>	Tracy
<i>Relationship:</i>	Mother
	WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Languages: English

Interpreter Needed - Patient: No

Interpreter Needed - Parent: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Allergy History

Allergies (Active)

No known allergies

Estimated Onset Date: Unspecified ; Reaction Status: Active ;

Category: Drug ; Substance: No known allergies ; Type:

Allergy ; Reviewed Date: 6/26/XX 10:03 EDT

Transfusion History

Transfusion History: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Communicable Disease Screening

Mumps Exposure History

Chicken Pox: No known exposure

Measles: No known exposure

Mumps: No known exposure

Pertussis: No known exposure

Rubella: No known exposure

Other: No known exposure

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Immunizations Current: Yes

Precautions for Current Encounter: Contact

Reason for Precautions: Pending MRSA culture

Antibiotic Resistant Organism - Patient: No

Antibiotic Resistant Organism - Family Member: No

TB (exposure): No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Pain Review

Pain Questions answered by: Patient with Parent/Guardian

Painful Experiences: No

Pain Relief: Acetaminophen like drug (Tylenol), Ibuprofen like drug (Motrin)

Patient In Pain Now: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

General Med/Surg History

Chief Complaint: Left neck abscess

History of Present Illness - Parent: left neck swelling, febrile

Concerns About Hospitalization: none

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Fall Risk Screen

Patient Greater than 1 Year Old: Yes

Factors Causing Risk for Fall: None

Patient at Risk for Falls: No

Education Completed: Not applicable

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Functional Health Patterns- Part 1

Diet: Regular, Age Appropriate

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Nutritional Screen

Failure to Thrive: No

Malnutrition: No

Eating Disorder: No

Metabolic Disease: No

New Onset DM: No

Special formula > 24 Kcal/oz: No

NPO >3 days prior to admission?: No

Multiple food allergies - 2 or more: No

TPN Feedings: No

Significant Weight Loss or Weight Gain: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Toileting Pattern: Independent

Problems Sleeping: None

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Bathing: Self

Dressing: Self

Mobility: Self

Feeding: Self

Toilet: Self

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Functional Screen

Contracted, Deformed, or Weak Joints: No

Parent States Level Not Age Appropriate: No

Cardiopulmonary Issues Requiring PT: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Functional Health Patterns- Part 2

Patient a Newborn and Never Been Home: No

Speech Issues: No

Hearing Issues: No

Visual Issues: No

Substance/Tobacco Use: No

History of Uncomfortable Touch: No

Adult Staying with Child at Hospital: Mom

Threats of Harm: No

Restraint History: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Value Belief Pattern

Religious/Spiritual Preference: Unable to collect
Chaplaincy Visit During Stay: Unable to assess

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Discharge Planning Needs

Formal/Informal Support Systems at Home: Yes

Any Existing Services at Home?: No

New/Additional Services Needed at Home: No

Learning Style - Patient: Explanation from parent/guardian, Receive little info at a time, Verbal explanation/instruction, Written explanation/instruction

Learning Style - Parent/Guardian: Receive info all at once, Verbal explanation/instruction, Written explanation/instruction

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Reason for Admission/ Past Medical History

Reason for Admission: Needle aspiration of left neck abscess

Past Medical History: Ear tubes placed

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Admission Checklist

Physical Assessment Complete: Yes

Consent Signed: Yes

Advanced Directive in Chart: Not applicable

Patient ID Applied and Verified: Yes

Parent ID Obtained: Yes

Unit Overview/Handouts Provided: Yes

Visitor Policy Reviewed: Yes

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Problem List

Note Type: Operative Note
 Date: June 26, XX 00:00 EDT
 Status: Modified
 Subject: Operative Note
 Created by: BELLAMY MD, PIERRE T on June 29, XX 08:24 EDT
 Verified by: BARR MD, RON C on July 12, XX 07:33 EDT
 Encounter info: XXXX, Community General Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

DATE OF PROCEDURE: 06/29/XX.

PRE-OPERATIVE DIAGNOSIS: Left neck abscess.

POST-OPERATIVE DIAGNOSIS: Left neck abscess.

PROCEDURES PERFORMED: Incision and drainage of left neck abscess.

SURGEON: Barr, Ron C, MD.

ASSISTANTS: Bellamy, Pierre, MD.

ANESTHESIA: General endotracheal.

ESTIMATED BLOOD LOSS: Less than 10 mL.

INTRAVENOUS FLUIDS: 250 mL.

INDICATIONS FOR PROCEDURE: Aubrey is a 14-year-old girl who presented with a left neck infection. She underwent a trial of needle drainage, as well as intravenous antibiotics. She continued to have fevers and induration at that site. Given her lack of response to these measures, the decision was made to bring her to the operating room to undergo operative intervention.

FINDINGS: There was an area of induration about 4 centimeters x 4 centimeters in size that was superficial. Upon entry to the cavity, we found approximately 3 mL of purulent material. The abscess rind was noted. Purulent material was sent for culture. A biopsy of the abscess rind was sent to pathology.

DETAILS OF PROCEDURE: The patient was identified in the preoperative holding area, and consent was verified. She was brought to the operating room and laid on the operating table in the supine position. She underwent uneventful general anesthesia induction and intubation.

She was then prepared and draped in standard fashion. Approximately 1 mL of lidocaine 0.5% with epinephrine 1:200,000 was injected into the pre-defined incision site. The incision was marked over the area of the abscess, which was noted to be overlying the sternocleidomastoid in the superior left neck. The area of induration was approximately 4 centimeters x 4 centimeters. Using a #15 blade, and incision was made. Using a combination of a Jake and snap, the soft tissues were dissected down to an abscess cavity. Using a retractor, the sternocleidomastoid was retracted anteriorly, exposing the abscess area. The abscess cavity was entered with a Jake, with immediate return of purulent material in the amount of approximately 3 mL. Loculations were broken up with use of a hemostat, after which the wound was copiously

irrigated with normal saline. A quarter-inch Penrose was placed into the abscess cavity. Hemostasis was obtained with Bovie cautery. Using a 4-0 fine nylon suture, the Penrose was tacked to the skin. The remainder of the 1 centimeter incision was loosely closed with 6-0 nylon. A dressing was applied.

The patient was awakened from anesthesia uneventfully and transferred to the post anesthesia care unit in stable condition.

Dr. Ron Barr was present for and involved in the entire procedure.

COMPLICATIONS: None.

Note Type: Otolaryngology Clinic Note
Date: June 29, XX 00:00 EDT
Status: Auth (Verified)
Subject: Otolaryngology Clinic Note XXXX
Created by: BARR MD, RON C on June 29, XX 15:37 EDT
Verified by: BARR MD, RON C on July 12, XX 11:16 EDT
Encounter info: XXXX, Community General Hospital, Documents, X/X/XXXX - X/X/XXXX

*** Final Report ***

Dear Dr. Ali,

Your patient, Aubrey Leblanc was taken to the operating room today, June 29, XX, and underwent incision and drainage of her left neck infected lymph node. As we discussed on the phone, this was not responsive to intravenous antibiotics and Aubrey continued to have intermittent fevers, as well as an elevated white blood count. An ultrasound performed June 28, XX did not suggest that there was frank abscess present at that time.

Today in the operating room we did in fact find an abscess cavity and approximately 5 mL of pus within this infected/necrotic lymph node. The abscess was drained and cultures as well as tissue taken for microbiology evaluation and pathology examination. Aubrey did well with this procedure. I expect that she will have a rapid improvement in her clinical course and we expect that she will be able to be discharged to home on p.o. antibiotics in the very near future.

Sincerely yours,

Ron C Barr, MD

CC: Layla Ali, MD
125 Wisteria Lane
Suite 462
Wisteria, CA XXXXX

Note Type: Anesthesia Followup
Date: June 30, XX 16:25 EDT
Status: Auth (Verified)
Subject: Post Anesthesia Visit
Created by: BRINKMAN MD, JAMES C on June 30, XX 16:27 EDT
Verified by: BRINKMAN MD, JAMES C on June 30, XX 16:27 EDT
Encounter info: XXXX, Community General Hospital, Inpatient, 6/26/XX - 6/31/XX

*** Final Report ***

Patient found on bed awake, alert and comfortable. Mother claims that she had a good night; received enough pain medications and was able to ambulate today without vomiting. Nausea had been consistent for five days but patient now says nausea has been greatly reduced. Post General Anesthesia day # 1 without apparent anesthesia related complications

Note Type: Infectious Diseases Consult XXXX
 Date: June 31, XX 00:00 EDT
 Status: Auth (Verified)
 Subject: Infectious Diseases Consult XXXX
 Created by: THAO MD, PhD, JESSICA A on June 31, XX 10:39 EDT
 Verified by: HAMILTON MD, RUPERT N on June 31, XX 11:50 EDT
 Encounter info: XXXX, Community General Hospital, Documents, X/X/XXXX - X/X/XXXX

*** Final Report ***

INPATIENT INFECTIOUS DISEASES CONSULT SIGN OFF NOTE
 6/31/XX

Aubrey is a 14yo F who was admitted with left neck swelling and fever and treated for a left neck abscess. Her CT showed a ~1x2cm rim enhancing lesion in her posterior neck and she had an initial needle aspiration of the fluid. The fluid grew moderate MSSA. She continued to have persistent fever and minimal clinical improvement and was therefore taken to the OR for an incision and drainage. There was drainage of about 3ml of pus. In consultation with the ORL service, she was treated with Unasyn and was discharged on 6/31/XX to complete a 10day course of Augmentin 500mg po TID. Her Toxoplasma IgM was 1.01 which is equivocal and repeat testing is recommended in 2 weeks. She has Bartonella and tularemia titers pending. She will follow up with her PMD.

We would be happy to see her in ID clinic if any tests return positive or if any concerns arise.

Jessica Thao, MD
 ID fellow pXXXX

As above, cultures and findings c/w staphylococcal lymphadenitis which should respond to excision and antibiotics. We did not identify any precipitating events leading to the adenitis.
 Agree with the above.

Rupert N. Hamilton, MD
 ID Staff, XXXX

Note Type: Discharge Plan Report
 Date: June 31, XX 07:17 EDT
 Status: Auth (Verified)
 Created by: CASTRICONE RN, RACHEL L on June 31, XX 07:17 EDT
 Verified by: CASTRICONE RN, RACHEL L on June 31, XX 07:17 EDT
 Encounter info: XXXX, Community General Hospital, Inpatient, 6/26/XX - 6/31/XX

Name: LEBLANC, AUBREY
 MRN: XXX-XX-XX
 Date of Birth: 04/23/XX
 Admission Date: 06/26/XX 09:45 am

General

Discharge Date: 06/31/XX 06:55 am
 Primary Care Physician: ALI MD, LAYLA C

Attending Physician: BARR MD, RON C

Discharge Diagnosis: neck abscess

Disposition

Discharged To: Home

Follow-up Appointment 1

Follow-up Appointment Location: ORL clinic

Follow-up Appointment Provider: BARR MD, RON C

Follow-up Appointment Phone Number: XXX-XXX-XXXX

Follow-up Appointment 1 Scheduled: To be scheduled

Follow-up Appointment 1 Instructions: Please follow up in 1-2 weeks, call for appointment

Diet

Discharge Diet: Regular

Instructions

Additional Instructions:
 Please call MD or go to nearest emergency room if your child:
 -experiences a fever over 101 (F)
 -has increased drainage/bleeding from incision site
 -has increased redness around incision site
 -has prolonged vomiting/diarrhea
 -is unable to tolerate diet or shows signs of dehydration such as lethargy
 -or for any other serious concerns

Activity Level: quiet activity x 2 weeks, please keep incision clean and dry (use tegaderm when showering)

See "Medications at Discharge" page for home medication information.

I acknowledge my participation, review of and agreement with the above plan. I have been told in a timely manner of the need to plan for discharge or transfer to another facility, and I have been told of the reason for transfer and available alternatives to transfer. I have been given an opportunity to select the provider for any post-hospital services. I have received a written copy of the plan, my questions have been answered, and I understand the contents. I understand that, in order to arrange necessary services, relevant medical and other information is being shared with post-hospital providers.

Signature of Patient/Parent/Legal Guardian Date _____

Signature of discharging nurse Date _____

If Patient/Parent/Legal Guardian does not sign above, state reasons for not signing, including any objections to the plan in progress note.

IMPORTANT! Be sure to bring this form with you on your next visit to the clinic or your doctor.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #4**

Note Type: Discharge Summary
 Date: April 03, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: BRANDON MD, NATHALIE L on April 03, XX 10:41 EST
 Verified by: BILEN MD, DOMINIC P on April 03, XX 10:57 EST
 Encounter info: XXXX, Richmond Trinity Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

ATTENDING PHYSICIAN: Dr. DOMINIC BILEN

DATE OF BIRTH: 03/20/XX

ADMITTED: 03/31/XX [11 days old]

HOUSE OFFICER:

JAMES VAN DER BERG

ADMITTING DIAGNOSIS:

RSV BRONCHIOLITIS

PRINCIPAL DIAGNOSIS:

RSV BRONCHIOLITIS

SECONDARY DIAGNOSES:

NONE

PRINCIPAL PROCEDURE:

SPINAL TAP

COMPLICATIONS:

NONE

SUMMARY OF HOSPITAL COURSE:

Chief complaint:

Fever and cough x 1 day

DISCHARGE CONDITION:

IMPROVED

DISCHARGE CONDITION:

IMPROVED

DISCHARGE CONDITION:

DATE:

03/31/XX

HPI:

11 days old male who was born FT, AGA and C/S due to repeat was doing well at home until 1 day before admission when he started to have cough and cold symptoms. He was feeding well on breast milk. He presented to the Kingdom Hospital on day of admission with the parents c/o decreased feeding and a fever of 101F. He was also noted to be fussy and less active. The elder sibling at home was also sick with URI symptoms. He was found to be dehydrated, lethargic with dry mucus membranes. His VS were; T 98.6, HR 160, RR 60, BP 101/63 (71) and O2 sat 95% with 6L oxygen at 100%. A respiratory viral panel was done and he was found to be RSV positive and his CBC was left shifted with 14 bands. CXR showed RUL collapse vs infiltrate. ABG was done and showed 728/58/55/24. He was found to have a delayed cap refill and he was given a NS bolus 20ml/kg x 1. He was given further hydration with IVF and was given Ampicillin and Cefotaxime and then he was transferred from the pediatric floor at Kingdom to NICU at RTH for further care.

PMHx:

He was born at Kingdom Hospital on 03/20/XX at 8AM. Mother is a 27 years old. She was O+/-, RI, RPR NR, HepBsAg -, GBS -. The delivery was via C/S due to repeat and a concern that the fetus is macrosomic. He had APGAR of 8 and 9 at one and five minutes respectively. BW 3430g. He received Hepatitis B vaccine at birth and he passed his hearing screen.

Transport History:

RTH transport team was set up for transport of the baby to RTH. The team found the baby to be lethargic and in moderate to severe respiratory distress: his O2 saturation levels were 72% for several minutes, and they decided to intubate him before transport. He was pre-medicated with Atropine 0.1mg, Versed 0.8mg, Fentanyl 24 micrograms and Succinylcholine 8mg. He was intubated with 3.5 non cuffed tube and taped at lip mark of 9cm. He started to have low MAP after intubation and was given NS bolus 10ml/kg x 2. He was given further Fentanyl 8 micrograms and Versed 0.4mg x 2 during transport. He continued to have low MAPs (40s) and was started on Dopamine 5 micrograms/kg/min en route to RTH. He was kept at PIP 22, PEEP 5, Rate 20 and FiO2 70%.

NICU Course at RTH:

The patient was received intubated and sedated with D5 1/4 NS running at 60 ml/kg/day. He was continued on same respiratory settings and an arterial blood gas and a spinal tap was performed after parental consent. His MAP was 55 and Dopamine was stopped 10 minutes after his arrival to NICU. Versed 0.3 mg and Fentanyl 10 micrograms were continued for sedation.

Admission Physical Exam:

Weight: 3.7kg (50-75th percentile)

Length: 52cm (50-75th percentile)

HC: 36cm (90th percentile)

VS: Temp 37, HR 186, MBP 55, O2 sat 95% on 75% FiO2.

4-limb blood pressures were recorded. RA 84/28 (48), RL 80/43 (55), LA 75/32 (48) and LL 78/33 (50)

Gen: Intubated and on SIMV. Sedated.

HEENT: Sedated, Pupils equal and sluggish response to light. Neck supple. Ropalg and ETT in place. Skull atraumatic and AF is flat. Copious oral secretions present.

Resp: On SIMV and has equal breath sounds B/L with slight decreased breath sounds on the right base. No crackles or wheezing noted.

CVS: Normal heart sounds with no added sounds. Peripheral perfusion fair. Radial and femoral pulses B/L and Symmetrically palpable.

GI: Soft mild abdominal distension. No visceromegaly. BS present. Umbilical stump dry and clean.

Genitalia: Normal male external genitalia with testes descended B/L and there is a right hydrocele present.

Neuro: Sedated

Extrem: Poor cap refill.

Labs:

CBC: WBC 15, P 46, B14, L 32. Hct 40. Platelets 391.

UA: Yellow, Cloudy. SG 1024. pH 6. WBC 0-2. Rest of exam negative.

Blood and Urine culture sent from Kingdom Hospital ER and pending.

ABG: 733/46/117/24

CSF: Clear and colorless. WBC 3, L13, M84. RBC 0, Glucose 71 and Protein 48. CSF gram stain and culture pending.

SMA: 133/4.8/99/28/101/16-0.4

CXR: RUL collapse and indistinct right heart border. ETT high and was advanced.

Tracheal aspirate: pending

RSV positive

MRSA Cx done

RICHMOND TRINITY HOSPITAL COURSE BY SYSTEMS:

CV: On admission Oliver had a brief pressor requirement. Dopamine was weaned and discontinued 03/31. Oliver has remained hemodynamically stable since.

ACCESS: Peripheral access was maintained

RESP: On admission, Oliver was placed on SIMV settings of 25/5 and rate of 22 with FiO2 40%. Received CPT and racemic epi nebs with noted thick secretions. RSV + resp panel from Kingdom Hospital. Uncomplicated intubation period and was weaned and extubated. Soon after extubation, child was noted to have low respiratory rates, consistent, decreased O2 sats requiring stimulation for over 10 minutes as well as hypotension. As a result, child received flumazenil and naloxone x4 over the course of 2 hours with good response until mental status consistently improved. Once stable, child was managed on Nasal cannula 120 mls and Mist tent 28%. He continues to receive CPT and prn suctioning for copious secretions.

FEN/GI: Initially NPO with IV fluids of D10 with maintenance electrolytes @ 60 ml/kg/day. Serum electrolytes and glucoses were normal. Enteral feeds of Breast milk were restarted 4/1 and advanced to full PG feeds @ 150 ml/kg/day 1/2 after extubation. Given tachypnea he continues to require PG feeds of BM20 calorie/ounce @ 150 ml/kg/day.

HEME: Admission HCT 03/31: 40%

ID: Continued on ampicillin and cefotaxime on admission. Known temperature to 101F, CBC with bandemia. Blood, urine and CSF culture were negative. Resp panel RSV positive @Kingdom Hospital. CXR with RUL infiltrate on follow up film improved. Repeat resp panel with strep pneumoniae sensitive to ceftriaxone, clindamycin, erythromycin and vanco. Given these findings of probable superimposed strep pneumoniae from sputum culture, likely RUL infiltrate, ampicillin was discontinued. Oliver is completing a 10 day course of cefotaxime. He is currently day 4 of a 10 day course. If iv lost im ceftriaxone could be used.

NEURO: Received minimal doses of fentanyl on admission. Activity has remained appropriate.

RHCM:

PCP: Dr Saul Morris

Hepatitis B: recommended prior to discharge

Car Seat test recommended prior to discharge

vs:

Wt: 3575 kg 36.8 141 69 78/39 (53) 95% on 30cc NC, 30% Mist Cube

Gen: awake, alert, NAD, pink

Heent: AFOSF, NCAT, mucous membranes moist, eyes and nares clear

Chest: coarse breath sounds bilaterally, good aeration, mild subcostal retractions

CV: RRR, no murmurs

Abd: soft, non tender, non distended, + BS, no HSM

Ext: warm, well perfused, 2 + pulses bilaterally

GU: right sided hydrocele, left sided testes descended

Neuro: normal tone, 2 + reflexes, + moro, suck, grasp reflex

DISCHARGE DISPOSITION:

ACUTE CARE FACILITY (OUT OF STATE)

DIET:

ENFAMIL 20 150CC/KG/DAY PG
LISTED ALLERGIES:
NONE LISTED
MEDICATIONS:
CEFOTAXIME
200 MG IV Q8HRS
SPECIAL INSTRUCTIONS:
RETROTRANSFER TO JAMES RIVERS HOSPITAL
PATIENT/FAMILY EDUCATION:

UNSCHEDULED AND EXTERNALLY SCHEDULED APPOINTMENTS:
NONE
TESTS PENDING AT DISCHARGE:
NONE
CONSULTATIONS:
NONE
REFERRING/PRIMARY CARE PHYSICIAN:

DISCHARGING HOUSE OFFICER:
NATHALIE BRANDON (BY ELECTRONIC SIGNATURE 04/03/XX)

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #5**

Note Type: Discharge Summary
 Date: March 15, XX 07:17 EST
 Status: Auth (Verified)
 Subject: Discharge Summary.
 Created by: MARSH MD, STEPHANIE E on March 15, XX 07:22 EST
 Verified by: KHOURI MD, PhD, SABRINA J on March 16, XX 11:25 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 2/3/XX - 3/15/XX

* Final Report *

Discharge Summary.

Patient: **SOLGOS, NAOMI**
 Age: **4 years** Sex: **Female** DOB: **11/13/XXXX**
 Associated Diagnoses: **Leukemia; Febrile neutropenia**
 Author: **MARSH MD, STEPHANIE E**

Discharge Information

Discharge Summary Information: Admitted 2/3/XX, Discharged 3/15/XX.

Attending Physician: KHOURI MD, PhD, SABRINA J.

Admitting diagnosis: Complaint of Leukemia

Discharge diagnosis: Leukemia - Working, Febrile neutropenia - Working

Hospital Course

Hospital Course

Admitted from: from emergency department.

Arrival via: by car.

Admission disposition: admit to medical bed.

OTHER:

Presenting History:

4yo previously healthy girl presenting with petechiae, anemia, thrombocytopenia, and leukocytosis concerning for acute leukemia. Per parents, they first noted just a few small petechiae on her left upper chest one week ago. Within the past 3 days, she also developed a couple of areas of bruising on her back. On day prior to admission, patient woke up sweating and was noted to have an increase in number of petechiae on her chest. Parents note that patient has had a viral URI for the past week, notably cough with rhinorrhea, associated with low-grade fevers (Tm99), but otherwise has been afebrile. Family has not noticed any pallor but did see darker circles under her eyes which they attributed to her URI. Naomi has not been acting more tired and she has maintained a good appetite, with normal urine and stool output. Given concern for increased petechiae and bruising, parents brought Naomi to her PMD today. At PMD's office, labs notable for WBC 25 (1S, 27L, 71Blast), Hgb 7.3, Hct 23.6, Plt 18. Patient was therefore referred to ED.

In the ED, patient well-appearing, afebrile. Repeat labs confirmed 30% lymphs, 70% blasts, with ANC 0; Plt 24. LDH elevated, but chem and LFT's wnl. CXR negative. Heme/Onc team consulted, who met and updated family in ED. Per Oncology team, sent flow cytometry, Varicella Ab titer, and Coags. Patient admitted for further management.

Review of Systems: No headaches or vision changes, no difficulty breathing, no epistaxis, no bleeding from gums, no nausea/vomiting, no abdominal pain, no hematuria/dysuria, no joint pain or swelling. Sick contacts include Mom and younger brother with URI symptoms.

Past Medical History: FT. h/o eczema and otitis media x 2, h/o constipation

Family History: FamHx: notable for MGM with breast ca, MGF with prostate ca, PGM with esophageal ca. No history of childhood cancers, including leukemia, in family. No history of anemia or clots.

Psychosocial History: Lives with Mom, Dad, and younger brother.

Hospital Course:

Oncology:

Naomi is a 4 yo F with a new diagnosis of ALL via bone marrow biopsy who was placed on 03-001 protocol. Her LP was negative for evidence of CNS disease. Her cytogenetics showed no high risk translocations, + hyperdiploidy. Prior to receiving chemo she had an Echocardiogram 2/5 demonstrating normal biventricular function, ophtho exam with no leukemic infiltrates and a dental exam with no evidence of leukemic disease (dental exam did demonstrate caries and recommended follow up in 1 month). She received induction chemotherapy starting on 2/5/XX with steroids days 1-32, asparaginase day 7, VCR: days 4, 11, 18, 25, doxorubicin days 4, 5, LP with IT triples + BM on day 18. Overall she tolerated this regimen well. She was on allopurinol and hyperhydration but did not develop tumor lysis syndrome so these were stopped on 2/16. On 3/6/XX she had a repeat bone marrow biopsy demonstrating remission. She then began consolidation chemo on 3/6/XX with IT methotrexate, vincristine day 1, and 6-MP days 1-3. Her 6-MP was stopped on 3/8/XX because of an absolute phagocytic cell (APC) count of <500. She received hyperhydration and leucovorin until her MTX level cleared. Throughout her course she was transfused red blood cells and platelets as needed based on standard transfusion parameters (Hb <7; PLT <10).

ID:

Following her chemotherapy Naomi developed neutropenia. She had fevers and was placed on ceftazadime per protocol. She developed a blistering red rash on her left arm at the site of an old PICC dressing following her consolidation chemo. She was started on vancomycin as a result in order to cover her for possible skin infection in the setting of neutropenia. Dermatology was consulted for the rash and felt it was a hypersensitivity rash from the methotrexate at the site of the old PICC dressing and recommended supportive care. Prior to discharge Naomi was taken off of the vancomycin and placed on clindamycin PO to cover her arm for potential infection for a planned course of 7 days following count recovery. Her ceftazadime was stopped once her counts recovered. She was placed back on ceftriaxone prior to discharge on 3/13 for fever to 38.0 C twice. She received two doses of ceftriaxone and her fever curve improved. She was afebrile for 24 hours prior to discharge. She received a dose of ceftriaxone prior to discharge on 3/15 and her mother was given clear instructions to call for any 2 fevers >38.0 or 1 fever >38.4. Addendum: At discharge, pt had a temperature of 38.0, in the context of a normal PE with excellent overall appearance and activity level, ANC>500, BCX NGTD. She received a dose of ceftriaxone to cover her for an additional 24 hours. Blood cultures were also sent. Fever instructions, management, and indications to call the oncology team and return for medical care were carefully reviewed. The family agreed with the discharge plan.

FEN/GI:

Naomi tolerated a regular diet and received PRN miralax for constipation.

Access: Naomi has a left sided PICC.

Results Review**General Results**Today's results (24 hrs): Results

3/15/XX 11:14 EST	Temperature	36.8 DegC
3/15/XX 08:03 EST	Temperature	37.3 DegC
3/15/XX 07:57 EST	Specific Gravity, Urine Refract POCT	
1.005		
	pH, Urinalysis POCT	6.0
	Glucose, Urinalysis POCT	Negative
	Ketones, Urinalysis, POCT	Negative
	Protein, Urinalysis POCT	Negative
	Blood, Urinalysis POCT	Negative
	Leukocytes, Urinalysis POCT	
Negative		
	Nitrite, Urinalysis POCT	Negative
	Urobilinogen, Urinalysis POCT	
0.2 (normal)		
	Bilirubin, Urinalysis POCT	
Negative		
3/15/XX 04:00 EST	Temperature	37.5 DegC
3/15/XX 00:20 EST	WBC	4.01 K cells/uL
LOW		

LOW	WBC Corrected	3.98 K cells/uL
	Hemoglobin	9.9 g/dL LOW
	Hematocrit	29.7 % LOW
	Platelet	231 K cells/uL
	MPV	8.5 fL HI
LOW	RBC	3.37 M cells/uL
	MCV	88.0 fL HI
	MCH	29.4 pg
	MCHC	33.4 g/dL LOW
	RDW	16.6 % HI
LOW	HDW	3.37 g/dL HI
	Absolute Neutrophil Count	0.99 K cells/uL
	Absolute Lymphocyte Count	2.41 K cells/uL
	Absolute Eosinophil Count	0.00 K cells/uL
	Absolute Basophil Count	0.00 K cells/uL
LOW	RBC Morphology	Yes
	Neutrophil/Band	25 % LOW
	Left Shift	Absent
	Lymphocyte	60 % HI
	Monocyte	12 % HI
	Eosinophil	0 % LOW
	Basophil	1 %
	Atypical Lymphocyte	2 %
	NRBC	1
	Anisocytosis, RBC	2+
	Macrocytosis, RBC	1+
	Polychromasia, RBC	1+
	Poikilocytosis, RBC	1+
	Ovalocytes, RBC	1+
	Sodium	140 mmol/L
	Potassium	3.50 mmol/L
	Chloride	105 mmol/L
	CO2	25 mmol/L
	Anion Gap	10.0 mmol/L
	Creatinine	0.2 mg/dL LOW

Physical Examination

Gen: well appearing, NAD, alert, complaining of headache
 Heent: pupils reactive, EOMI, MMM, no oral lesions
 Resp: comfortable respiratory pattern, good aeration bilaterally
 CV: RRR, no murmurs
 Abd: soft, NT, ND, BS+
 Extrem: WWP, 2+ peripheral pulses, L upper extremity with blistering erythematous rash on upper lateral arm without drainage or purulence in location of prior tape/PICC placement, improved from previous exam
 Skin: Port site c/d/i
 Neuro: cranial nerves II-XII intact, moves all extremities, obeys commands and answers questions

Discharge Plan

Discharge Summary Plan

Discharge Status: improved.

Discharge instructions given: written discharge instructions

1. CALL YOUR MD/PNP OR NURSE IMMEDIATELY IF YOUR CHILD HAS A FEVER > 38.0 (100.4F) TWICE IN ONE DAY, OR A FEVER > 38.5C (101.3F) ONE TIME, SHAKING OR CHILLS.
2. CALL IF YOUR CHILD HAS ANY SIGNS OF POTENTIAL INFECTION SUCH AS REDNESS, SWELLING, OR DRAINAGE FROM ANY SORE AREA OR WOUND, PAC/CVL SITES INCLUDED.
3. CALL IF YOUR CHILD HAS ANY SIGNS OF BLEEDING, SUCH AS INCREASED BRUISING OR TINY RED SPOTS (PETECHIAE), ANY BLOOD IN URINE OR STOOL, A CUT THAT DOESN'T STOP BLEEDING AFTER 10 MINUTES, A NOSEBLEED THAT DOES NOT STOP AFTER 15 MINUTES.
4. CALL IF YOUR CHILD HAS ANY SIGNS OF ANEMIA SUCH AS EXTREME TIREDNESS, PALE SKIN, OR SHORTNESS OF BREATH.
5. CALL IF YOUR CHILD HAS ANY SIGNS OF DEHYDRATION SUCH AS: DECREASED OR NO URINATION FOR 6-8 HOURS, FEWER THAN 4-6 WET DIAPERS PER DAY, NOTHING TO EAT OR DRINK FOR >6 HOURS WHILE AWAKE IF UNDER 1 YEAR OF AGE, OR NOTHING TO EAT OR DRINK FOR >8 HOURS IF YOUR CHILD IS OVER 1 YEAR OF AGE.
6. CALL IF YOUR CHILD HAS PROBLEMS WITH CONSTIPATION OR DIARRHEA
7. FOR ANY LIFE THREATENING EMERGENCIES, CALL 911.

Discharge disposition: home with VNA.

Discharge Diet: Age appropriate as tolerated.

Follow-Up: OTHER.

F/up on Thursday at 3/23 with Dr Khouri. No home care labs planned. VNA to visit home for initiation of services on 3/16.

Orders: Medication List (Selected).

Prescriptions

Ordered

- DME CVL dressing change kit: Special Instructions: as directed for PAC access
Dispense Quantity: 6 EA Refills: 5 Stop: 03/21/XX 23:59:00 EST See Instructions
- Emla 2.5%-2.5% topical cream: See Instructions, Therapy Acute, Dispense Quantity: 30 g Refills: 3 Special Instructions: Apply as directed to injection site and cover with Tegaderm 1/2-1 hour prior to access Stop: 011/12/XX 8:00:00 EDT
- Huber Needles 22 gauge, 1 inch: Huber Needles 22 gauge, 1 inch Special Instructions: For implanted port access Dispense Quantity: 1 box Refills: 5 Stop: 03/21/XX 23:59:00 EST See Instructions
- MiraLax oral powder for reconstitution: Dose Amount: 0.5 capful PO daily, Therapy Soft Stop, Dispense Quantity: 225 g Refills: 1 Special Instructions: mixed in 2 to 4 ounces water Indication: constipation for pts 5-12 yo
- Normal Saline Flush 0.9% injectable solution: 5mL IV As Directed, Therapy Soft Stop, Dispense Quantity: 1 box Refills: 6 Special Instructions: flush before and after blood draws or medication administration
- clindamycin 75 mg/5 mL oral liquid: Dose: 150 mg Dose Amount: 10 mL PO TID Take for 6 day, Therapy Acute, Dispense Quantity: 180 mL Refills: 1 Special Instructions: continue thru PM dose on Thursday 3/19. Stop: 03/25/XX 14:06:55 EST
- heparin flush 100 units/mL intravenous solution: See Instructions, Therapy Acute, Dispense Quantity: 1 box Refills: 5 Special Instructions: 5 ml flush as directed for PAC care Stop: 011/12/XX 8:00:00 EDT

ondansetron 4 mg/5 mL oral solution: Dose: 2.5 mg Dose Amount: 3.125 mL PO
Q8hr PRN Nausea/Vomiting, Therapy Soft Stop, Dispense Quantity: 120 mL
Refills: 3

oxycodone 5 mg/5 mL oral solution: Dose: 1.5 mg Dose Amount: 1.5 mL PO As
Directed PRN Pain, Therapy Soft Stop, Dispense Quantity: 60 mL Refills: 0
Special Instructions: Frequency: Q4-6 hrs PRN < 50 kg:

sulfamethoxazole-trimethoprim 200 mg-40 mg/5 mL oral suspension: Dose: 80 mg
PO As Directed, Therapy Soft Stop, Refills: 6 Special Instructions: Frequency:
daily 3 days per week. Indication: < 32 kg pt, Dispense supply: 30 day

Note Type: Oncology Admission MD
 Date: February 05, XX 17:42 EST
 Status: Auth (Verified)
 Created by: ECE MD, ZEHRA on February 05, XX 17:49 EST
 Verified by: STEVENSON MD, EPHRAM on February 06, XX 12:11 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 02/5/XX - 3/17/XX

* Final Report *

Chief Complaint: petechiae, CBC concerning for bone marrow suppression with 71% blasts

History of Present Illness: 4yo previously healthy girl presenting with petechiae, anemia, thrombocytopenia, and leukocytosis concerning for acute leukemia. Per parents, they first noted just a few small petechiae on her left upper chest one week ago. Within the past 3 days, she also developed a couple of areas of bruising on her back. On day prior to admission, patient woke up sweating and was noted to have an increase in number of petechiae on her chest. Parents note that patient has had a viral URI for the past week, notably cough with rhinorrhea, associated with low-grade fevers (Tm99), but otherwise has been afebrile. Family has not noticed any pallor but did see darker circles under her eyes which they attributed to her URI. Naomi has not been acting more tired and she has maintained a good appetite, with normal urine and stool output. Given concern for increased petechiae and bruising, parents brought Naomi to her PMD today. At PMD's office, labs notable for WBC 25 (97L, 71Blast), Hgb 7.3, Hct 23.6, Plt 18. Patient was therefore referred to ED.

In the ED, patient well-appearing, afebrile. Repeat labs confirmed 30% lymphs, 70% blasts, with ANC 0; Plt 24. LDH elevated, but chem and LFT's wnl. CXR negative. Heme/Onc team consulted, who met and updated family in ED. Per Oncology team, sent flow cytometry, Varicella Ab titer, and Coags. Patient admitted for further management.

Review of Systems: No headaches or vision changes, no difficulty breathing, no epistaxis, no bleeding from gums, no nausea/vomiting, no abdominal pain, no hematuria/dysuria, no joint pain or swelling. Sick contacts include Mom and younger brother with URI symptoms.

Past Medical History: FT. h/o eczema and otitis media x 2, h/o constipation

Family History: FamHx: notable for MGM with breast ca, PGF with prostate ca, PGM with esophageal ca. No history of childhood cancers, including leukemia, in family. No history of anemia or clots. MGGM with MS.

Psychosocial History: Lives with Mom, Dad, and younger brother (age 2). Parents are in medicine (cardiac surgery PA and work at medical device company). Naomi attends daycare/preschool.

Immunizations: UTD, except for flu shot. (Due for 4yo immunizations)

Home Medications on Admission: Miralax prn constipation.

Documented medications were reviewed and reconciled with the history provided by the patient. All of the medications were listed here and/or the Powerchart medication history was updated.

Allergies: Documented allergies were reviewed and reconciled with the history provided by the patient and Powerchart was updated as needed.

Allergies: No known allergies [updated]

Physical Exam:

Basic Vital Signs

Vitals Signs since (02/04 17:43)	24 h min	24 h max	Most recent (Time)
Temperature	36.5	37.2	37.2 (16:32)

Heart Rate	132	166	143 (16:32)
BP Systolic	98	129	129 (16:32)
Diastolic	58	74	74 (16:32)
Respiratory Rate	20	28	28 (16:32)
Oxygen Saturation (SPO2)	100%	100%	100% (16:32)
Weight (kg)			16.500 *10:40*

Gen: very well-appearing, playing on ipad, NAD

Skin: few, tiny scattered petechiae of L upper chest as well as horizontally along chest below nipple line, few petechiae of L flank and a few on L medial ankle. +echymoses (x2) of mid-lower back as well as on dorsum of L foot (x1). No other rashes or lesions. No jaundice.

HEENT: NC/AT, PERRL, EOMI, sclerae clear, +nasal congestion with clear rhinorrhea, oropharynx clear without obvious lesions, MMM

Neck: supple, +anterior and posterior cervical as well as supraclavicular LAD.

Lungs: CTA with good aeration bilaterally. No increased work of breathing, no wheezing/crackles.

CV: RRR, normal S1 and S2, no murmur appreciated. Cap refill < 2 sec.

Abd: soft, +BS, NT/ND, no hepatomegaly, spleen palpated 1-2cm below costal margin, no masses

GU: deferred

Ext: wwp, no edema, 2+ distal pulses

Neuro: awake, alert, normal tone/strength, 2+ DTR

Labs (Reported 02/04/XX 17:43 - 02/05/XX 17:43)

Chem 7 (02/05 12:15)

138	101	20 H	/ 107 H (Glu)
4.50	23	0.3	\ Ca 9.6 Mg 2.3 H Phos 5.7

LFTs (02/05 12:15)

AST	ALT	Bili T	/ Bili D
36	12	0.1 L	/ 0.1
82 L	4.2		
ALK	ALB		

CBC (02/05 12:15)

31.14 H	\ 7.7 C	/ 24 K C
	/ 23.0 L	\

MCV 84.3 H

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
02/05 12:54	10.1	0.96	25.8		362	

Diagnostic Studies:

CXR (02/5): The lungs are clear without focal consolidation, edema, effusion, or pneumothorax. The cardiomeastinal silhouette is normal in appearance. There is a left aortic arch. No abnormal mediastinal masses are identified. The imaged bony structures are normal in appearance.

Assessment & Plan: 3 yo F presenting with petechiae, with CBC concerning for anemia, thrombocytopenia and leukocytosis consistent with new diagnosis of acute leukemia, lymphoblastic vs myeloblastic, awaiting official flow cytometry and smear results. Patient at risk for hemodynamic instability secondary to tumor lysis syndrome. Will admit for monitoring and further work-up in anticipation of starting induction therapy.

Plan:

Oncology: new diagnosis of acute leukemia, likely lymphoblastic per preliminary reviews of smear, awaiting final report.

- peripheral blood smear to be reviewed by Hematology Pathologist 02/6
- flow cytometry sent 02/5; to be reviewed by Hematology Pathologist 02/6
- Bone Marrow, LP, PICC likely Mon 02/7; will try to schedule for GPU
- pre-chemo evaluation: echocardiogram (to be done 02/6), optho exam, dental exam

Tumor Lysis: concern for tumor lysis syndrome

- allopurinol TID
- hydration per alkalization protocol, urine pH goal: 7-8
- serum electrolytes, uric acid q6 hrs
- rasburicase if uric acid > 6

Heme:

- CBC daily
- f/u Coags
- standard transfusion parameters: hgb <7, platelets <10

ID: afebrile, neutropenic..

- daily blood cultures if febrile
- If febrile, culture and ceftaz . T >38.5 x 1, 38.0 x 2
- f/u Varicella antibody titer

CV/Resp:

- monitor HD: HR and BP
- continuous CR monitor

FEN/GI:

- po ad lib gen diet
- strict I/O
- weight on admission

Pain:

- tylenol, motrin for pain prn

Social:

- Social Work to be contacted on Mon 02/7

Access: PIV currently

- central access to be considered once diagnosis is confirmed.

Zehra Ece, MD

PGY-2, XXXX

ATTENDING ADDENDUM:

I saw Naomi in conjunction with the residents and our fellow, Dr. Dannarzai. I have read the note above and agree with its findings. Naomi's presentation of pancytopenia with peripheral blasts is consistent with likely leukemia and malignant-appearing cells on peripheral smear are most consistent with lymphoblasts. Overnight will focus on tumor lysis prophylaxis and plan for flow cytometry of peripheral blood tomorrow morning. Patient neutropenic so will follow closely for fevers or signs of infection. We disclosed all known diagnostic information to the parents who are now up to date on the plan.

Sabrina Khouri, MD, PhD

Oncology Attending

pager XXXX

Note Type: Brief Operative
 Date: February 25, XX 11:19 EST
 Status: Auth (Verified)
 Created by: BHATNAGAR MD, PhD, RUPAK E on February 25, XX 11:24 EST
 Verified by: BHATNAGAR MD, PhD, RUPAK E on February 25, XX 11:24 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 02/5/XX - 3/17/XX

*** Final Report ***

PROCEDURE PERFORMED: lumbar puncture, administration of intrathecal chemotherapy, unilateral bone marrow aspirate.

DATE OF PROCEDURE: 02/25/XX

PROCEDURE PERFORMED BY: Rani George MD, PhD

Location: OR

INDICATIONS: ALL on PPTH 03-001.

DESCRIPTION OF PROCEDURE: Met mother. Consent verified. Chemotherapy checked with nurse. Time out called prior to procedure. The patient was placed under anesthesia by the anesthesia staff. The patient then was placed in the left lateral decubitus position. The skin overlying the lower spinal column and posterior iliac crests was prepped with Betadine. A 22 gauge spinal needle was inserted into the L4-L5 spinal interspace, and clear CSF was obtained. 6ml CSF was removed. Intrathecal chemotherapy was then administered consisting of Cytarabine, methotrexate and hydrocortisone. The spinal needle was removed. 1ml of bupicaine 0.25% was injected into the periosteum of the right iliac crest. A 15 gauge bone marrow aspiration needle was inserted into the iliac crest, and liquid bone marrow was aspirated. After the needle was removed, the area was cleaned and dressed. The patient tolerated the anesthesia and procedure well. Estimated blood loss was less than 2 ml.

Specimens from the cerebrospinal fluid were sent for glucose, protein, and cell count, and a tube was sent with a requisition stating "ONCOLOGY CSF FOR CORE LAB" for cytopathologic evaluation.

Specimens from the bone marrow were sent as instructed by primary team to lab control for HOLD (one EDTA and one Na Heparin). One EDTA tube brought to 6N for protocol studies.

Note Type: Dermatology Consultation
 Date: March 15, XX 12:19 EST
 Status: Auth (Verified)
 Created by: WOOLRICH MD, JAMIE on March 15, XX 10:19 EST
 Verified by: LEE MD, MARILYN T on March 16, XX 15:39 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 2/5/XX - 3/17/XX

* Final Report *

Requesting physician/service: Dr. Khouri - Oncology

Reason for consultation: Concern for drug rash

History of Present Illness: 4 year old female with new diagnosis of Pre-B ALL, and no other medical history, being treated on PPTH Protocol 03-001, which includes consolidation with methotrexate, who noticed a new area of erythema and blisters on her left upper arm over the last few days.

The patient's mother states she first noticed a rectangular area of erythema, which used to be occluded by an adhesive, on Sunday. The patient was started on broad spectrum antibiotics to help prevent infection. Since Sunday, this area appears "less bright red", but a few vesicles have developed in the area. The area is tender, but otherwise asymptomatic. There are no new lesions. The current area on the arm is not spreading.

Of note, the patient has a hypersensitivity to other adhesives used during this hospitalization as well.

In regards to her medications, she received her last dose of methotrexate on 3/6, her last dose pf 6-MP 3/9. Her current medications are listed below.

Past Medical History: none

Active Medication Orders

Scheduled Medications

ceftazidime 750 mg IV Q8hr Last admin: 750 mg IV (03/14/XX 11:55)
 polyethylene glycol 3350 (MiraLax) 17 g PO daily *Com Last admin: 17 g PO (03/14/XX 05:58)
 vancomycin 300 mg IV Q6hr Last admin: 300 mg IV (03/14/XX 10:13)

PRN Medications

acetaminophen 200 mg PO Q4hr PRN Fever/Pain *Com Last admin: 200 mg PO (03/14/XX 10:11)
 heparin flush (heparin Flush 10 unit/mL) 20 unit IV Q8hr PRN Line Maintenance *Com Last admin: 20 unit IV (02/25/XX 00:15)
 heparin flush (heparin Flush 10 unit/mL) 50 unit IV 1time PRN Other - See Order Comments *Com
 lactulose 7.5 mL PO Q2hr PRN Constipation *Com Last admin: 7.5 mL PO (02/24/XX 03:59)
 morphine (morphine enteral) 0.5 mg PO Q4hr PRN Pain *Com
 morphine (morphine IV) 0.825 mg IV Q2hr PRN Pain Last admin: 0.8 mg IV (03/13/XX 05:22)
 nalbuphine 0.33 mg IV Q4hr PRN Itching *Com
 naloxone 16 mcg IV 1time PRN Respiratory depression *Com
 ondansetron 1 mg IV Q8hr PRN Nausea/Vomiting *Com Last admin: 1 mg IV (03/10/XX 06:53)
 oxycodone (oxyCODONE) 1.5 mg PO Q4hr PRN Pain *Com Last admin: 1.5 mg PO (03/12/XX 09:30)
 polyethylene glycol 3350 (MiraLax) 17 g PO daily PRN Constipation *Com Last admin: 17 g PO (03/09/XX 13:38)

Continuous Medications/Fluids

D5W NS 500 mL IV *Com

Allergies: No known allergies

Family History: No history of skin disease or blistering disorder.

Review of Systems: Mother reports otherwise Naomi is feeling well.

Physical Examination:

Basic Vital Signs

Vitals Signs since (03/14 10:13)	24 h min	24 h max	Most recent (Time)
Temperature	36.6	38.8	37.8 (10:00)
Heart Rate	111	145	125 (10:00)
BP Systolic	100	123	123 (10:00)
Diastolic	60	75	70 (10:00)
Respiratory Rate	20	26	22 (10:00)
Oxygen Saturation (SPO2)	98%	100%	100% (10:00)

A complete cutaneous examination of the scalp, face, neck, eyelids, mouth, lips, conjunctiva, chest, abdomen, back, bilateral arms, bilateral legs, buttocks, digits and nails revealed the following significant findings:

- geometric area of dull erythema with vesicles and bullae located centrally on the left upper arm
- linear areas of erythema in the peri-oral area where prior adhesives had been used during anesthesia
- small circular erosion at the tip of the tongue

Labs (Reported 03/14/XX 12:10 - 03/16/XX 12:10)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
03/16 00:05	137	3.83	103	25		0.2 L	

CBC	WBC	HBG	HCT	PLT
03/16 00:05	2.10 L	10.1 L	30.3 L	316 K

3/12 diff showed no eosinophilia

transaminases not checked recently

Assessment & Recommendations:

4 year old girl with ALL with a geometric area of erythema consistent with an area of cutaneous hypersensitivity, perhaps secondary to adhesive use, and exacerbated by recent methotrexate. There is no sign of secondary superinfection as noted above. Per the patient's mother, the area appears to be self resolving.

We therefore recommend the following:

- please keep the area covered with vaseline and vaseline impregnated gauze, then wrapped in kerlex. This will help prevent erosions in the area.
- If desired topical clobetasol ointment may be applied to this area daily x 1 week. This may hasten improvement of area.
- if vesicles and bullae do become un-roofed, please leave skin intact, as even dead skin can provide a barrier to infection
- as patient seems to react to adhesives, please consider using paper tape only
- there is currently no role for prophylactic antibiotics for this process

Thank you for this interesting consult. Please page with any questions or concerns.

Jamie Woolrich, M.D.
Consult Resident
Pager XXXX

Patient seen and examined with consult attending, Dr. Lee.
Please see attending note in chart/addendum to be added online

Patient seen and evaluated. I reviewed the history, examination, and plan with the resident. I agree with Dr. Woolrich's 3/16/XX history, examination and plan documented above. Briefly, 4 year old female with ALL and painful rash on left arm. No previous rash in this location. PE - Geometric erythematous patch left arm with clear bulla. Playing game. A/P - Likely contact dermatitis. Topical corticosteroids and dressing if desired but she may prefer no therapy. Will follow with you.

Marilyn Lee, M.D.

Note Type: Oncology Inpatient MD
 Date: March 15, XX 10:32 EST
 Status: Auth (Verified)
 Created by: KHOURI MD, PhD, SABRINA J on March 17, XX 10:34 EST
 Verified by: KHOURI MD, PhD, SABRINA J on March 17, XX 10:34 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 02/5/XX - 3/17/XX

*** Final Report ***

Solgos, Naomi XXX-XX-XX

ID: 4 year old female with new diagnosis of SR Pre-B ALL being treated on PPTH Protocol 03-001.

I obtained history from the patient and/or parent.
 I obtained history from the resident or clinical fellow.
 I personally examined the patient or supervised the trainee's exam.
 I discussed the plan of care with the resident and/or clinical fellow.
 I agree with the assessment and documented plan of care, with the changes or additions noted below:

Interval History: Tmax 38.3. Several episodes of emesis. One loose stool per day. No mouth pain. ANC now 690.

PE: Patient was alert, interactive, NAD. Alopecia. MMM, no mucositis. No ptosis, no facial drop. No oral lesions. Lungs clear, no wheezes or crackles. Heart sounds normal S1 and S2, no rubs, murmurs, gallops. Abdomen soft, non-distended, non-tender, normal bowel sounds. No HSM. Extremities warm and well-perfused, no edema. Erythematous and papular rash at site of former tape at PICC site now significantly less erythematous, several ruptured blisters; no bruising or petechiae. Neuro exam grossly normal. PERRL. EOMI.

Labs:

Labs (Reported 03/16/XX 10:33 - 03/17/XX 10:33)

Chem 7 (03/17 01:00)

136	103		/ (Glu)
3.12 L	24	0.2 L	\

CBC (03/17 01:00)

2.67 L \	9.4 L	/	225 K
/	28.7 L	\	

MCV 88.1 H

Assessment/Plan: 4 year old female with new diagnosis of SR Pre-B ALL being treated on PPTH Protocol 03-001. Consolidation I therapy.

Oncology:

- Pre-B ALL on SR arm of 05001
- CNS1
- Cytogenetics: hyperdiploid
- Consolidation I (3/10/XX): Today 3/17/XX is day 7.

-MTX 24 hr level 30. MTX 48 hr level 0.25, IVF increased per protocol. MTX 72 hr level 0.06. MTX undetectable 3/14/XX.
 -6-MP stopped due to APC<500.

Heme: Standard transfusion parameters.

-6-MP stopped due to APC<500.
 -pRBC transfusion 3/14/XX.
 -ANC 690

ID: Febrile 3/11/XX.

-erythema at former PICC site, likely due to MTX. Started on vancomycin on 3/13/XX for possible cellulitis, though.
 -seen by dermatology yesterday who thought the rash was a likely drug reaction to MTX. Recommended Vaseline dressing.
 -ceftazidime and vancomycin. Since rash seems more likely related to MTX, rather than cellulitis, we stopped vancomycin on 3/14/XX and changed to oral clindamycin, which she will be discharged on. Monitoring rash closely after change in antibiotics. No signs of superinfection.
 -ANC 690 on 3/17/XX. Since no longer neutropenic, we will stop ceftaz, but continue clindamycin. If febrile, will need ceftriaxone and culture.

Derm:

-rash at site of former PICC dressing; first noted after MTX infusion
 -less red today, but with fluid-filled blisters. Some blisters now ruptured. Seen by dermatology, likely MTX reaction. Will use vaseline gauze as needed. Improving daily.

HA:

-complaining of intermittent HA, which responds to pain medication. Sometimes, seems to often correlate with fever. Also, seemed to improve after pRBC transfusion. Naomi continues to be playful and active. Denied HA on rounds today. Normal neurologic exam. Low concern for serious cause of HA, such as a clot, at this time. Will continue to follow closely and consider imaging if change in clinical status.

GI: PO ad lib. Bowel regimen. Tums.

-good appetite
 -several episodes of emesis yesterday

Access:

-PAC 3/9/XX

Prophylaxis:

-bactrim started

Primary Team: Androkites/Kesselheim

Social: followed by psychsocial.

Dispo: Likely today with dose of ceftriaxone prior to departure. Will f/u with Dr Khouri on 3/23/XX.

I spent over 35 minutes today on the inpatient floor coordinating the patient's care and in counseling. This time included discussion with multiple providers on rounds including the fellow/resident/nursing staff, discussion with the patient and family, physical examination of the patient, and reviewing primary lab data.

Sabrina Khouri, MD/PhD
Pediatric Oncology
CHB Pager# XXXX

Addendum: At discharge, patient was well appearing and active, and just completed eating dinner. Temperature was then recorded at 38.0. We administered a parting dose of ceftriaxone to cover the patient for an additional 24 hours and resent blood cultures. We reviewed fever management and the discharge considerations with the parents, who agreed with the discharge plan. We will phone follow up with family tomorrow morning and also follow up all cultures. Indications to call the oncology service and return to the hospital were reviewed in detail.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #6**

Note Type: Discharge Summary
 Date: April 05, XX 13:10 EST
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: IVANOV MD, TRAICHO E on April 05, XX 11:36 EST
 Verified by: RICCA MD, ADAM on June 16, XX 08:53 EDT
 Encounter info: XXXX, St. Sebastian's Hospital, Inpatient, 3/25/XX - 4/5/XX

* Final Report *

DATE OF ADMISSION: 03/25/XX.

DATE OF DISCHARGE: 04/05/XX.

ATTENDING PHYSICIAN: Ricca, Adam, MD.

ADMISSION DIAGNOSIS: Chronic ulcerative colitis.

HISTORY OF PRESENTING ILLNESS: This patient was admitted to the care of the gastroenterology service on 03/25/XX because of a flare of ulcerative colitis refractory to multiple medical treatments. Please see the prior transfer note for full details of the hospital course before her surgery, when she was in the care of the gastroenterology service for approximately one week.

MEDICAL HISTORY: Chronic ulcerative colitis. Chronic idiopathic thrombocytopenic purpura.

PHYSICAL EXAMINATION: For the details of the admission physical examination, please see the transfer summary.

HOSPITAL COURSE FROM 03/30/XX: The patient was transferred to the care of the general surgery service after undergoing a standard bowel prep followed by total abdominal colectomy with ileoanal pull-through and creation of anal J-pouch and ileostomy on 3/30/XX. Please see the operative note for details of the surgery. An epidural was given for pain control. By system:

1. Neurologic. An epidural was in place for postoperative pain control. She was followed by the pain service for most of her stay. The epidural provided adequate pain relief, until she had some bleeding around the entry site on postoperative day #3. A lumbar MRI scan revealed a small hematoma in the posterior epidural space at the level of catheter insertion. However, her neurologic exam was stable. The catheter was removed, and a Dilaudid patient-controlled analgesia was used until intravenous access was lost, when she transitioned to oral medication. Pain control was good, except for some persistent pain in the right shoulder, which was attributed to diaphragmatic inflammation from pneumoperitoneum during surgery. Incidentally, on the spinal MRI was noted a fatty filum. Dr. Rizzo discussed this finding with Neurosurgery and it was decided that Ruby will follow up with Dr. Sean Attenborough of neurosurgery to determine the need for further monitoring or interventions, based on symptomatology. At the time of discharge, neuro exam was normal.

2. Cardiovascular. No issues.

3. Respiratory. No issues.

4. Gastrointestinal. The patient initially had a nasogastric tube in place after surgery. This was maintained on wall suction until postoperative day #3, when it was put to gravity. Intravenous access was lost, and she began taking clear liquid to maintain hydration after removal of the nasogastric tube. She tolerated clear liquids with no nausea or vomiting and was able to keep up with stoma output. The stoma started to put out gas and stool on postoperative day #2 and was working well by postoperative day #4. She was able to advance her diet on postoperative day #4 and was tolerating a full diet by discharge. Her stoma remained pink and healthy appearing. Output was starting to thicken by discharge.

The patient was on steroids and tacrolimus preoperatively. The steroids were continued after she received a stress dose with prednisone 20 milligrams by mouth twice per day. After the stress dose steroids were finished, a taper was started on postoperative day #5 and consisted of the following: prednisone 35 milligrams once daily from 04/06/XX until 04/08/XX, followed by 30 milligrams daily from 04/09/XX through 04/12/XX, followed by 25 milligrams daily from 04/13/XX until 04/15/XX, when she will follow up with gastroenterology in clinic to determine her further steroid taper.

5. Genitourinary. A Foley catheter was initially in place while the epidural was in. This was removed when the epidural came out, and she voided without issue.

6. Hematologic. The patient has a history of idiopathic thrombocytopenic purpura. Therefore, her platelet count was followed closely. Prior to surgery, it was greater than 150 and continued to be in the 100s until postoperative day #5, when it was 94. A repeat CBC was stable at 136. The hematology service was consulted for management during the steroid taper. Prednisone 20 milligrams twice per day was being given, with a taper beginning at discharge. Hematology recommended checking daily CBCs while in the hospital to watch her platelet count as the steroids decreased, with the recommendation that if the platelet count dropped as the steroids were weaned she may need IVIG treatment. She will receive a repeat CBC at follow up with GI.

7. Infectious disease. The patient's white blood cell count remained elevated, but this was attributed to steroid use. She remained afebrile. There were no issues with infection.

8. Endocrine. No issues.

CONDITION ON DISCHARGE: The patient was discharged in stable condition on 04/05/XX, tolerating a full diet, with good urine output and good ostomy output. She and her mother received stoma care teaching. Supplies were sent to their home.

FOLLOW UP: She will follow up with the gastroenterology service in one week and with Dr. Buck in one to two weeks. She will call for an appointment w/ Dr. Sean Attenborough of neurosurgery.

DISCHARGE MEDICATIONS:

1. Prednisone taper. Prednisone 35 milligrams by mouth daily on April 5 and April 6, then prednisone 30 milligrams by mouth daily on April 7, 8, 9, and 10, then prednisone 25 milligrams by mouth daily on April 11, 12, and 13 when she will f/u w/ GI to determine further taper.

2. Oxycodone 5-10 milligrams by mouth every four to six hours as needed for pain.
3. Tylenol 650 milligrams by mouth every four hours as needed for pain and fever.
4. Nystatin powder to stoma site as needed for skin care.

TESTS PENDING AT DISCHARGE: Pathology specimen results.

Note Type: ED Consultation
 Date: March 27, XX 00:00 EST
 Status: Auth (Verified)
 Subject: ED Consultation
 Created by: BANERJEE MD, SANDEEP A on March 27, XX 12:13 EST
 Verified by: MIZRAHI MD, ALEXA E on March 31, XX 19:36 EST
 Encounter info: XXXX, St. Sebastian's Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

GI Consult Note:
 Service/Attending Requesting Consult: Emergency Department
 Reason for Consult: Abdominal Pain, Hematochezia, UC

HPI: This is a 13 yo female with a history of UC (diagnosed 10/XX) and ITP who presents now with worsening abdominal pain, hematochezia. She was recently discharged from the hospital (3/12/XX) after a UC flare requiring reintroduction of steroids. Due to the persistence of symptoms she was transitioned to tacrolimus to be used as a transition to eventual colectomy.

For the first week after discharge she was feeling very well. She had no blood in her stools. Her stools were well formed and she had a BM 1 - 2 times a day. However, ~ 1 week ago she began to complain of a recurrence of symptoms. She noted the onset of lower quadrant abdominal pain. Mother reports that she began to notice blood in her stool with worsening frequency and urgency. She spoke with her primary GI doctor who started her on cortifoam enemas without significant improvement. Her symptoms persisted and increased till this AM when mom reports frank blood in the toilet and significant abdominal pain, so she sought care at the ED.

No fevers. + Nausea, no vomiting. + Decrease PO intake. Father is sick at home with URI like symptoms

PERTINENT GI HISTORY: as above

HISTORY OF LIVER DISEASE: none

DIET: Normal age appropriate

PAST MEDICAL HISTORY:

- ITP diagnosed 12/XX: followed by hematology. Responds well to IVIG

MEDICATIONS:

- Tacrolimus 5 mg BID
- Prednisone 40mg qDay
- Bactrim 160mg q M/W/F
- Protonix 40mg qDay
- Zofran
- Cortifoam enemas

ALLERGIES: NKDA

PREVIOUS GI STUDIES:

- Endoscopy: last in 10/XX showing pancolitis

PREVIOUS SURGERY: none

FAMILY HISTORY:

- unremarkable

SOCIAL HISTORY:

- Hasn't been back to school since discharge from the hospital

REVIEW OF SYSTEMS

EAR, NOSE & THROAT: Normal
 CARDIAC: Normal
 MUSCULOSKELETAL: Normal
 RESPIRATORY: No dyspnea or wheezing.
 BLOOD DISORDERS: Normal
 GENITOURINARY: Normal
 SKIN: Normal
 ENDOCRINE/METABOLIC: Normal
 NEUROLOGIC: Normal
 PSYCHOSOCIAL: Normal

PHYSICAL EXAM

General: Well-developed, well-nourished
 Weight: 59.8 kg
 BP: 120/74 P: 100 T: 36.4
 Well-hydrated. ill appearing, Alert & appropriate.
 Skin: without jaundice. No erythema nodosum.
 HEENT: An-icteric sclerae, no conjunctivitis, moist mucous membranes, no ulcers
 Neck: without masses, no goiter
 Chest: clear to auscultation, breathing unlabored
 CV: Regular rate, regular rhythm, no murmurs, no edema
 Abdomen: No surgical scars, non-distended, normal bowel sounds. No mass palpable. Lower quadrant tenderness. Liver not palpable. Spleen not palpable.
 Anus: refused examination
 Lymphadenopathy: none
 Ext: No clubbing.
 Neuro: Developmentally appropriate.
 Psych: unremarkable

Labs:

Date	Test Name	Result/Units	Flag	Ref.
	Range			

03/13/XX 10:47				
	Hemoglobin	14.0 g/dL	H	11.3 -
13.4				
	Hematocrit	42.2 %	H	32.1 -
38.7				
	Platelet	134 K cells/uL	L	189 -
342				
	C-Reactive Protein	1.70 mg/dL	H	-
<=0.50				
03/17/XX 09:10				
	Hemoglobin	12.9 g/dL		11.3 -
13.4				

Hematocrit	39.0 %	H	32.1 -
38.7			
Platelet	81 K cells/uL	L	189 -
342			
C-Reactive Protein	4.10 mg/dL	H	-
<=0.50			
Tacrolimus Level	14.7 ng/mL	H	3.0 -
14.0			
03/24/XX 09:06			
WBC	20.25 K cells/uL	H	5.52 -
9.29			
Hemoglobin	12.7 g/dL		11.3 -
13.4			
Hematocrit	38.2 %		32.1 -
38.7			
Platelet	45 K cells/uL	C	189 -
342			
C-Reactive Protein	4.30 mg/dL	H	-
<=0.50			
03/27/XX 11:28			
WBC	18.39 K cells/uL	H	5.52 -
9.29			
Hemoglobin	13.4 g/dL		11.3 -
13.4			
Hematocrit	38.5 %		32.1 -
38.7			
Platelet	53 K cells/uL	L	189 -
342			
Neutrophil/Band	69 %		46 -
76			
Lymphocyte	16 %		8 - 39
Monocyte	10 %	H	4 - 7
Eosinophil	2 %		1 - 3
Basophil	0 %		0 - 1
ESR (Erythrocyte Sedimentation Rate)	40 mm/hr	H	0 - 20
C-Reactive Protein	6.80 mg/dL	H	-
<=0.50			

Impression/Plan: This is a 13 yo with UC and ITP now here with a flare. We will admit to GI. With regards to the treatment of this acute flare. We will start Ruby on IV steroid to facilitate resolution, she has been responsive in the past. We will also check stool for infectious studies now. The more difficult question is regarding her long term plan. She will eventually need a colectomy, but will not be able to undergo one on her current steroid dose. We will discuss this more in detail with her Primary GI doctor.

-Sandeep Banerjee, MD
Clinical Fellow in Pediatric GI and Nutrition

History reviewed. Patient examined. 13 year old with UC on tacrolimus and steroids having increasing symptoms admitted for further treatment of her disease. Plan discussed with fellow and family as outlined above.

Alexa Mizrahi, MD
Attending in Gastroenterology

Note Type: Operative Note
 Date: April 2, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: RICCA MD, ADAM on May 10, XX 14:21 EST
 Verified by: RICCA MD, ADAM on July 24, XX 09:22 EDT
 Encounter info: XXXX, St. Sebastian's Hospital, Inpatient, 3/25/XX - 4/5/XX

*** Final Report ***

DATE OF PROCEDURE: 04/02/XX

PRE-OPERATIVE DIAGNOSIS: Ulcerative colitis

POST-OPERATIVE DIAGNOSIS: Same

PROCEDURES PERFORMED:

1. Rigid proctoscopy.
2. Laparoscopic subtotal colectomy
3. End ileostomy

SURGEON: Adam Ricca, MD

ASSISTANT: Jason Witherspoon, M.D.

HISTORY/INDICATIONS: Ruby Moyo is a 13-year-old female with medically refractory ulcerative colitis. She had ongoing abdominal pain and hematochezia. Due to the fact that she is not responding to medical therapy she was, therefore, deemed an appropriate candidate to be taken to the operating room for the beginning of a three stage laparoscopic colectomy and ileoanal J-pouch pull through. Today's operation is intended to remove the majority of her colon to help abate her symptoms.

FINDINGS: Normal intraabdominal anatomy. There is some injection with inflamed vessels on the surface of the colon.

DESCRIPTION OF PROCEDURE: After informed consent was obtained the patient was taken to the operating room and placed supine on the operating room table. After adequate endotracheal anesthesia had been administered she was placed in a modified lithotomy position. I then performed a rigid proctoscopy to evaluate her mucosa. There was diffuse beefy redness of the mucosa with a couple of small ulcers. It was clear that this patient would not be a safe two-stage colectomy and J-pouch candidate. The proctoscope was removed and the patient was then prepped and draped in the usual sterile fashion. The ileostomy site had been previously marked by Danny Zuko, our enterostomal therapist. I made a circular skin incision the size of a quarter using a Weck 30 degree blade. The Bovie electrocautery was used to dissect down to the level of the fascia and the fascia was incised. The posterior rectus fascia was elevated and incised and the peritoneum was entered safely. A silk suture was placed in the fascia to anchor a port and an Interdyne step dilator sheath was passed easily under direct vision. A 12 mm port was then placed and sutured in position with the silk. The 30 degree 5 mm laparoscope was then introduced into the abdomen to ensure that we were intraperitoneal. The abdomen was then insufflated to a pressure of 12 mm Hg with a carbon dioxide cast. Then 5 mm long ports were placed at the base of the umbilicus,

the suprapubic midline, the left flank and the epigastrium. All ports were placed under direct vision of the laparoscope. Once the ports had been placed I mobilized the rectosigmoid junction using the LigaSure device. A window was made in the rectosigmoid mesentery and the bowel was divided with two loads of a 60 mm long endo-GIA 3.5 mm thick staple load. I then mobilized the colon from its retroperitoneal attachments along the descending and sigmoid colon. The splenic flexure was mobilized and the gastric colic omentum was divided. The right colon was then mobilized up to the hepatic flexure. Once the entire colon was freed from its peritoneal attachments I then used the LigaSure device to divide the colonic mesentery. The colon was then removed directly through an enlarged facial incision at the 12 mm port site. A mesenteric window was made by clamping, dividing and ligating with Vicryl suture. At the ileocecal valve the small bowel was divided using an endo-GIA 2.5 mm thick staple load. The colon was passed off as a specimen. I then reinsufflated the abdomen and observed the ileostomy coming through the abdominal wall. The mesentery was more oriented on the superior aspect of the ileostomy. I took care to attempt to mobilize a longer segment of ileum, as the subcutaneous fat stores in this patient are ample. This made bringing up a well matured ileostomy difficult. Ultimately, however, I think we were successful in obtaining a nicely perfused ileostomy, which sat up fairly well. Then, 4-0 PDS sutures were placed in the fascia and then passed through the serosa of the small bowel to anchor it at the abdominal wall fascia. The fascia of all of the port sites was then closed after removing the ports using PDS suture. The skin edges were reapproximated in layers with Vicryl suture. Telfa and Tegaderm dressings were applied after Steri-Strips were placed. The staple line on the small bowel was then removed using the Bovie electrocautery. The ileostomy was matured in a Brooke fashion using 4-0 Vicryl suture. The first iteration of the four corner stitches of the ileostomy led to dipping of the skin in order to try to get good eversion of the ileostomy. I was concerned that this would make for major challenges in pouching and all of these four sutures were then removed and new corner sutures were placed placing less tension on the skin from the ileostomy. The skin was much flatter and then the quadrant sutures were tied and the quadrants were filled in with interrupted Vicryl sutures.

The patient tolerated the procedure well. The sponge and needle counts were correct at the end of the case. She was extubated in the operating room and taken to the post anesthesia care unit in stable condition. I am the attending surgeon and was present for the entirety of the operation.

Note Type: Pain Treatment Consultation
 Date: April 04, XX 15:27 EST
 Status: Auth (Verified)
 Created by: RIZZO MD, BETTY A on April 04, XX 15:27 EST
 Verified by: RIZZO MD, BETTY A on April 04, XX 15:27 EST
 Encounter info: XXXX, St. Sebastian's Hospital, Inpatient, 3/25/XX - 4/5/XX

*** Final Report ***

Ruby Moyo is being treated with PCA for ABDOMINAL PAIN pain, now POD #2 following Lap assisted subtotal colectomy for ulcerative colitis-dx XXXX. ITP

Patient Weight: 60.0 kg.

Issues overnight included: Pt received toradol x 1. Pt c/o increased back pain and was found to have bleeding at epidural site. Epidural removed, pressure dressing applied. Lumbar MRI done urgently (small amt of epidural blood at catheter insertion site, fibrofatty filum. Q1hr neuro checks overnight, with no change in neuro exam throughout. Started on Morphine PCA for pain control. Pt continues to have right shoulder pain and throat irritation from NGT. NGT currently clamped. MRI results reviewed with team and family.

Current nutritional status: NPO.

Allergies: NO KNOWN ALLERGIES.

On exam today, the patient was alert, oriented, VSS.

Respiratory condition: she had good respiratory rate and depth.

Epidural site condition: Pressure dressing removed. Clean insertion site where epidural catheter had been. Tegaderm dressing with gauze reapplied.

Exam of the lower extremities: shows good voluntary movement of both lower legs.

Our impression for Ruby Moyo: she is having good analgesia with morphine PCA. Had superficial bleeding at site of catheter due to irritation, ITP, ? toradol x 1. Incidental spinal fatty filum.

Our plan today: continue the current PCA morphine 1.5mg dose, 7 min lockout, 25mg 4hr max. Toradol d/c'd after initial dose.

I have personally reviewed the patient's history and laboratory studies, and have examined the patient, and I have supervised the fellows and PNPs in analyzing the clinical data and developing a diagnostic impression, and formulating a treatment plan.

Betty A Rizzo, MD

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #7**

Note Type: Discharge Summary
 Date: July 26, XX 17:34 EDT
 Status: Modified
 Subject: Discharge Summary
 Created by: KELTER MD, KATHERINE D on July 26, XX 16:47 EDT
 Verified by: WILLOUGHBY MD, PhD, FRED on July 29, XX 16:32 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***
Document Contains Addenda

ATTENDING PHYSICIAN: Dr. FRED WILLOUGHBY

DATE OF BIRTH: 07/18/XX

THIS IS A REPLACEMENT FOR A CANCELLED DOCUMENT

ADMITTED: 06/11/XX

HOUSE OFFICER:

TEHNAZ PARAKH BOYLE

ADMITTING DIAGNOSIS:

ALLOGENEIC BONE MARROW TRANSPLANT

PRINCIPAL DIAGNOSIS:

ALLOGENEIC BONE MARROW TRANSPLANT

SECONDARY DIAGNOSES:

COMBINED IMMUNODEFICIENCY

HYPER-IGE SYNDROME

S/P MITRAL VALVE REPAIR WITH RESIDUAL STENOSIS

ASTHMA

ADRENAL INSUFFICIENCY

PRINCIPAL PROCEDURE:

MATCHED SIBLING ALLOGENEIC BONE MARROW TRANSPLANT 06/21/XX

COMPLICATIONS:

NONE

SUMMARY OF HOSPITAL COURSE:

Maria is 8y/o F with combined immunodeficiency and hypereosinophilia/hyper IgE, admitted for sibling matched allogeneic bone marrow transplant.

6W BMT Service

Hospital Course (6/11-7/26)

CARDIOVASCULAR: She has a hx mitral valve repair for papillary muscle rupture secondary to endocarditis. Pre-transplant ECHO revealed normal cardiac function. She was initially continued on her home enalapril (converted to IV during transplant). She was pre-medicated with tylenol, benadryl and hydrocortisone, but after engraftment, she began to have daily fevers for which she had serial CXRs to evaluate for a pulmonary source of infection. These were notable for pulmonary edema with development of a small L pleural effusion which progressed over the next week after engraftment and was associated with severe respiratory distress. She was transferred to the ICU and her IVIg infusions stopped. Given her hx mitral valve disease, she underwent a repeat ECHO 7/13 to evaluate whether there was a primary cardiogenic component to her pulmonary edema. This showed mild mitral regurgitation and normal LV systolic function but new findings of increased mitral stenosis (as reflected by increased mitral valve gradient from 7 to 12

mmHg) and diminished LV relaxation. Cardiology was consulted and felt these findings of increased mitral stenosis and left atrial pressure should be interpreted in the context of increased tachycardia with fever, and should be reevaluated with an ECHO when she is closer to baseline hemodynamics prior to discharge. They recommended diuresis to achieve euvolemia by switching from Enalapril to Lasix BID. She responded well to the Lasix. She underwent repeat echocardiogram on 7/25 which was technically difficult due to poor windows, however, mean mitral inflow gradient of ~ 10 mm Hg (heart rate 109 bpm), mild mitral regurgitation, qualitatively mildly dilated left atrium, qualitatively good left ventricular systolic function and otherwise normal study. As she was doing so well, with likely decreased inflammation and fluid retention, and rising creatinine, we opted to decrease Lasix to once daily dosing and cardiology was in agreement with this plan. Her blood pressure was well controlled on the lasix and enalapril will continue to be held while she remains on the lasix. The lasix will not likely need to continue for very long after discharge; weaning/ discontinuation of lasix and resuming enalapril can be coordinated by cardiology as an outpatient.

RESPIRATORY: She was continued on her home Advair, Singulair, and Albuterol PRN for her hx moderate persistent asthma. She was engrafted on 7/10 (day 18). The week following engraftment, the patient had serial chest x-rays in the setting of fever and evolving respiratory distress (despite broad spectrum antibiotics and antifungal therapy), which showed progressive pulmonary edema and evolution of a L pleural effusion. On subsequent IVIg infusions she was pre-medicated with tylenol, benadryl and hydrocortisone 2mg/kg IV Q6hr x2. Despite her premeds, she developed a severe reaction with a fever to 39.7, rigors, pulmonary edema, and severe respiratory distress so was transferred to the ICU. IVIg Infusion was stopped. Because of shortness of breath, she was placed on BiPAP and treated with aggressive bronchodilator therapy x 3 days, initially with Albuterol Q2H which was spaced progressively to an as needed basis as her respiratory status improved with diuresis on Lasix BID. Echo at the time did not reveal any additional LA enlargement or higher degree of mitral stenosis. While having persistent fevers, she also underwent chest CT which showed new pulmonary (and hepatic) nodules (not visualized on pre-transplant chest CT from outside hospital) which could represent inflammatory nodules, but were concerning for new fungal infection. These were resolved on subsequent CT scan, and then felt to more likely have represented sub-segmental atelectasis. Maria's respiratory status improved slowly and at the time of discharge she was experiencing intermittent, mainly nocturnal, mild tachypnea. There was no evidence of CO2 retention. She was started on azithromycin QMWF for anti-inflammatory effects, which she will continue.

CONDITIONING: She received busulfan and cyclophosphamide for conditioning without incident.

GRAFT: She received a sibling matched allogeneic BMT on 6/22/XX (day 0) with a cell dose of 9.39×10^6 . She received transfusions initially per standard criteria (Hgb <7 and plt <10) but later with increased Plt parameters (plt <30) while having nosebleeds. She did not require PRBC transfusions, and her last platelet transfusion was on 7/2. She received premedication with tylenol/benadryl prior to transfusions. She was started on GCSF on day 0 and continued until her ANC > 2K for 3 consecutive days. She engrafted on 7/10 (day 18).

GVHD PROPHYLAXIS: Maria was treated with cyclosporine (starting day -2 with levels checked at least twice weekly and adjusted as needed) and full-dose

methotrexate on days 1, 3, 6, 11. Last cyclosporine level was 207 on 7/24 and her dose was changed from 75mg PO Q12hr to 50mg PO QAM and 75mg PO QPM.

FEN/GI:

1. Nutrition: Maria received PN as PO intake decreased in midst of transplant, but was weaned off on 7/15 as her PO intake improved.
2. Fluids/Electrolytes: As above, she had evidence of fluid overload with increased weight and pulmonary edema/L pleural effusion, for which she was started on Lasix 0.5 mg/kg IV BID. She had hypokalemia while on standing Lasix, ambisome, and albuterol, which was treated with intermittent IV potassium boluses, increasing potassium in PN, and eventually with standing oral potassium supplementation. As these medications were weaned and oral intake improved, her potassium levels rose and these supplements were discontinued on 7/25. Electrolytes should be checked as an outpatient.
3. GI: She received protonix for GI prophylaxis. She had significant nausea which required a regimen of Zofran ATC (attempted to wean to PRN, but changed back to scheduled 7/24 for increased vomiting), Ativan (to PO 7/21, to Q8 7/22, further weaning to happen on an outpatient basis), Benadryl PRN, marinol (to Q8 7/22, back to Q6hr 7/24 for increased vomiting), and Reglan/Benadryl, which were weaned off prior to discharge.

INFECTIOUS DISEASE:

On admission, she was started empirically on treatment dosing of meropenem IV (6/12-7/20) for sinusitis "cleanout" (given hx pneumococcal infections) and Flagyl (6/12-7/19) for giardia suppression. Repeat Giardia on 7/20 was negative.

Vancomycin (6/23-7/17), Cipro (6/6-7/13), and ambisome 3 mg/kg/day (7/6-7/24) were added sequentially with fever spikes. Persistent fevers began around time of engraftment. Serial blood cultures, bacterial and viral respiratory cultures/DFAs showed no growth. CXR were unrevealing for a new, significant bacterial process. She underwent chest CT which showed new pulmonary nodules (not visualized on pre-transplant chest CT from outside hospital) which could represent inflammatory nodules, but were concerning for new fungal infection. On 7/13, BetaDglucan was mildly elevated at 86 and galactamannin was negative. Repeat BetaDGlucan on 7/21 was decreased to 44, which is interpreted as negative based on the laboratory reference range. Initial chest CT also showed new R hepatic lesion. Abdominal MRI 7/18 showed a lesion possibly concerning for fungal infection though on further review with radiology it was felt that this may have been there previously. Repeat chest CT 7/19 with interval improvement in ???nodules???, raising possibility that these were not true nodules previously visualized but possibly segments of atelectasis.

We then opted to observe her expectantly and serially discontinue her treatment dose antibiotics. She defeveresced and continued to improve clinically, so further work up was not pursued. Through this time, other infectious etiologies were considered as well; she did not demonstrate sinus pain or nasal discharge despite history of recurrent sinusitis; and she had 4 loose teeth with no evidence of dental abscess or other oral infection.

After engraftment, she complained of painful urination, and had serial urinalyses, urine BK and adenovirus (and blood adenovirus) sent which were all negative. Her symptoms were more suggestive of urethritis than cystitis (mild relief with pyridium, better relief with topical normal saline via syringe), although the etiology was unclear.

She also received acyclovir for CMV prophylaxis (given positive pretransplant CMV titers) and fluconazole for fungal prophylaxis when not on ambisome. We followed weekly CMV PCR (when neutropenic) and antigenemia (once engrafted). Last CMV antigenemia on 7/24 was negative. Her acyclovir prophylaxis was continued beyond day 30 due to her history of recurrent mucocutaneous HSV. Her PCP prophylaxis was initially resumed with Bactrim; this was changed to nebulized pentamidine on 7/25 given a rise in her creatinine. She was on vancomycin/polymixin as per protocol for gut decontamination, discontinued once engrafted.

Maria also requires prophylaxis against encapsulated organisms given her asplenia. Her "anti-inflammatory" azithromycin is adequate to achieve this purpose.

ENDOCRINE: She has a hx adrenal insufficiency with prolonged steroid use for hypereosinophilia (home dose hydrocortisone 5 mg PO BID). She was initially converted to IV hydrocortisone 5 mg daily when her PO intake decreased, but was increased to stress-dose steroids in the setting of persistent fever around engraftment. As her fever curve improved, she was weaned to 7.5 mg PO TID on 7/16. Per endocrine, at this dose ($\sim 20\text{mg}/\text{m}^2/\text{day}$) this is neither physiologic nor stress dosing. A physiologic regimen would be approximately 7.5mg QAM and 2.5mg QPM ($10\text{mg}/\text{m}^2/\text{day}$). While it would be acceptable from adrenal standpoint to drop to this dose right away (no risk from an adrenal perspective), a fast wean will likely cause her to feel unwell. We therefore opted to send her home on a taper plan to achieve this dose over the course of approx 3 weeks. If Maria tolerates this dose for a 2-4 weeks, reducing the dose to 5mg QAM and 2.5mg QPM would be appropriate. Once at this dose steady "sub-physiologic" dose for 2-4wks, Maria could undergo a stim test to check adrenal function (which may take months to return to normal). It will be important to remember that she requires stress dose steroids in any future times of stress until adequate function is documented by a "passed" stim test. The endocrine team would be happy to become involved at any point if there are questions or concerns about this regimen.

PAIN: Maria received pain control via a morphine PCA which was eventually transitioned to intermittent morphine on 7/14, and weaned off completely.

RENAL: Maria's admission creatinine was 0.4 with a creatinine clearance of $173.7\text{mL}/\text{min}/1.73\text{m}^2$. Within the first 48 hours of admission her creatinine rose to 0.8. Her creatinine continued to trend up during the last week or so of her stay, with a discharge value of 1.1. The family was given supplies to collect a 24 hour urine at home starting Thursday and bring to clinic on Friday. We stopped Bactrim and change to nebulized pentamidine, and decreased her Lasix. We opted to continue her acyclovir at this point but this may need to be readdressed in the future.

ACCESS: Left CVL (6/12)

DISCHARGE EXAM:

General: walking around the hall, no distress

HEENT: Alopecia, cushingoid facies, facial edema, no icterus, no congestion/rhinorrhea, MMM

CV: S1 S2 normal, RRR, no murmurs.

Pulm: No evidence of increased WOB. Good aeration throughout without crackles, wheezes. No increased WOB

Abd: soft, +bowel sounds, non-distended, non-tender

Ext: warm, well-perfused

Broviac site on chest without erythema, induration, discharge
Skin: patchy hyperpigmentation.

DISCHARGE DISPOSITION:

ROUTINE DISCHARGE

DIET:

BONE MARROW TRANSPLANT DISCHARGE DIET

LISTED ALLERGIES:

NONE LISTED

MEDICATIONS:

PENTAMIDINE INHALATION POWDER

300MG NEB Q2WK, LAST DOSE 7/25/10

ACYCLOVIR

200MG PO BID

AZITHROMYCIN

250MG PO QMWF

NEORAL

50MG PO QAM AND 75MG PO QPM

DRONABINOL (MARINOL)

5MG PO Q6HR

FLUCONAZOLE

200MG PO DAILY

ADVAIR DISKUS 250MCG-50MCG

1 PUFF MDI BID

HYDROCORTISONE

7.5MG PO TID. SEE INSTRUCTIONS FOR WEAN PLAN.

LORAZEPAM

1MG PO TID

SINGULAIR

5MG PO DAILY

NYSTATIN TOPICAL 100000UNITS/G CREAM

1 APPLICATION TOPICAL TID PRN YEAST RASH

ONDANSETRON ODT

4MG PO Q8HR

OMEPRAZOLE

20MG PO DAILY

ALBUTEROL

2.5MG NEB Q4HR PRN WHEEZING/RESP DISTRESS

DOCUSATE

50MG PO DAILY PRN CONSTIPATION

FUROSEMIDE

20MG PO DAILY

HEPARIN FLUSH 10UNIT/ML

20UNIT IV Q12HR AND PRN

NORMAL SALINE FLUSH

2-3ML IV Q12HR AND PRN

SPECIAL INSTRUCTIONS:

CALL YOUR MD/PNP OR NURSE IMMEDIATELY IF YOUR CHILD HAS A FEVER > 38.0 (100.4F) TWICE IN ONE DAY, OR A FEVER > 38.5C (101.3F) ONE TIME, SHAKING OR CHILLS. 2. CALL IF YOUR CHILD HAS ANY SIGNS OF POTENTIAL INFECTION SUCH AS: REDNESS, SWELLING, OR DRAINAGE FROM ANY SORE AREA OR WOUND, PAC/CVL SITES INCLUDED. 3. CALL IF YOUR CHILD HAS ANY SIGNS OF BLEEDING, SUCH AS: INCREASED BRUISING OR TINY RED SPOTS (PETECHIAE), ANY BLOOD IN URINE OR STOOL, A CUT THAT DOESN'T STOP BLEEDING AFTER 10 MINUTES, A NOSEBLEED THAT DOES NOT STOP AFTER 15 MINUTES. 4. CALL IF YOUR CHILD HAS ANY SIGNS OF ANEMIA SUCH AS: EXTREME TIREDNESS, PALE SKIN, OR SHORTNESS OF BREATH. 5. CALL IF YOUR CHILD HAS ANY SIGNS OF DEHYDRATION SUCH AS: DECREASED OR NO URINATION FOR 6-8 HOURS, FEWER THAN 4-6 WET DIAPERS PER DAY, NOTHING TO EAT OR DRINK

FOR >6 HOURS WHILE AWAKE IF UNDER 1 YEAR OF AGE, OR NOTHING TO EAT OR DRINK FOR >8 HOURS IF YOUR CHILD IS OVER 1 YEAR OF AGE. CALL IF HE OR SHE IS VOMITING. 6. CALL IF YOUR CHILD HAS PROBLEMS WITH CONSTIPATION OR DIARRHEA 7. FOR ANY LIFE THREATENING EMERGENCIES, CALL 911. FOR ANY MEDICAL ISSUES BETWEEN 9AM AND 5PM MON-FRI, CALL THE LAKEVIEW CLINIC. FOR ALL OTHER TIMES CALL 617-632-3352 AND PAGE THE PEDIATRIC BMT FELLOW ON CALL.

STEROID WEAN PLAN: ON FRIDAY 7/28 CHANGE DAILY DOSING TO 7.5MG QAM, 5MG QLUNCH, 7.5MG QPM. ON TUESDAY 8/1 CHANGE DAILY DOSING TO 7.5MG QAM, 2.5MG QLUNCH, 7.5MG QPM. ON FRIDAY 8/4 CHANGE DAILY DOSING TO 7.5MG BID. ON TUESDAY 8/8 CHANGE DAILY DOSING TO 7.5MG QAM AND 5MG QPM. ON FRIDAY 8/11 CHANGE DAILY DOSING TO 7.5MG QAM AND 2.5MG QPM. MAINTAIN AT THIS DOSING REGIMEN UNTIL FURTHER DIRECTED. IF MARIA STARTS TO FEEL UNWELL WHILE WEANING PLEASE CALL DR. PLACE. IF MARIA BECOMES FEBRILE OR OTHERWISE ILL SHE WILL NEED STRESS DOSE STEROIDS.

PLEASE SEE YOUR CARDIOLOGIST IN 1 WEEK. AT THAT TIME YOU SHOULD DISCUSS DISCONTINUING THE LASIX AND WHETHER OR NOT THE ENALAPRIL SHOULD BE RESUMED.

PLEASE COLLECT A 24 HOUR URINE SAMPLE AS DIRECTED AND BRING TO YOUR LAKEVIEW CLINIC APPOINTMENT ON FRIDAY.
PATIENT/FAMILY EDUCATION:

UNSCHEDULED AND EXTERNALLY SCHEDULED APPOINTMENTS:

LAKEVIEW CLINIC DR ANDY PLACE FRIDAY 7/28 AT 10:15

TESTS PENDING AT DISCHARGE:

CHIMERISM

T AND B CELL LYMPHOCYTE SUBSETS

CONSULTATIONS:

CARDIOLOGY

NUTRITION

PHYSICAL THERAPY

PAIN TEAM

PSYCHIATRY

SOCIAL WORK

REFERRING/PRIMARY CARE PHYSICIAN :

DISCHARGING HOUSE OFFICER:

KATHERINE KELTER (BY ELECTRONIC SIGNATURE 07/26/XX)

Addendum by WILLOUGHBY MD, PhD, FRED on August 01, XX 18:05 EDT (Verified)

Correction: GCSF (Filgrastim) was not used after stem cell infusion.

Fred Willoughby, MD, PHD

X4987

Attending in HSCT

Note Type: Stem Cell Transplant Admission MD
 Date: June 11, XX 18:40 EDT
 Status: Auth (Verified)
 Subject: SCT Admission Note
 Created by: Patel MD, Kumar L on June 11, XX 18:42 EDT
 Verified by: Patel MD, Kumar L on June 12, XX 09:33 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 6/26/XX

*** Final Report ***

BMT ADMIT NOTE 6/11/XX

CC: Maria is 8y/o F with combined immunodeficiency and hypereosinophilia/hyper IgE being admitted for sibling matched allogeneic bone marrow transplant.

PMH:

- Combined immune deficiency: Multiple infections since infancy. First one was pneumococcal meningitis and sepsis in 2004. She failed to respond to pneumococcal vaccine after the first infection and was later found to have falling IgG level, falling T cells (particularly) CD4 counts, and high monoclonal IgE. Thereafter she has experienced multiple pneumonias, recurrent otitis, urinary tract infections, recurrent and severe HSV of the skin and persistent Giardia infection. She has been on prophylactic IVIG, bactrim and acyclovir. About a week ago had chest CT, bronchoscopy and sinus puncture. Per pre-transplant notes, no active infection was identified.
- Idiopathic Hypereosinophilia: First noted 2004. Has undergone extensive evaluation including bone marrows 2007 and XX and FIPIL1-PDGFR fusion gene, which was negative. Eosinophilia responded to steroids, but not to hydroxyurea, and imatinib.
- Mitral valve repair: Had chorda tendinae rupture resulting in flail mitral valve for which she underwent mitral valve commissuroplasty at Plainsboro Hospital in October 2004
- Adrenal insufficiency: Thought to be from chronic steroid use. Takes hydrocortisone at baseline and needs stress dose steroids for procedures.

Recent history:

Last infection was UTI in April XX, treated with antibiotics. No fevers since then. Has chronic sinusitis manifested as persistent intermittent cough and post nasal drip. Recent evaluation with bronch, chest ct and sinus tap was negative for active infection. Experiences intermittent chest and muscle pain of unclear etiology and often gets headache with infusion of IVIG. Has intermittent abdominal pain with occasional emesis. Is having formed stools daily. No significant vomiting or diarrhea. Also experiences occasional rash on face and elbows.

Surgeries: Mitral valve repair (2006), myringotomy and tympanostomy tubes in the right (2011), sinus puncture

ALL: Cephalosporins (mild, has tolerated as well)

FH: The family history is negative for early deaths, blood diseases, malignancies, severe atopy, or immunodeficiencies.

SH: She lives in Springfield, Massachusetts, with her parent 2 older siblings (18y/o sister and 5y/o brother) and 2 grandparents. She is the product of a consanguineous marriage, in that her parents are first cousins. They are of Lebanese Arab descent.

Home Medications:

1. Enalapril, 5 mg twice a day.
2. Acyclovir, 200 mg twice a day.
3. Penicillin, 250 mg twice a day.

4. Advair inhaler, 1 puff two times a day.
5. Singulair, 5 mg by mouth once a day.
6. Bactrim, 10 mL daily.
7. Hydrocortisone, 5 mg two times a day.
8. Calcium, 2 Gummy Bears twice a day.
9. Vitamin D, 1000 units once a day.
10. Intravenous immunoglobulin, 20 g intravenously every three weeks.
11. Pepcid, 1 tablet daily.
12. Flagyl 250mg PO TID

Allergies: Documented allergies were reviewed and reconciled with the history provided by the patient.

Allergies: cephalosporins, cow's milk, eggs, nuts (all tree nuts), Peanuts

Physical Exam:

Basic Vital Signs

Vitals Signs since (06/10 18:41)	Most recent (Time)
Temperature	36.6 (14:45)
Heart Rate	120 (14:45)
BP Systolic	93 (14:45)
Diastolic	54 (14:45)
Respiratory Rate	20 (14:45)
Oxygen Saturation (SPO2)	100% (14:45)
Weight (kg)	29.3 (14:45)

Physical Exam:

Gen: Well appearing, active, interactive, talkative, no distress
 HEENT: NC/AT head, PERRL, EOM intact, conjunctiva clear, MMM, no oral lesions
 Lungs: Clear to auscultation
 Heart: RRR, no murmur
 Abdomen: Soft, NT, ND, BS present
 Skin: No rash, petechiae or bruising.

Labs (Reported 06/11/XX 03:36 - 06/12/XX 03:36)

Chem 7 (06/11 22:45)

134 L	100	11	/ 127 H (Glu)
3.86	22	0.4	\ Ca 9.7 Mg 1.9 Phos 3.9

LFTs (06/11 22:45)

AST	ALT	Bili T	/ Bili D
17	18	0.2 L	/ 0.1
221	4.0		
ALK	ALB		

CBC (06/11 22:45)

7.32 \ 12.5 / 721 K H
 / 37.8 \ MCV 76.2 L

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
06/12 22:45	10.8	1.01	25.7	346	325	

Pre-transplant work-up:

Dental: Normal by report.
Ophthalmology (6/26/XX): Normal exam.

Audiology (6/9/XX): Normal hearing.

Pulmonary function tests (5/22/XX): FVC 93, FEV1 87, FEV1/FVC 93

Echocardiogram/ECG (5/4/XX): Mild LA dilation, mild MS, moderate MR, LV dilation resolved, Trivial AR, LVFS 44%

Creatinine clearance (5/8/XX): 92ml/min (corrected 173.7 ml/min/m2 per 1.73m2)

Serologies (5/31/XX): CMV 3.39, HSV 19.9, EBV IgG 5.49, EBV PCR negative, VZV 2.76, Hep A IgM negative, Hep B sAg negative, Hep B sAb 212.5, Hep B core negative, HCV negative, HCV PCR negative, Toxo<5, HIV negative, RPRNR, Adenovirus PCR negative

Blood type: O Pos

Donor information:

Donor source: matched sibling

Blood type: O Pos

Serologies: CMV <0.07, HSV less than 0.08, EBV 0.26, Hep A IgM negative, VZV 2.63

Assessment: 8y/o F with combined immunodeficiency hypereosinophilia and hyper IgE being admitted for sibling matched allogeneic bone marrow transplant

Plan:

Conditioning: Busulfan 23 mg IV on days -9,-8,-7, -6 with fosphenytoin prophylaxis beginning day -10 x6 days. Rest on day -5. Cyclophosphamide 1500 mg days -4, -3, -2 and -1. Day 0 = 6/22/10.

GVHD prophylaxis: Cyclosporine starting day 2 and methotrexate on days 1, 3, 6, 11.

Cardiovascular/Respiratory: Hx mitral valve replace and multiple pneumonias. No active issues.

ID: HSV positive, VZV positive and CMV positive/negative. Due to known mitral valve repair will give Ampicillin before line placement and due to known sinusitis will start Meropenem on day -10 as antibiotic prophylaxis. Continue Flagyl for Giardia. Will discontinue penicillin prophylaxis on day -10, but continue Bactrim for PCP prophylaxis until day -1 and give Acyclovir home dose of 200mg PO BID through day -4, then treatment dose at 500 mg/m2 beginning day -5. Fluconazole for fungal prophylaxis. Check IgG level on admission and then every 3 weeks, IVIG for levels<400. CMV screening to initiate on day +21.

Heme: Transfuse for Hgb<7% and platelets<10 or bleeding. Does not need pre-meds prior to blood products.

Endocrine: Adrenal insufficiency. Will give stress dose steroids around central line placement x3 days, then decrease to baseline.

FEN/GI: BMT diet. TF = 1700ml/day. NPO at midnight for procedure tomorrow. Follow PO intake with daily chemistries. Nutrition consult for PN when indicated. Protonix for gut prophylaxis. Standard antiemetics with Zofran, Reglan, Benadryl.

Access: Will have line placement 6/12.

Liane Meloni, MD
pager 4652

Note Type: Operative Note
Date: June 12, XX 00:00 EDT
Status: Auth (Verified)
Subject: Operative Note
Created by: Lee MD, Harold L on June 12, XX 14:27 EDT
Verified by: Lee MD, Harold L on July 03, XX 21:48 EDT
Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***

DATE OF PROCEDURE: 06/12/XX.

PRE-OPERATIVE DIAGNOSIS: Immune deficiency syndrome.

POST-OPERATIVE DIAGNOSIS: Immune deficiency syndrome.

PROCEDURES PERFORMED: Placement of left subclavian double lumen Broviac catheter.

SURGEON: Harold L. Lee, M.D.

ASSISTANTS: Cindy Kim, M.D.

INDICATIONS: Maria is a little girl with a very extensive past medical history who is in need of a central venous line for the initiation of chemotherapy to treat her immunodeficiency syndrome. She presents for operative placement.

DETAILS OF PROCEDURE: After informed consent was obtained from her mother, she was taken to the operating room and placed in supine position where general anesthesia was induced without difficulty. The chest was prepped and draped in the usual sterile fashion.

The 7 French double lumen Broviac catheter kit was utilized. The left subclavian vein was accessed on the first attempt and the guide wire was threaded centrally. Fluoroscopy showed this to be present within the right heart. A counterincision was made and the catheter was tunneled and trimmed to the appropriate length. The obturator and peel away sheath were placed centrally and the catheter was threaded.

Excellent catheter position was verified with the tip of the SVC-RA junction as well as good function. The catheter was flushed with heparinized saline as per protocol and capped. The catheter was secured to three separate locations in the chest wall with 2-0 Ethibond. The little counterincision was closed with a little monocryl. Sterile dressings were applied. The young lady was awakened from anesthesia, extubated and transferred to the recovery room in stable condition.

ESTIMATED BLOOD LOSS: 3 mL.

SPECIMENS: None.

DRAINS: None.

COMPLICATIONS: None.

Note Type: Pediatrics Inpatient MD
 Date: July 10, XX 07:12 EDT
 Status: Modified
 Subject: HSCT Daily Note
 Created by: HARRIS MD, NEILA on May 10, XX 07:12 EDT
 Verified by: HARRIS MD, NEILA on May 10, XX 20:00 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***
Document Contains Addenda

Events

-more congested, viral DFA sent (neg)
 -cough worsening at night
 -CXR yesterday showing +pulmonary edema, L pleural effusion → given Lasix x 1
 -very nauseous this AM
 -continues to be febrile
 -AM labs: low K, engrafted (day 3)

Basic Vital Signs

Vitals Signs since (07/09 07:12)	24 h min	24 h max	Most recent (Time)
Temperature	37.2	38.8	37.7 (05:20)
Heart Rate	89	118	105 *03:37*
BP Systolic	83	105	95 *03:37*
Diastolic	31	57	57 *03:37*
Respiratory Rate	26	36	32 (05:20)
Oxygen Saturation (SPO2)	97%	100%	99% *03:37*
Weight (kg)			31.5 (07/09 14:21)

IO Summary (Daily totals are 0:00-23:59)

I&O	07/09/XX - 07/09/XX	07/10/XX as of 07:12
In: other	7.1	5.7
In: parenteral	2360.28	523.86
In: TOTAL	2367.38	529.56
Out: urine	1890	442
Out: stool	124	30
Out: tubes/drains/other	25	25
Out: TOTAL	2039	497
Balance: TOTAL	328.38	32.56
I&O counts		
Stools (Number)	2	0
Voided Urine (Number)	4	0

Active Medication Orders**Scheduled Medications**

acyclovir 480 mg IV Q8hr *Com Last admin: 480 mg IV (07/10/XX 04:00)
 amphotericin B liposomal (AmBisome) 88 mg IV Q24hr *Com Last admin: 88 mg IV (07/09/XX 22:53)
 ciprofloxacin (ciprofloxacin IV) 400 mg IV Q12hr Last admin: 400 mg IV (07/09/XX 21:37)
 cycloSPORINE 40 mg IV Q12hr *Com Last admin: 40 mg IV (07/10/XX 05:11)
 diphenhydrAMINE 7 mg IV Q6hr *Com Last admin: 7 mg IV (07/10/XX 03:10)

dronabinol 5 mg PO Q6hr Last admin: 5 mg PO (07/09/XX 18:45)
 enalapril (enalaprilat) 300 mcg IV Q12hr Last admin: 300 mcg IV (07/09/XX 22:51)
 fluticasone-salmeterol (Advair Diskus 250 mcg - 50 mcg inhalation powder) 1 puff MDI BID *Com Last admin:
 1 puff MDI (07/09/XX 21:34)
 hydrocortisone 12.5 mg IV Q6hr Last admin: 12.5 mg IV (07/10/XX 03:10)
 lorazepam 0.7 mg IV Q6hr *Com Last admin: 0.7 mg IV (07/10/XX 06:37)
 meropenem 750 mg IV Q8hr Last admin: 750 mg IV (07/10/XX 02:21)
 metoclopramide 15 mg IV Q6hr *Com Last admin: 15 mg IV (07/10/XX 03:10)
 metronidazole 250 mg IV Q6hr *Com Last admin: 250 mg IV (07/10/XX 02:21)
 montelukast 5 mg PO daily Last admin: 5 mg PO (07/09/XX 21:34)
 ondansetron 4 mg IV Q8hr Last admin: 4 mg IV (07/10/XX 06:37)
 pantoprazole (PANTOprazole) 30 mg IV Q24hr *Com Last admin: 30 mg IV (07/09/XX 22:52)
 vancomycin 440 mg IV Q6hr *Com Last admin: 440 mg IV (07/10/XX 05:11)

PRN Medications

acetaminophen 325 mg PO Q4hr PRN Fever/Pain *Com Last admin: 325 mg PO (07/09/XX 13:30)
 albuterol 2 puff MDI Q4hr PRN Wheezing *Com
 concentrate medications (pharmacy use) concentrate medications
 diphenhydramine 12.5 mg IV Q6hr PRN Agitation Last admin: 12.5 mg IV (07/10/XX 03:59)
 docusate (Colace) 50 mg PO daily PRN Constipation Last admin: 50 mg PO (06/18/XX 12:28)
 immune globulin intravenous 15 g IV Q3wk PRN Other - See Order Comments *Com
 magnesium sulfate (magnesium sulfate dose (CVL/PIV)) 1,465 mg IV daily PRN Other - See Order Comments
 *Com Last admin: 1,465 mg IV (07/03/XX 03:00)
 morphine (morphine IV) 1.5 mg IV Q2hr PRN Pain Last admin: 1.5 mg IV (07/28/XX 12:09)
 nalbuphine 0.6 mg IV Q4hr PRN Itching *Com
 naloxone 30 mcg IV 1time PRN Respiratory depression *Com
 sodium chloride nasal 1 spray Nasal Q2hr PRN Other - See Order Comments *Com
 Total Fluids 1,700 mL
 Vaseline topical 1 appl Nasal BID PRN Other - See Order Comments *Com

Continuous Medications/Fluids

D5W 1/2NS 500 mL IV Last admin: 0 mL IV (07/09/XX 16:59)
 Parenteral Nutrition 1080 mL 1,080 mL Last admin: 33 mL IV (07/10/XX 06:59)
 PCA/NCA morphine 30 mg *Com Last admin: 8.3 mL PCA (07/06/XX 06:59)

Suspended/On-Hold Medications

calcium carbonate (Suspended) 750 mg PO BID *Com Last admin: 750 mg PO (06/15/XX 20:21)

Additional Medications Admin within last 24 hours (or since 07/09 07:12)

furosemide Last admin: 15 mg IV (07/09/XX 15:20)
 ursodiol Last admin: 300 mg PO (07/07/XX 19:48)
 vitamin E *Com Last admin: 200 unit PO (07/07/XX 16:40)

*Com: Order comment exists. Consult Order Profile or MAR for details

Physical Exam:

General: Sleeping in bed, tired but arousable, responds to commands, NAD
 Skin: No rashes
 HEENT: Alopecia, cushingoid facies, no icterus, no congestion/rhinorrhea, boggy oral mucosa but no lesions or mucositis, MMM
 CV: S1 S2 normal, RRR, no murmurs. Well healed median sternotomy scar.
 Pulm: intermittent cough, good aeration throughout, scattered crackles in bases, not tachypneic, no wheezes
 Abd: soft, NT/ND, normoactive bowel sounds, no HSM
 Ext: warm, well-perfused, cap refill <2 sec, no edema
 Broviac site on chest without erythema, induration, discharge

Labs (Reported 07/09/XX 19:58 - 07/10/XX 19:58)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
05/10 00:20	137	2.54 C	106	23	14	0.4	145 H

Chem	Ca	Mg	Phos
05/10 00:20	8.8	1.9	2.6 L

LFTs	AST	ALT	Bili T	Bili D	ALK	ALB	LDH
05/10 00:20	13	6	0.3	0.1	168	3.1	283

CBC	WBC	HBG	HCT	PLT
05/10 00:20	3.90 L	7.8 C	23.7 L	166 K L

Assessment/Plan:

8 y/o F with combined immunodeficiency and congenital asplenia, idiopathic hypereosinophilia and hyper IgE, asthma, mitral valve regurgitation s/p repair, and adrenal insufficiency now s/p conditioning and **on day +18** for sibling matched allogeneic BMT.

Cardiovascular: H/o mitral valve repair s/p papillary muscle rupture. Pre-transplant ECHO with normal cardiac function.

-Enalapril IV (home dose is 5 mg PO BID)

Respiratory: H/o multiple pneumonias and moderate persistent asthma. **+Evolving pulm edema.**

-Continue home albuterol, Advair, Singulair

-Consider Lasix PRN.

Conditioning: S/p busulfan and cyclophosphamide

Graft: Day 1 = 6/22/XX.

-Transfuse for Hgb<7% and platelets<30 or bleeding with tylenol/benadryl premedication (Plt threshold increased for frequent nosebleeds)

-S/p amicar q6h x 3 days; may now receive PRN; as well as topical Afrin and saline nasal spray

GVHD prophylaxis:

-Cyclosporine levels qM/Th (last 123 on 7/9, increased by 10%. Recheck 7/11)

-Methotrexate days 1, 3, 6, 11

VOD:

-Vit E/Ursodiol for VOD ppx

FEN/GI: On full PN with poor PO intake. History of chronic giardia.

-Continue full PN today. Increase K in PN.

-Daily chemistries, LFTs.

-Protonix for gut prophylaxis

-Antiemetics with Zofran, Ativan, Reglan, Benadryl (decreased dosing), marinol

ID: Hx recurrent cutaneous HSV infections. Hx UTIs with ESBL organisms. Screening BMT cultures: +Candida albicans from throat, rectum 6/20, throat 6/27. MRSA/VRE negative. Portable CXR 7/6 no acute process. Repeat PA/lat CXR 7/7 with increased interstitial prominence (possible viral infection, atypical PNA) but no infiltrate. **Repeat CXR 7/9 with pulmonary edema and L pleural effusion.**

Treatment Abx:

-Meropenem IV (6/XX-) for sinusitis "cleanout" (h/o pneumococcal infections)

- vancomycin IV for fever** (6/23-); continue with qM, Th (last 12.1 on 7/3, no changes made)
- Flagyl** (6/12-) for giardia suppression
- Cipro (7/6-) and ambisome (7/6-)** added for GNR double coverage and fungal coverage with fever

Prophylactic Abx:

- Acyclovir** for CMV prophylaxis
- s/p **Fluconazole** (6/12-7/6) for fungal prophylaxis.
- Vancomycin-polymixin** for bacterial ppx

-Monitor for persistent fever.

- Follow weekly CMV Ag for +CMV titer pretransplant**
- BID sitz baths and topical treatment for perirectal sore**

Endocrine: H/o Adrenal insufficiency with prolonged steroid use for hypereosinophilia.

-at baseline, on maintenance hydrocortisone IV 5 mg daily → **increased to stress dose 7/6 (12.5 mg IV q6h) for fever with plan to continue until 24 hours afebrile and well appearing**

Pain: Morphine PCA with continuous 0.3 mg and bolus 0.4 mg.

Access: Broviac (6/12-)

Neila Harris, MD PGY2
Pager 9834

Addendum by WILLOUGHBY MD, PhD, FRED on July 10, XX 21:04 EDT (Verified)

ATTENDING ADDENDUM

I personally examined the patient and reviewed the pertinent portions of the history, vital signs and laboratory. I agree with Dr. Harris's exam findings and I concur with her assessment and plan as described above. Maria is engrafted as of today, continues to have fevers on maximal Abx. Also has edema on CXR, improves with Lasix. ? engraftment related vs infection, will follow, consider CT. I was directly involved in the formulation of the plan outlined above.

Fred Willoughby, MD, PHD
HSCT Attending
X4305

Note Type: Inpatient Nursing
Date: July 11, XX 12:52 EDT
Status: Auth (Verified)
Created by: KEIGHER RN, KRISTEN L on July 11, XX 12:57 EDT
Verified by: KEIGHER RN, KRISTEN L on July 11, XX 18:31 EDT
Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***

Problem: Risk for infection

Outcome: Tmax 38.2 x 1- down on own. Blood cx due if spikes. Increased RR- MDs aware. Pt. continues on PN/IL x24h. Attempting POs at this time. No s/s pain noted. Continues on Morphine PCA + CI. Emesis x 1. Continues on ATC Ativan, Reglan, benadryl, Marinol, and Zofran.

Plan of Care: Continue to monitor for s/s infection and to draw bld cx as indicated. Continue to monitor respiratory status for any changes. Continue to monitor for s/s pain and nausea and treat accordingly. Plan to report changes in status to HO. No plans for d/c at this time. Continue with plan of care.

Note Type: Pediatrics Inpatient MD
 Date: July 11, XX 07:19 EDT
 Status: Modified
 Subject: HSCT Daily Note
 Created by: HARRIS MD, NEILA on July 11, XX 07:19 EDT
 Verified by: HARRIS MD, NEILA on July 11, XX 20:02 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***
Document Contains Addenda

Events

-increased K in PN for low K → PM recheck still low → given KCL bolus with improvement this AM
 -increased Ativan for nausea
 -CXR showed stable pulmonary edema, given Lasix 15 mg iv x 1 with good diuresis
 -surveillance CMV Ag negative

Basic Vital Signs

Vitals Signs since (07/10 07:19)	24 h min	24 h max	Most recent (Time)
Temperature	37.1	38.6	37.1 (03:24)
Heart Rate	91	142	91 (03:24)
BP Systolic	90	107	105 (03:24)
Diastolic	44	61	61 (03:24)
Respiratory Rate	26	36	32 *06:52*
Oxygen Saturation (SPO2)	97%	99%	98% (03:24)
Weight (kg)			31.1 *05/10 08:03*

IO Summary (Daily totals are 0:00-23:59)

I&O	07/10/XX - 07/10/XX	07/11/XX as of 07:19
In: enteral	330	0
In: other	5.7	5.5
In: parenteral	2251	516.18
In: TOTAL	2586.7	521.68
Out: urine	1742	488
Out: stool	68	0
Out: tubes/drains/other	55	0
Out: TOTAL	1865	488
Balance: TOTAL	721.7	33.68
I&O counts		
Emesis (Number)	0	1
Stools (Number)	1	0

Active Medication Orders**Scheduled Medications**

acyclovir 480 mg IV Q8hr *Com Last admin: 480 mg IV (07/11/XX 04:00)
 amphotericin B liposomal (AmBisome) 88 mg IV Q24hr *Com Last admin: 88 mg IV (07/11/XX 00:40)
 ciprofloxacin (ciprofloxacin IV) 400 mg IV Q12hr Last admin: 400 mg IV (07/10/XX 20:18)
 cycloSPORINE 40 mg IV Q12hr *Com Last admin: 40 mg IV (07/11/XX 05:25)
 diphenhydramine 7 mg IV Q6hr *Com Last admin: 7 mg IV (07/11/XX 03:15)
 dronabinol 5 mg PO Q6hr Last admin: 5 mg PO (07/11/XX 03:14)

enalapril (enalaprilat) 300 mcg IV Q12hr Last admin: 300 mcg IV (07/10/XX 23:13)
 fluticasone-salmeterol (Advair Diskus 250 mcg - 50 mcg inhalation powder) 1 puff MDI BID *Com Last admin:
 1 puff MDI (07/10/XX 22:00)
 hydrocortisone 12.5 mg IV Q6hr Last admin: 12.5 mg IV (07/11/XX 03:30)
 lorazepam 1.4 mg IV Q6hr Last admin: 1.4 mg IV (07/11/XX 06:15)
 meropenem 750 mg IV Q8hr Last admin: 750 mg IV (07/11/XX 01:01)
 metoclopramide 15 mg IV Q6hr *Com Last admin: 15 mg IV (07/11/XX 03:15)
 metronidazole 250 mg IV Q6hr *Com Last admin: 250 mg IV (07/11/XX 01:26)
 montelukast 5 mg PO daily Last admin: 5 mg PO (07/10/XX 21:41)
 ondansetron 4 mg IV Q8hr Last admin: 4 mg IV (07/11/XX 06:36)
 pantoprazole (PANTOprazole) 30 mg IV Q24hr *Com Last admin: 30 mg IV (07/10/XX 22:15)
 vancomycin 440 mg IV Q6hr *Com Last admin: 440 mg IV (07/11/XX 05:07)

PRN Medications

acetaminophen 325 mg PO Q4hr PRN Fever/Pain *Com Last admin: 325 mg PO (07/10/XX 18:26)
 albuterol 2 puff MDI Q4hr PRN Wheezing *Com
 concentrate medications (pharmacy use) concentrate medications
 diphenhydramine 12.5 mg IV Q6hr PRN Agitation Last admin: 7 mg IV (07/10/XX 09:58)
 docusate (Colace) 50 mg PO daily PRN Constipation Last admin: 50 mg PO (06/18/XX 12:28)
 immune globulin intravenous 15 g IV Q3wk PRN Other - See Order Comments *Com
 magnesium sulfate (magnesium sulfate dose (CVL/PIV)) 1,465 mg IV daily PRN Other - See Order Comments
 *Com Last admin: 1,465 mg IV (07/03/XX 03:00)
 morphine (morphine IV) 1.5 mg IV Q2hr PRN Pain Last admin: 1.5 mg IV (06/28/XX 12:09)
 nalbuphine 0.6 mg IV Q4hr PRN Itching *Com
 naloxone 30 mcg IV 1time PRN Respiratory depression *Com
 sodium chloride nasal 1 spray Nasal Q2hr PRN Other - See Order Comments *Com
 Total Fluids 1,700 mL
 Vaseline topical 1 appl Nasal BID PRN Other - See Order Comments *Com

Continuous Medications/Fluids

D5W 1/2NS 500 mL IV Last admin: 30 mL IV (07/10/XX 09:59)
 Parenteral Nutrition 1080 mL 1,080 mL Last admin: 18 mL IV (07/11/XX 06:59)
 PCA/NCA morphine 30 mg *Com Last admin: 8.3 mL PCA (07/06/XX 06:59)

Suspended/On-Hold Medications

calcium carbonate (Suspended) 750 mg PO BID *Com Last admin: 750 mg PO (06/15/XX 20:21)

Additional Medications Admin within last 24 hours (or since 07/10 07:19)

furosemide Last admin: 15 mg IV (07/10/XX 18:04)
 lorazepam *Com Last admin: 0.7 mg IV (07/10/XX 06:37)
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) *Com Last admin: 15 mEq IV (07/10/XX 22:35)

*Com: Order comment exists. Consult Order Profile or MAR for details

Physical Exam:

alert, conversant, but c/o nausea, leaning over bucket
 refused exam due to nausea

Labs (Reported 07/10/XX 20:02 - 07/11/XX 20:02)

Chem 7 (07/11 01:45)

139	108	14	/ 129 H (Glu)
3.01 L	23	0.4	\ Ca 8.7 Mg 2.1 Phos 2.4 L

(07/10 19:45)

140	106	18	/ 112 H (Glu)
2.46 C	23	0.5	\ Ca 8.5 Mg 2.0 Phos 3.2

LFTs (07/11 01:45)

AST	ALT	Bili T	/ Bili D
-----	-----	--------	----------

12	7	0.2 L	/ 0.1
171	3.0		
ALK	ALB		

CBC (07/11 01:45)

5.90 \ 7.7 C / 228 K
/ 23.4 L \

MCV 80.2

Assessment/Plan:

8 y/o F with combined immunodeficiency and congenital asplenia, idiopathic hypereosinophilia and hyper IgE, asthma, mitral valve regurgitation s/p repair, and adrenal insufficiency now s/p conditioning and **on day +19** for sibling matched allogeneic BMT.

Cardiovascular: H/o mitral valve repair s/p papillary muscle rupture. Pre-transplant ECHO with normal cardiac function.

-Enalapril IV (home dose is 5 mg PO BID)

Respiratory: H/o multiple pneumonias and moderate persistent asthma.

-Continue home albuterol, Advair, Singulair

Conditioning: S/p busulfan and cyclophosphamide

Graft: Day 1 = 6/22/XX.

-Transfuse for Hgb<7% and platelets<30 or bleeding with tylenol/benadryl premedication (Plt threshold increased for frequent nosebleeds)

-S/p amicar q6h x 3 days; may now receive PRN; as well as topical Afrin and saline nasal spray

GVHD prophylaxis:

-Cyclosporine levels qM/Th (last 123 on 7/9, increased by 10%. Recheck 7/11)

-Methotrexate days 1, 3, 6, 11

VOD:

-Vit E/Ursodiol for VOD ppx

FEN/GI: On full PN with poor PO intake. History of chronic giardia.

-Continue full PN today, increase K concentration 7/11.

-Daily chemistries, LFTs. Monitor low K while on Lasix PRN. Consider starting Ksupps.

-Protonix for gut prophylaxis

-Antiemetics with Zofran, Ativan (increased 7/10), Reglan, Benadryl (decreased dosing), marinol. Check with Pharmacy re:scopolamine patch.

ID: Hx recurrent cutaneous HSV infections. Hx UTIs with ESBL organisms. Screening BMT cultures: +Candida albicans from throat, rectum 6/20, throat 6/27. MRSA/VRE negative. Portable CXR 7/6 no acute process. Repeat PA/lat CXR 7/7 with increased interstitial prominence (possible viral infection, atypical PNA) but no infiltrate. **Repeat CXR 7/9 with pulmonary edema and L pleural effusion. Stable on repeat CXR 7/10.**

Treatment Abx:

-Meropenem IV (6/12-) for sinusitis "cleanout" (h/o pneumococcal infections)

-vancomycin IV for fever (6/23-); continue with qM, Th (last 12.1 on 7/3, no changes made)

-Flagyl (6/12-) for giardia suppression

-Cipro (7/6-) and ambisome (7/6-) added for GNR double coverage and fungal coverage with fever

Prophylactic Abx:

-Acyclovir for CMV prophylaxis

-s/p Fluconazole (6/12-7/6) for fungal prophylaxis.

-**Vancomycin-polymixin** for bacterial ppx

-**Monitor for persistent fever. If still afebrile 7/12, will obtain pan-CT to evaluate for fungal infection.**

-**Follow weekly CMV Ag for +CMV titer pretransplant (last CMV Ag negative 7/10)**

-BID sitz baths and topical treatment for perirectal sore

Endocrine: H/o Adrenal insufficiency with prolonged steroid use for hypereosinophilia.

-at baseline, on maintenance hydrocortisone IV 5 mg daily → **increased to stress dose 7/6 (12.5 mg IV q6h) for fever with plan to continue until 24 hours afebrile and well appearing**

Pain: Morphine PCA with continuous 0.2 mg and bolus 0.4 mg. **Wean continuous to 0.1 mg/h on 7/11.**

Access: Broviac (6/12-)

Neila Harris, MD PGY2

Pager 6741

Addendum by WILLOUGHBY MD, PhD, FRED on July 11, XX 21:53 EDT (Verified)

ATTENDING ADDENDUM

I personally examined the patient and reviewed the pertinent portions of the history, vital signs and laboratory. I agree with Dr. Harris's exam findings and I concur with her assessment and plan as described above. Maria's fever curve is improving on maximal antibiotics and now engrafted.

Engraftment inflammation vs infection. If fevers persist will scan, continue to follow clinically. Doing well in all other respects with POs increasing. I was directly involved in the formulation of the plan outlined above.

Fred Willoughby, MD, PHD

HSCT Attending

X4305

Note Type: Cardiology Consultation
 Date: July 14, XX 11:54 EDT
 Status: Modified
 Created by: THOMAS MD, EDDIE D on July 14, XX 12:31 EDT
 Verified by: THOMAS MD, EDDIE D on July 14, XX 19:03 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***
Document Contains Addenda

Requesting physician/service:

Willoughby/6W BMT

Reason for consultation:

Tachypnea, concern for CHF

History of Present Illness:

Asked to see this 8 yo girl with history of severe combined immunodeficiency and congenital asplenia, idiopathic hypereosinophilia and hyper IgE, asthma, and mitral regurgitation s/p mitral valvuloplasty. She is presently day +21 following matched sib BMT. Her cardiac history is significant for a history of presumed endocarditis at 8 months of age, with presentation at that time with severe MR and a flail anterior mitral leaflet, presumably due to ruptured chordal attachments. She was followed medically for some time but developed progressive LV and mitral annular dilatation. On 10/13/2008, she underwent mitral valve repair. Intraoperative findings were significant for an unsupported central portion of the anterior leaflet, with a defect reminiscent of a cleft. This region was tightened up with sutures, and an annuloplasty was performed. She tolerated the procedure well and has been followed by Dr Morris at Southshore, with mild residual MR and moderate MS.

Over the past few days, she has had high persistent fevers, tachypnea, facial edema, foot swelling and difficulty sleeping. She had been receiving significant IVF for PN and meds making her net fluid positive but yesterday her PN was concentrated, IV fluids restricted and she was given prn Lasix, ending up 1.6L negative. Her mother notes that her tachypnea and leg and facial swelling have improved. She has been less tachypneic and more comfortable.

Review of Systems: see HPI

Past Medical History: as above.

Active Medication Orders

Scheduled Medications

acyclovir 480 mg IV Q8hr *Com Last admin: 480 mg IV (07/14/XX 11:23)
 albuterol 1 mL NEB Q4hr *Com Last admin: 5 mg NEB (07/14/XX 10:23)
 amphotericin B liposomal (AmBisome) 88 mg IV Q24hr *Com Last admin: 88 mg IV (07/13/XX 22:21)
 cycloSPORINE 40 mg IV Q12hr *Com Last admin: 40 mg IV (07/14/XX 04:54)
 diphenhydrAMINE 7 mg IV Q6hr *Com Last admin: 7 mg IV (07/14/XX 09:34)
 dronabinol 5 mg PO Q6hr Last admin: 5 mg PO (07/14/XX 09:34)
 enalapril (enalaprilat) 300 mcg IV Q12hr Last admin: 300 mcg IV (07/14/XX 11:24)
 fluticasone-salmeterol (Advair Diskus 250 mcg - 50 mcg inhalation powder) 1 puff MDI BID *Com Last admin: 1 puff MDI (07/14/XX 09:34)
 furosemide 15 mg IV 1time Stop: 07/14/XX 11:13
 hydrocortisone 12.5 mg IV Q6hr Last admin: 12.5 mg IV (07/14/XX 09:34)
 lorazepam 1.4 mg IV Q6hr Last admin: 1.4 mg IV (07/14/XX 11:24)
 meropenem 750 mg IV Q8hr Last admin: 750 mg IV (07/14/XX 10:05)
 metoclopramide 15 mg IV Q6hr *Com Last admin: 15 mg IV (07/14/XX 09:34)

metronidazole 250 mg IV Q6hr *Com Last admin: 250 mg IV (07/14/XX 08:30)
 montelukast 5 mg PO daily Last admin: 5 mg PO (07/13/XX 19:40)
 morphine (morphine IV) 0.5 mg IV Q4hr Last admin: 1.5 mg IV (06/28/XX 12:09)
 ondansetron 4 mg IV Q8hr Last admin: 4 mg IV (07/14/XX 06:00)
 pantoprazole (PANTOprazole) 30 mg IV Q24hr *Com Last admin: 30 mg IV (07/13/XX 21:21)
 phenazopyridine 100 mg PO 6 dose TID Stop: 05/15/10 08:00 Last admin: 100 mg PO (07/14/XX 09:34)
 vancomycin 440 mg IV Q6hr *Com Last admin: 440 mg IV (07/14/XX 10:24)

PRN Medications

acetaminophen 325 mg PO Q4hr PRN Fever/Pain *Com Last admin: 325 mg PO (07/13/XX 21:44)
 albuterol 2 puff MDI Q4hr PRN Wheezing *Com
 concentrate medications (pharmacy use) concentrate medications
 diphenhydramine 12.5 mg IV Q6hr PRN Agitation Last admin: 12.5 mg IV (07/13/XX 01:00)
 docusate (Colace) 50 mg PO daily PRN Constipation Last admin: 50 mg PO (06/18/XX 12:28)
 immune globulin intravenous 15 g IV Q3wk PRN Other - See Order Comments *Com
 lorazepam 2 mg IV 1time PRN Other - See Order Comments *Com
 magnesium sulfate (magnesium sulfate dose (CVL/PIV)) 1,465 mg IV daily PRN Other - See Order Comments *Com Last admin: 1,465 mg IV (07/12/XX 03:00)
 morphine (morphine IV) 0.25 mg IV Q2hr PRN Pain
 nalbuphine 0.6 mg IV Q4hr PRN Itching *Com
 naloxone 30 mcg IV 1time PRN Respiratory depression *Com
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) 15 mEq IV daily PRN Other - See Order Comments *Com Last admin: 15 mEq IV (07/12/XX 06:00)
 sodium chloride nasal 1 spray Nasal Q2hr PRN Other - See Order Comments *Com
 Total Fluids 1,700 mL
 Vaseline topical 1 appl Nasal BID PRN Other - See Order Comments *Com

Continuous Medications/Fluids

D5W 1/2NS 500 mL IV Last admin: 0 mL IV (07/14/XX 06:59)
 Parenteral Nutrition 540 mL 540 mL Last admin: 13 mL IV (07/14/XX 08:59)

Suspended/On-Hold Medications

calcium carbonate (Suspended) 750 mg PO BID *Com Last admin: 750 mg PO (06/15/XX 20:21)
 sulfamethoxazole-trimethoprim (Bactrim) (Suspended) 160 mg PO MWF *Com Last admin: 160 mg PO (07/14/XX 09:34)

Additional Medications Admin within last 24 hours (or since 07/13 11:54)

albuterol *Com Last admin: 5 mg NEB (07/13/XX 22:07)
 furosemide *Com Last admin: 30 mg IV (07/13/XX 17:19)
 PCA/NCA morphine 30 mg *Com Last admin: 8.3 mL PCA (07/06/XX 06:59)

*Com: Order comment exists. Consult Order Profile or MAR for details

Allergies: cow's milk, eggs, nuts (all tree nuts), Peanuts

Physical Exam:

Basic Vital Signs

Vitals Signs since (07/13 12:15)	24 h min	24 h max	Most recent (Time)
Temperature	37	38.2	38.2 (11:37)
Heart Rate	117	147	131 (11:37)
BP Systolic	86	103	103 (11:37)
Diastolic	38	66	58 (11:37)
Respiratory Rate	30	46	30 (11:37)
Oxygen Saturation (SPO2)	97%	100%	97% (11:37)
Weight (kg)			32.3 *08:29*

8 yo girl sleeping in mother's arms with mild comfortable tachypnea but no significant distress. Cushingoid, ? mild facial edema. No obvious JVD. Chest wall with CVL without erythema. Occl crackle in bases but good air entry with comfortable tachypnea. Tachycardic while febrile with regular rhythm, nl S1, phys split S2, no systolic murmur, soft diastolic rumble. Abdomen soft but uncooperative with abdomina exam so unable to appreciate liver size. No pitting edema at shins. Good distal pulses, good cap refill.

Input/Output (Daily totals are 0:00-23:59)

In/Out/Bal: Yesterday 2346.74/3688/-1341.26; Today (as of 11:54) 955.39/784/171.39

Labs (Reported 07/13/XX 11:54 – 07/14/XX 11:54)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
07/14 09:00	142	3.42	109	25	21 H	0.5	101 H
07/14 02:00	143	2.65 C	107	26	17	0.5	119 H

Chem	Ca	Mg	Phos
07/14 09:00	8.6	2.2	3.3
07/14 02:00	8.2	2.0	2.9 L

LFTs	AST	ALT	Bili T	Bili D	ALK	ALB	LDH
07/14 02:00	12	6	0.3	0.1	196	3.1	314 H

CBC	WBC	HBG	HCT	PLT
07/14 02:00	13.90 H	7.7 C	24.0 L	410 K H

Diagnostic Imaging:

Echo 7/13/XX: Moderate mitral stenosis (mean gradient ~12 mm Hg with heart rate 140). Mild MR. Round systolic ventricular septal position suggests that the right ventricular pressure is not significantly elevated. Low septal early diastolic tissue doppler velocity suggests impaired relaxation. Central line seen in the left innominate vein. No aortic regurgitation. Normal left ventricular systolic function (EF 60%). Qualitatively good right ventricular systolic function.

CXR: normal heart size. Small L pleural effusion. Mild pulmonary edema.

Assessment & Recommendation):

No evidence of ventricular dysfunction by exam or echocardiography. Given her cardiac history, mitral stenosis and increased LAP may contribute to her respiratory symptoms but do not seem to have rapidly progressed. While her mitral valve gradient is higher on the recent echo, this is in the setting of significant tachycardia (previous study showed a mean gradient ~7 mm Hg with a heart rate of 112 bpm. The valve has a similar 2D appearance. We feel her fever and other issues are likely playing a larger role in her tachypnea, but her symptoms seem to be improved from yesterday after diuretics and negative fluid balance. We would recommend trying to keep her euvolemic and would D/C enalapril in favor of diuretic (switch prn Lasix to 15 mg IV daily). Could consider bid Lasix if response is insufficient. Will follow and consider repeat echo when she is closer to baseline or with clinical change.

History, laboratory data and diagnostic imaging reviewed, patient examined and plan discussed with Dr. Penn.

Eddie D Thomas, MD
Clinical Fellow, Cardiology

Addendum by PENN MB, BS, CHRISTOPHER on July 16, XX 09:43 EDT (Verified)

Reviewed history and examined patient, agree with assessment and plan above

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #8**

Note Type: Discharge Summary
 Date: February 11, XX 11:51 EST
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: JANOTA MD, MANUEL M on February 4, XX 10:06 EST
 Verified by: HINGHAM MD, WILLIAM E on February 14, XX 08:29 EST
 Encounter info: XXXX, Springfield General Hospital, Inpatient, 01/16/XX - 01/24/XX

*** Final Report ***

Dr. ANN PERKINS
 4321 WISTERIA LANE
 SUITE 321
 NEIGHBORVILLE, USA XXXXX

Encounter Number XXXX
 Date of Birth August 29, XX
 Age 4 years old
 Gender Female

Your patient, Natsumi Hirata, was admitted to Springfield General Hospital on 01/16/XX to the Nephrology Service. The principal admission diagnosis was "RENAL TRANSPLANT". Procedures performed during the hospitalization include "SURGICAL REMOVAL OF HEMODIALYSIS CATHETER" performed on 01/20/XX, "SURGICAL PLACEMENT OF NEW QUENTIN HD CATHETER" performed on 01/22/XX, and "RENAL TRANSPLANT" on 02/05/XX.

Natsumi was discharged on 02/11/XX. The principal discharge diagnosis was "RENAL TRANSPLANT" which was noted to be unchanged. Other discharge diagnoses included "ESRD" which was noted to be unchanged.

There were no recent laboratory results before discharge. There are no tests pending at discharge.

Discharge medications:

- * FOLIC ACID: 1 MG LIQUID DAILY
- * GLYCERIN SUPPOSITORY: 1 SUPPOSITORY PER RECTUM AS NEEDED FOR CONSTIPATION
- * LANSOPRAZOLE: 15 MG LIQUID DAILY
- * KEPPRA: 250 MG LIQUID BID
- * METHYLPREDNISOLONE: 2 MG EVERY OTHER DAY
- * REGLAN: 1 MG EVERY 8 HOURS
- * POLY VI SOL: 1 ML LIQUID DAILY
- * OXYCARBAZEPINE: 240 MG LIQUID BID
- * KAYEXALATIE: 5.625 G PER EVERY 24 HOURS FORMULA
- * SOMATOTROPIN: 1.2 MG SC EVERY 24 HOURS
- * COUMADIN: 4 MG DAILY

Discharge diet:

FORMULA SIMILAC PM 60/40, 20 KCAL/OZ, 35 CC/HR CONTINUOUS G-TUBE FEEDS

We gave the following instructions to Natsumi and her family:

CALL DOCTOR FOR FEVER, ABDOMINAL PAIN, VOMITING, DIFFICULTY BREATHING, CHANGE IN BEHAVIOR, OR ANY OTHER CONCERNS

The discharging provider wrote the following lines regarding this hospitalization:

CC: Infected hemodialysis catheter

HPI: Natsumi is a 4 y.o. female with ESRD on HD, admitted in preparation for a renal transplant. History of perinatal asphyxia secondary to placental abruption. She is s/p deceased donor renal transplant in Feb 'XX, complicated by acute humoral rejection 10 days after transplant, leading to loss of allograft. She has been maintained on HD since May 'XX.

PMH: Perinatal asphyxia -> neurologic impairment and ESRD, CP

-ESRD: Initially on PD starting at 3 weeks of age; converted to HD in Jan 'XX due to recurrent peritonitis; s/p deceased donor renal transplant in Feb 'XX, complicated by acute humoral rejection, with loss of allograft; now on HD

-Peritransplant course marked by thrombosis of IVC, right femoral, and right external iliac veins - now on coumadin

-Complications of ESRD: hyperPTH, hyperPhos, hyperKal, anemia

-Seizure d/o

-s/p G-tube

-Dev delay

Meds:

Prevacid 15mg every day

Reglan 1mg PO/GT Q8H

Trileptal 240mg PO/GT BID

Keppra 250mg PO/GT BID

Medrol 2mg PO/GT every other day

Coumadin 1.5mg PO/GT once daily (goal INR 2-3)

Nutropin 1.2mg SC once daily

Folic Acid 1mg PO/GT once daily

Poly-Vi-Sol 1ml PO/GT once daily

Kayexalate 1 1/2 tsp per 24 hours of formula (decanting formula)

Epogen 2,700 units 3x/wk (given with dialysis)

Glycerin Suppository; one prn bid

L-Carnitine 500 mg IV with HD 4x/wk (given with dialysis)

Zemplar 10 mcg IV with HD 4x/wk (given with dialysis)

Zyrtec 2.5 mg GT daily

Diet: Similac PM 60/40 35 cc/hr continuous G-tube feeds

Allergies: Inderal - tachycardia

IMM: UTD

Physical Exam:

Afeb, 105, 26, 87/59, 100% RA

Lying in bed, NAD

MMM

Neck supple, no LAD

Good air entry, coarse transmitted upper airway sounds

RRR, S1S2, no m/r/g

Soft, NT, ND, +BS, G-tube c/d/i

No rash

Site of cath removal c/d/i, no hematoma

Assessment: 4 y.o. girl with ESRD on HD, now with infection of HD catheter, refractory to Abx treatment. Presents for surgical removal of line.

Hospital course as follows by system:

1. Renal:

- Infected left subclavian HD cath removed four days after admission, without complication
- US of neck vessels on 01/21 showed patent vessels
- Returned to OR on 01/22 for placement of new Quentin HD catheter
- Underwent hemodialysis next day

2. CVS/Resp: Remained hemodynamically stable, comfortable on room air

3. FEN/GI: Continued home GT feeds.

4. ID: Developed fever 48 hours after admission. Left subclavian HD cath grew out *E. faecalis* on 01/20/XX after having low-grade fevers. She was treated with vanco, but cultures persistently positive.

-Continued Vancomycin with dialysis, and will continue to be treated upon discharge

-Blood cultures from 01/21 and 01/22 were NGTD

5. Heme: Coumadin held peri-procedurally; restarted at 4 mg daily prior to discharge; will have INR checked with dialysis, and will adjust coumadin dose accordingly

-INR 1.11 on 01/21

Thank you for allowing us to participate in the care of your patient, and for continuing to refer your patients to Springfield General Hospital.

Attending Physician: William Hingham, Phone (XXX) XXX-XXXX

Discharging Provider: Manuel Janota, Pager (XXX) XXX-XXXX

Note Type: Operative Note
 Date: January 20, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: BUBULKA MD, NOLAN W on January 20, XX 19:19 EST
 Verified by: BUBULKA MD, NOLAN W on January 22, XX 21:11 EST
 Encounter info: XXXX, Springfield General Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

DATE OF PROCEDURE: 01/20/XX

PRE-OPERATIVE DIAGNOSIS: 1. Chronic renal failure. 2. Hemodialysis infection.

POST-OPERATIVE DIAGNOSIS: Same

PROCEDURES PERFORMED: Tunneled hemodialysis catheter removal.

SURGEON: Nolan Bubulka, M.D.

ASSISTANTS: Phillip Eid, M.D.

PATIENT AGE: 4 years, 19 kilograms

ANESTHESIA: General endotracheal anesthesia by Dr. Marco Acosta.

INDICATIONS: This young girl has a complex medical history including bilateral Wilms' tumors and a failed kidney transplant. She was admitted 1/16, several days prior to her scheduled renal transplant, and placed on hemodialysis the same day. Unfortunately this catheter became infected while she was in the hospital awaiting transplant so Dr. Trisha Doerfler has requested that it be removed.

FINDINGS: The patient underwent uncomplicated removal of the hemodialysis catheter. It was removed intact. The tip was sent for culture.

DETAILS OF PROCEDURE: After induction of general anesthesia, she was already on antibiotics, she was very carefully positioned and hard points carefully padded. Her left chest and neck were meticulously and thoroughly sterilely prepped and draped.

CATHETER REMOVAL: We cut sutures holding it in position, dissected the cuff off from the surrounding tissues until we could slide the catheter out. The catheter was slowly slid out. It was removed intact. There was egress of dark blood out of the wound. We held pressure over the wound until the bleeding stopped after about a minute or two. We then used Steri-Strips to occlude the wound and apply sterile dressing. We did locally infiltrate Marcaine for postop pain control.

COMPLICATIONS: None

ESTIMATED BLOOD LOSS: Less than 3 ML

PATHOLOGY: Catheter

MICROBIOLOGY: Catheter tip being sent for cultures.

I am the attending surgeon present for the entire procedure. The patient tolerated the procedure well and at the end of the operation, is being awakened for transport to the recovery room in good condition.

Surgical End Time: 10:56	Pt. Out of O.R.: 11:24
Pt. Transferred to: PACU	Transferred Via: BED W/ O2
Pt. In PACU: 11:10	Pt. Out of PACU: 13:25
Pt. In Other:	Pt. Out of Other:

Comments: TO DIALYSIS AND THEN TO FLOOR 6A

Signature: CHEN RN

Signature: ELIZABETH

Implant	QTY	Size
Lot No	Serial No	

Note Type: Operative Note
 Date: January 21, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: MAJORS MD, STACEY L on February 03, XX 05:47 EST
 Verified by: MAJORS MD, STACEY L on February 20, XX 18:21 EST
 Encounter info: XXXX, Springfield General Hospital, Inpatient, 01/16/XX - 01/24/XX

* Final Report *

DATE OF PROCEDURE: 01/21/XX

PRE-OPERATIVE DIAGNOSIS: Chronic renal failure.

POST-OPERATIVE DIAGNOSIS: Chronic renal failure.

PROCEDURES PERFORMED: Placement of left femoral 11-French Mahurkar hemodialysis catheter.

SURGEON: Stacey L. Majors, MD

CO-SURGEON: David Lindiwe, MD (Interventional Radiology)

FIRST ASSISTANT: Dan Thuy Nguyen, MD

INDICATIONS FOR PROCEDURE: Natsumi is a four-year-old little girl with chronic renal failure as well as a multitude of medical problems. She has failed transplantation and has been known to have exceedingly difficult vascular access. Because of this, an upper extremity ultrasound was done that showed the jugular system to be patent bilaterally. She presents for temporary hemodialysis catheter replacement as her recent line required removal because of infection. She has a history of exceedingly difficult vascular access. Her former line was in the left subclavian.

DESCRIPTION OF PROCEDURE: After informed consent was obtained from her parents, the patient was taken to the operating suite and placed in the supine position where general anesthesia was induced without difficulty. The chest and bilateral neck was prepped and draped in the usual sterile fashion. She received antibiotics.

We turned our attention to the left subclavian vein. Dr. Nguyen and I tried for over 20 min to access this vein without any success or a flash despite multiple repositioning maneuvers. Fluoroscopy showed that there was no pneumothorax.

We then went to the right neck where we tried for another 20 min or so to access the right subclavian. Again we were never even able to obtain a flash in order to even attempt to thread a guidewire. Another fluoroscopic shot showed no pneumothorax.

We then arranged to have the SonoSite ultrasound machine brought into the room. She had no visible veins in her neck and multiple scars. We turned our attention first to the right neck and were not really able to identify any significant internal jugular system. At that point, I called Dr. David Lindiwe who is our interventional radiologist on-call for intraoperative

assistance. He was gracious to come help for what turned out to be the next 4 hrs.

Dr. Lindiwe ultrasounded the right neck with us disagreeing with the previous read on the ultrasound in that he did not see an internal jugular vein on the right. Rather we saw a small external jugular. We were able to access this with the use of the SonoSite and thread a small guidewire. However, this kept meeting resistance at the brachiocephalic. It took multiple catheter changes and maneuvers, which he will dictate in his consultation note to maintain access of the vein over a guidewire. We then were finally able to thread a small catheter into this system and perform a venogram under fluoroscopic guidance. This venogram showed complete occlusion of the brachiocephalic system with filling through collaterals into the right chest into the azygos system. These were very circuitous appearing much like a medusa and finally went centrally. However, there was certainly no direct pathway or any stenotic area that we could dilate to utilize the right neck. We then reultrasounded and confirmed that we did not see an internal jugular on that side. We therefore then abandoned this approach.

We could see a reasonable IJ in the left neck with ultrasound. Dr. Lindiwe punctured this with the use of the SonoSite and we threaded the guidewire centrally. We performed dilations with the Cook vascular catheter over the vein and then ultimately were able to thread a small catheter to do a venogram as we were not able to get the guidewire to thread centrally as it kept meeting resistance at the brachiocephalic system. Unfortunately the venogram appeared fairly similar to the one on the right neck filling multiple small thready collaterals ultimately going centrally but certainly not through any major venous system. These appeared to fill the hemiazygos system and then collaterals into the heart. Therefore, it appeared that we had bilateral brachiocephalic occlusion and Dr. Lindiwe and I agreed that there was no utility in continuing this approach. It had now been approximately three to four hours attempting to gain access.

We then broke down the surgical drapes and prepped and draped the lower extremities. I had a discussion with Dr. Hingham who is her attending nephrologist. She had had her previous transplant in the right iliac fossa and they were trying to save the left side for her transplant, which would be our last choice for vascular access. Nonetheless she is obvious in need of dialysis.

We then went to the right groin where ultrasound showed no femoral system that was patent. There was a very superficial thready vein that we were able to cannulate under ultrasound guidance. The regular wire was not able to be threaded at all meeting resistance at the inguinal ligament. We were able to pass a very small glidewire and dilated this up with several catheter and glidewire changes in order to get a small catheter into this thready tributary, which is the only patent vessel in her right groin. A venogram showed complete occlusion of the iliac system on the right with collateralization into the retroperitoneum and lumbar system, but certainly no filling of the cava. Obviously, this would not be suitable for central access as there was a complete occlusion here and there was nothing to even dilate.

Therefore as our last choice we went to the left groin and found a small collateral vein. A guidewire would not initially thread centrally and we had to again do several catheter changes and manipulations in order to put a small catheter in to perform a venogram. This venogram showed filling of the

iliac but then a very stenotic area up in the cava with preferential filling of the collaterals. At least this was something that we could then possibly dilate. Dr. Lindiwe manipulated a very small glidewire ultimately up the iliac. With multiple long manipulations we were able to get this glidewire through the area of the caval stenosis. We then were able to serially dilate up the cava in order to accept the 11-French Mahurkar catheter, which was finally placed centrally. The tip was up above her native renals and excellent function was verified. We flushed the catheter with heparinized saline and secured this in multiple locations to the skin.

Clearly, this is a tour de force of both the pediatric surgical service as well as interventional radiology and took approximately 5.5 hr to obtain this access. However, it was exceedingly useful information as she is going to be very difficult for additional access in consideration of transplantation. In fact, Dr. Lindiwe suggested that we not attempt any central access in the traditional fashion but rather on her next line go straight to transhepatic cannulation. I will share this with Dr. John Watson, her transplant surgeon, as this is a very challenging situation for Natsumi.

ESTIMATED BLOOD LOSS: 20 mL.

SPECIMENS: None.

DRAINS: None.

COMPLICATIONS: None.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #9**

Note Type: Discharge Summary
Date: May 09, XX 01:30 EST
Status: Auth (Verified)
Subject: Discharge Summary
Created by: LORINSKI MD, PETER A on July 08, 2010 16:15 EDT
Verified by: ROSENBERG MD, ADAM D on July 20, 2010 11:23 EDT
Encounter info: XXXX, Wyndham Hospital, Inpatient, 2/5/2010 - 2/9/2010
Contributor system: ORADOC

*** Final Report ***

ADMISSION DIAGNOSIS: Biliary Atresia

SECONDARY DIAGNOSIS: History of bronchiolitis

DISCHARGE DIAGNOSIS: Pulmonary hypertension, multisystem organ failure, arterial bleeding post liver transplant

OPERATIVE PROCEDURES:

1. Liver transplant with reduced graft, right trisegmentectomy, and choledochcholedochostomy on 5/6/XX.
2. Emergency laparotomy, right femoral arterial line placement, and direct inferior vena cava catheter placement performed on 5/9/XX.

CONSULTATIONS: Infectious Disease, Nutrition, Pharmacy, Social Work, Liver Hepatology

HISTORY OF PRESENT ILLNESS: Alex was a 3-month-old male who had presented preoperative for a liver transplant. The patient had been seen previously when he was transferred from Shoreline Medical Clinic for a liver transplant evaluation. The patient has biliary atresia. He was admitted to Shoreline Medical Clinic on April 17 with fever and tachypnea with confirmed bronchiolitis and was transferred to Wyndham Hospital on April 20 for pre-transplant evaluation.

PAST MEDICAL HISTORY: 25 weeks gestation with a significant Neonatal Intensive Care Unit course. Was on CPAP but was not on any oxygen after his initial neonatal course. The patient was on Similac 60/40 during the day and 12 hours overnight PC N-G tube running for 30 hours at night. The patient had an extensive evaluation by the Liver Transplant Team pre-surgery as well. The patient was up to date with his immunizations.

FAMILY HISTORY: Non-contributory

MEDICATIONS:

1. Protonix
2. Bactrim 3 times a week for prophylaxis
3. Tylenol as needed
4. Zofran as needed

PHYSICAL EXAMINATION UPON ARRIVAL TO THE HOSPITAL PRE-TRANSPLANT: Jaundiced, poorly-nourished-appearing male Mother at bedside. Patient afebrile, vital signs were stable. Good breath sounds, regular rhythm, abdomen soft, large

palpable liver with full margins. The patient was then brought to the operating room for a liver transplant.

HOSPITAL COURSE: On 5/5/XX, the patient went to the operating room where he had an uncomplicated orthotopic liver transplant with reduced graft, including segments 1, 4-8 performed by Dr. Adam Rosenberg, Dr. Pablo Hermoso, and Dr. Maziar Rassi. Postoperatively, the patient was brought to the Intensive Care Unit for recovery. Patient did well. Postoperative ultrasound showed all transplant vessel anastomoses were widely patent with no perihepatic chelation or other acute complications. Patient was managed on a heparin drip, aspirin, dextran, basiliximab, methylprednisolone, nystatin, pantoprazole, tacrolimus was started on postoperative day #1. The patient was extubated and was doing well otherwise.

On postoperative day #2, the patient was transferred to the floor, doing well. He was started on a diet of clear liquids on 5/8/XX.

The patient was transferred to the Intensive Care Unit late in the evening on postoperative day #3 into 4 for just 2 days. He developed acute onset of refractory hypotension which required emergent transfer back to the Intensive Care Unit. He was fluid-resuscitated and intubated for decreased mental status and hypotension. Consideration was made for ECMO but while the circuit was being set up, he improved with fluid-resuscitation and pressors. Following this, his abdomen became acutely distended with blood coming from his J-P drains and it was then decided to take him emergently to the operating room for exploration. Bleeding was identified from the hepatic artery. With repair of the artery, the bleeding stopped and the patient gradually stabilized. He was transferred back to the ICU following the procedure.

Note Type: Operative Note
Date: May 05, XX 00:00 EST
Status: Auth (Verified)
Subject: Operative Note
Created by: ROSENBERG MD, ADAM D on May 08, XX 14:29 EST
Verified by: ROSENBERG MD, ADAM D on May 16, XX 14:49 EST
Encounter info: XXXX, Wyndham Hospital, Inpatient, 5/5/XX - 5/9/XX

*** Final Report ***

DATE OF START OF PROCEDURE: 05/05/XX.
DATE OF COMPLETION OF PROCEDURE: 05/06/XX.

AGE OF PATIENT: 3 months.

PRE-OPERATIVE DIAGNOSIS: Biliary Atresia

POST-OPERATIVE DIAGNOSIS: Biliary Atresia

PROCEDURES PERFORMED: 1. Orthotopic liver transplant with reduced liver graft (segments 1, 4-8).
2. Insertion of central venous line.

SURGEON: Rosenberg, Adam Daniel, MD.

ASSISTANTS: Rassì, Maziar, MD.
Hermoso, Pablo B, MD, Ph.D.

ANESTHESIA: General endotracheal.

COMPLICATIONS: None.

INDICATIONS FOR SURGERY: This young boy was born prematurely and, therefore, spent the first three months of his life in the hospital. He was recently diagnosed with biliary atresia.

FINDINGS AT SURGERY: We performed orthotopic liver transplant using a graft from an 8 kilogram weight donor. The graft was reduced in situ and consisted of segments 1, 4-8. The graft was implanted in standard piggyback fashion with an end-to-end anastomosis from the donor suprahepatic vena cava to the recipient confluence of the left and middle hepatic veins, end-to-end portal vein anastomosis, and end-to-end hepatic artery anastomosis from a branch patch of the recipient confluence of the left and right hepatic arteries to the donor branch patch of the celiac and splenic arteries.

Operative times were as follows:
Donor cross-clamp time was on 05/05/XX at 2220 hours.
The hepatic artery was ligated on 05/06/XX at 0115 hours.
The portal vein was clamped at 0243 hours.
The liver came off ice at 0547 hours.
The portal vein was opened at 0312 hours.
The artery was re-perfused at 0359 hours.

The estimated blood loss was 200 mL.

Transfusions consisted of:
 Packed red blood cells 270 mL.
 Albumin 120 mL.
 Fresh frozen plasma 60 mL.
 Platelets 60 mL.
 Cryoprecipitate 120 mL.
 Crystalloid 60 mL.

A team surgery approach was necessary to complete this very complex operation in this child weighing only 5.5 kilograms with biliary atresia. Dr. Rosenberg was responsible for placement of the central venous line and the entire operation, including hepatectomy and implantation of the graft. Dr. Rassi was responsible for back table preparation of the graft, as well as the entire operation, including hepatectomy and implantation. Dr. Hermoso was responsible for back table preparation of the graft.

DESCRIPTION OF PROCEDURE: The patient was brought to the operating room and placed in the supine position. After general endotracheal anesthesia was achieved, we began with central venous line placement. A #4.8 French, 8 centimeter, double-lumen Arrow catheter was in the right subclavian vein without complication under fluoroscopic guidance. The site was sterilely dressed.

We then prepared and draped the abdomen in the usual sterile fashion. A large bilateral subcostal incision was made. The Thompson retractor was used for exposure. We then mobilized the liver from its ligamentous attachments. We began by dissecting out the porta hepatis. The hepatic artery was ligated beyond its bifurcation and divided. Bleeding ensued, but with some difficulty, we were able to suture the artery. The portal vein was skeletonized. We then mobilized the liver from the retrohepatic cava and ligated multiple direct branches. The right hepatic vein was encircled. This was suture ligated and divided. The caudate lobe was completely mobilized, and the liver was left on a pedicle of the portal vein for inflow and left and middle hepatic veins for outflow.

While this was going on, the graft was being prepared on the back table. The graft was taken from an 8 kilogram donor and was reduced in situ. It consisted of segments 1, 4-8, with good perfusion of segment 4. There was a single common bile duct. The hepatectomy was completed by cross-clamping the left and middle hepatic veins and clamping the portal vein, and the liver was removed. The confluence of the left and middle hepatic veins was then opened into a single orifice, which appeared to be a good size match for the donor suprahepatic cava. There was adequate hemostasis.

The liver was brought to the table and anastomosed in the following fashion. The donor suprahepatic vena cava was anastomosed end-to-end to the confluence of the left and middle hepatic vein with running 5-0 Prolene suture. The portal vein was then anastomosed end-to-end from main portal vein to main portal vein with running 6-0 Prolene suture. This was tied with a small amount of growth factor to allow for anastomotic expansion. Portal flow was restored to the liver graft, and a small blood flush was performed, with evacuation via the infrahepatic vena cava. Once we had adequate blood flush, the infrahepatic vena cava was ligated, and the hepatic vein clamp was removed.

The patient was stable throughout the procedure. The liver perfused evenly, although it still appeared somewhat dark at this point, without arterial

flow. After taking a few moments to achieve hemostasis, we turned our attention to the hepatic artery anastomosis. The recipient hepatic artery bifurcation was dissected free, and the main hepatic artery was clamped with a bulldog clamp. The confluence of the left and right hepatic arteries was opened into a single branch patch, which appeared to have excellent inflow. The donor common hepatic artery was opened as it came off the celiac into a branch patch of the celiac and the splenic artery. These appeared to be a good size match for the recipient artery branch patch. We then performed the anastomosis with interrupted 7-0 Prolene sutures. The artery was fed via the side branch of the gastroduodenal artery, and flow was restored. The liver pinked up immediately and evenly and began making bile almost immediately. There was excellent Doppler flow in both the hepatic artery and portal vein at this point. Three Jackson-Pratt drains were placed, the right one behind the right lobe of the liver, the middle one behind the bile duct anastomosis, and the left one near the cut edge of the liver. The wound was closed with two layers of running PDS to the fascia, followed by subcutaneous and subcuticular Vicryl. Sterile dressings were applied.

The patient tolerated the procedure well and was extubated in the operating room and taken to the recovery room in stable condition.

Note Type: Liver Intestine Transplant Inpatient MD
 Date: May 08, XX 17:58 EST
 Status: Auth (Verified)
 Subject: Liver Transplant POD#2
 Created by: GIANDECHI MD, SACHI L on May 08, XX 18:02 EST
 Verified by: GIANDECHI MD, SACHI L on May 09, XX 11:48 EST
 Encounter info: XXXX, Wyndham Hospital, Inpatient, 5/5/XX - 5/9/XX

*** Final Report ***

Interval History: Tm 38.4, PRBC today for low HCT, transferred to 6A

Basic Vital Signs

Vitals Signs since (05/07 17:58)	24 h min	24 h max	Most recent (Time)
Temperature			37.1 (14:42)
Heart Rate	133	170	133 *16:58*
BP Systolic			116 (14:55)
Diastolic			104 (14:55)
Respiratory Rate	26	37	37 *16:58*
Oxygen Saturation (SPO2)	96%	99%	99% *16:58*
Weight (kg)			5.35 (15:16)

IO Summary (Daily totals are 0:00-23:59)

I&O	05/07/XX - 05/07/XX	05/08/XX as of 17:58
In: parenteral	30.84	15.19
In: TOTAL	30.84	15.19
Out: urine	0	84
Out: tubes/drains/other	0	18
Out: TOTAL	0	102
Balance: TOTAL	30.84	-86.81

Active Medication Orders

Scheduled Medications

aspirin 20.25 mg PO daily *Com
 basiliximab 10 mg IV 1time Stop: 05/10/XX 13:16 *Com
 cytomegalovirus immune globulin 840 mg IV 1time Stop: 05/08/XX 17:00 *Com
 filgrastim 28 mcg IV Q24hr Last admin: 28 mcg IV (05/08/XX 11:00)
 ganciclovir 28 mg IV Q12hr *Com
 methylPREDNISolone 16.68 mg IV 2 dose Q12hr Stop: 05/08/XX 21:00 *Com Last admin: 16.68 mg IV (05/08/XX 09:00)
 methylPREDNISolone 22 mg IV 2 dose daily Stop: 05/09/XX 10:00 *Com
 methylPREDNISolone 11 mg IV 1 dose daily Stop: 05/10/XX 09:00 *Com
 nystatin 1 mL PO QID Last admin: 1 mL PO (05/08/XX 16:00)
 pantoprazole (PANTOprazole) 5.5 mg IV Q24hr *Com Last admin: 5.5 mg IV (05/08/XX 08:00)
 prednisoLONE 6 mg PO 1 dose daily Stop: 05/11/XX 09:00 *Com
 prednisoLONE 3 mg PO daily *Com

tacrolimus (TACROLimus) 1.5 mg PO Q12hr *Com Last admin: 1 mg NG (05/08/XX 09:00)

PRN Medications

diphenhydramINE (Benadryl) 6 mg IV Q4hr PRN Itching *Com Last admin: 6 mg IV (05/08/XX 09:38)

lidocaine topical (LMX 4 with Tegaderm) 1 g TOP 5x/Day PRN Procedure(s) *Com

morphine (morphine IV) 0.278 mg IV Q2hr PRN Pain Last admin: 0.278 mg IV (05/08/XX 17:01)

sucrose (Sucrose 24% oral solution) 2 mL PO Q2hr PRN Pain *Com Last admin: 2 mL PO (05/08/XX 14:52)

Continuous Medications/Fluids

D5W NS 500 mL + potassium CHLORIDE, IVF 10 mEq IV *Com

heparin [33.00 unit/kg/hr] + NS *Com Last rate: 33 unit/kg/hr

Suspended/On-Hold Medications

acetaminophen (Suspended) 60 mg PR Q4hr PRN Fever/Pain Last admin: 60 mg PR (05/06/XX 12:36)

Additional Medications Admin within last 24 hours (or since 05/07 17:58)

ampicillin-sulbactam (Unasyn) *Com Last admin: 264.5 mg IV (05/08/XX 06:00)

furosemide *Com Last admin: 6 mg IV (05/08/XX 10:00)

heparin [27.00 unit/kg/hr] + D10W *Com Last rate: 18 unit/kg/hr

methylPREDNISolone *Com Last admin: 22.24 mg IV (05/07/XX 21:00)

morphine *Com Last admin: 1 mg ICU-IV (05/08/XX 11:30)

*Com: Order comment exists. Consult Order Profile or MAR for details

Allergies: No known allergies

Physical Examination:

GEN: alert, crying, appears hungry, mother at bedside and attentive

HEENT: sclera clear, MMM, NGT R nare

CHEST: port accessed, RRR, no murmur, LS CTAB, easy WOB

ABD: soft, NTND, transverse dsg c/d/i, JP x3 with sersanguinous drainage in dsg and in drain, foley catheter with pale yellow urine

EXT: WWP, no edema, PIV

Labs (Reported 05/07/XX 17:58 - 05/08/XX 17:58)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
05/08 16:15	140	3.51	104	24	9	0.3	108 H
05/08 08:56	138	4.26	108	21 L	8	0.3	107 H
05/08 04:46	134 L	4.07	102	21 L	7	0.2	105 H
05/07 22:10	129 L	3.67	98 L	24	6	0.2	124 H

Chem	Ca	Mg	Phos
05/08 16:15	9.3	1.6	2.4 L
05/08 08:56	8.7	1.5	2.7 L
05/08 04:46	8.9	1.6	2.6 L
05/07 22:10	8.7	1.5	2.6 L

LFTs	AST	ALT	Bili T	Bili D	ALK	ALB	LDH
05/08 16:15	234 H	111 H	0.7	0.2	160	3.5	472 H
05/08 08:56	229 H	105 H			116	2.9 L	321
05/08 04:46	235 H	110 H	0.5	0.2	113	2.8 L	
05/07 22:10	246 H	118 H	0.6	0.3	95 L	2.6 L	

CBC	WBC	HBG	HCT	PLT
05/08 16:15	34.57 H	11.8	34.3	180 K L
05/08 04:46	2.73 L	7.5 C	21.8 L	159 K L
05/07 14:10	3.94 L	7.8 C	22.7 L	163 K L
05/06 15:52		11.0	33	
05/06 04:15		10.6 L	32	
05/06 03:15		12.9 H	39 H	
05/06 02:35		12.1	36	
05/06 01:30		11.3	34	
05/06 00:55		9.1 L	27 L	
05/05 23:30		9.2 L	27 L	

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
05/08 16:15	11.8	1.13	50.5 C		278	
05/08 07:10	10.9	1.03	40.2 H	283	301	
05/08 04:46	10.5	0.99	41.0 H		333	
05/07 22:10	10.3	0.97	44.9 H		356	

Diagnostic studies: 5/8/XX ABD US doppler: There is a small amount of free pelvic fluid.

Grayscale examination of the liver is unremarkable, without evidence of focal lesions or biliary radicles dilatation. The two main hepatic veins demonstrate normal triphasic waveform. The main hepatic artery demonstrates normal arterial waveform, with a resistive index of 0.53. Intrahepatic portal vein demonstrate normal monophasic hepatopedal flow. Native IVC is identified and demonstrate normal waveform. Evaluation of the aorta is limited but demonstrates high resistance arterial waveform.

Views of the pancreas are limited by overlying bandages. However, the previously visualized loculated collection, just to the left of the left hepatic margin is again identified, and appears slightly smaller. The right kidney measures approximately 4.7 cm. The left kidney measures approximately 5.7 cm. There is no evidence of hydronephrosis. The spleen measures 5.3 cm.

Micro Results: Updates since 05/07 17:58. Collection date displayed.

Blood Culture Routine, Aerobic: (Blood, Venous) 05/06. **Preliminary Report:** No growth to date Culture is continuously monitored and will be updated if positive

Blood Culture Routine, Aerobic: (Blood, CVL) 05/06. **Preliminary Report:** No growth to date Culture is continuously monitored and will be updated if positive

Blood Culture Routine, Aerobic: (Blood, Portacath) 05/06. **Preliminary Report:** No growth to date Culture is continuously monitored and will be updated if positive

EBV PCR, Quantitative: (Blood) 05/06. **Final Report:** No EBV DNA detected by PCR. The lower limit of this test is 10,000 EBV genomes per mL of blood. A reference range for this test has not been established. Results should be interpreted in the context of other clinical and laboratory information. Values obtained in this test can be compared to those obtained at University of Pittsburgh (where the test was previously sent) using these approximate values: 10,000 in this test equals 8 at Pittsburgh, 25,000 in this test equals 40 at Pittsburgh; 150,000 in this test equals 200 at Pittsburgh; 500,000 in this test equals 500 at Pittsburgh. This test is performed on whole blood, while the test at University of Pittsburgh is performed on purified lymphocytes. This test should not be used to diagnose latent or previous EBV infection. People with latent or previous EBV infection may not have detectable EBV DNA in their blood by this test. The variability of this test should be considered when interpreting results. Changes of approximately

three fold in the quantity of EBV DNA detected may be due to variation in the test rather than actual changes in the level of EBV DNA in the sample. Note: This test was developed and its performance characteristics determined by the Infectious Diseases Diagnostic Division of Wyndham Hospital. It has not been cleared or approved by the U.S. Food and Drug Administration. The FDA has determined that such clearance or approval is not necessary.

MRSA Culture: (Nares) 05/06. **Final Report:** No methicillin resistant *Staphylococcus aureus* isolated

Urine Culture: (Urine, straight catheterized) 05/06. **Preliminary Report:** No growth or fewer than 1,000 organisms/mL

VRE Culture, Rectal: (Rectum) 05/06. **Final Report:** No vancomycin resistant *Enterococci* isolated

Impression and Plan: 3 mo male now POD#2 right reduced lobe liver transplant for biliary atresia in stable condition.

1. Methylprednisolone 3 mg/kg IV q12hrs today, 4 mg IV x1 in am 5/9, 2 mg/kg IV 5/XX, prednisolone 1 mg/kg po 5/11, prednisolone 0.5 mg/kg po 5/12 per protocol
2. nystatin 1 ml QID
3. ganciclovir 5 mg/kg/dose q12hrs and cytogam 150 mg/kg IV x1 as donor CMV+
4. Labs q6hrs today, q12hrs tomorrow
5. Heparin drip with goal PTT 60
6. Antithrombin III goal 50-70 - only treat if less than 50
7. ABD US doppler 5/9 per protocol
8. Start aspirin when heparin drip DC approx POD#5
9. Remove NGT now, start pedialyte po only 10 mL per feed
10. Foley to gravity
11. Prograf 1.5 mg po q12hrs
12. Synagis due 5/26/XX
13. Basiliximab POD#4 per protocol
14. IVF at maintenance
15. WBC elevated to 34 this pm - send blood cultures now from port. May be elevated in setting of GCSF x1 this am but pt febrile this am.

Jillien Lochridge, CPNP

Attending Note: I have reviewed the available patient data and assisted with the coordination of care with input from members of the multidisciplinary team.

Patient seen and examined. laboratory evaluation reviewed. PE lungs with good air entry bilaterally, abdomen soft, surgical site covered in gauze, passed flatulence during exam. Assessment as above. Plan discussed with team and mom. I participated in a multidisciplinary discussion of this child's status, cause and plan of care. The multidisciplinary group included the transplant surgeon, nurse coordinator, dietitian, transplant pharmacist, social worker, and staff nurses from the transplant unit.

Sachi Giandechi, MD
Attending in Hepatology

Note Type: Inpatient Nursing
 Date: May 08, XX 20:00 EST
 Status: Auth (Verified)
 Created by: MORAN RN, PATRICIA R on May 08, XX 20:17 EST
 Verified by: MORAN RN, PATRICIA R on May 08, XX 23:15 EST
 Encounter info: XXXX, Wyndham Hospital, Inpatient, 5/5/XX - 5/9/XX

*** Final Report ***

Progress Note - Nursing

Problem: Alteration in fluid balance / ICU transfer

Outcome: Pt admitted this afternoon. By report he had received a blood transfusion prior to transfer. VSS. BP 's 116/84, afebrile. Patient was alert and fussy. He received Sweet-ease for comfort and it seemed to soothe him for short intervals. Mom at side was able to soothe Alex and he finally fell asleep. Labs were drawn at 1600, and of note his WBC's had risen to 34.35. Cultures were ordered and obtained from his Port. his pre CMVIG VS showed an elevation in his BP's (130's over 80's) and his heart rate was also elevated to the 130's. Surgery was paged and informed as well as asked if CMVIG should be started. It was decided to continue. Patient continued with increasing BP's and surgery was again informed and checked in on his status. At 2045 he woke abruptly and was diaphoretic, his BP's were still elevated, his temp was 36.6, he had a desat to 86 which initially improved with BB O2. Surgery was paged and at the time she first saw him he appeared stable with a BP of 116/70, without respiratory distress. Within 2 minutes he was limp, pale and had desated to 83. He was switched to 1L O2 by NC and an ICU STAT was called. His BP continued to drop to 46/30, a 100cc NS bolus was given before he was transferred.

Alex did not receive his tacrolimus Team and ICU RN aware. His CMVIG was stopped abruptly with 5mL remaining of an 840mg/ 16.8 mL dose.

Problem: Potential Alteration in Coping:

Outcome: Mom is very attentive and caring. She watches over Alex as he slept and was able to hold him for about 30 minutes this afternoon. During the ICU Stat she remained calm and understood the need to transfer Alex to the ICU.

Note Type: Operative Note
 Date: May 08, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: ROSENBERG MD, ADAM D on May 09, XX 08:39 EST
 Verified by: ROSENBERG MD, ADAM D on May 16, XX 14:49 EST
 Encounter info: XXXX, Wyndham Hospital, Documents, 1/1/1869 - 1/1/2100

*** Final Report ***

DATE OF PROCEDURE: 05/8/XX

PRE-OPERATIVE DIAGNOSIS:

1. Biliary Atresia
2. Status post orthotopic liver transplant
3. Hypotension

POST-OPERATIVE DIAGNOSIS: Same with 4; hemoperitoneum,

PROCEDURES PERFORMED:

1. Exploratory laparotomy
2. Pericardial window

SURGEON: Adam D Rosenberg, MD

ASSISTANTS: Maziar Rassi, MD. Biren P Modi, MD

ANESTHESIA: General endotracheal tube anesthesia

INDICATIONS FOR PROCEDURE: This young boy was just two days status post an orthotopic liver transplant and was doing quite well. He had just been transferred from the intensive care unit to the transplant floor. He developed a relatively acute onset of refractory hypotension, which required emergent transfer back to the intensive care unit. He was fluid resuscitated and intubated for decreased mental status and hypotension. Consideration was made to put him on ECMO but while the circuit was being set up he improved with fluid resuscitation and pressors. Following this however, his abdomen became acutely distended and blood starting coming from his JP drains. It was then decided to take him emergently to the operating room for exploration. Ongoing fluid resuscitation occurred during transfer emergently to the operating room. The patient's mother was present during the ICU resuscitation and I discussed the need to return to the OR with Alex's mother. She was crying and confused but seemed to understand the gravity of the situation and the need for emergent operation.

FINDINGS: the patient had a large hemoperitoneum upon opening the prior liver transplant incision, hepatic arterial bleeding identified and repaired. Hemodynamics improved following the repair.

DESCRIPTION OF PROCEDURE: The patient was brought emergently with ongoing fluid and pressor resuscitation after already being intubated. Upon arrival in the operating room the patient's abdomen was distended but he was maintaining a blood pressure. We decided to emergently open his abdomen after prepping and draping. Upon opening the peritoneal cavity a large amount of blood was evacuated which appeared quite fresh and the wound was

packed temporarily. The liver appeared distended and dark, consistent with impaired venous outflow but there was no evidence of hepatic vein thrombosis and the anastomosis appeared soft and intact. Despite aggressive ongoing fluid and blood resuscitation, the patient continued to have hypotension. We identified the source of bleeding to stem from the hepatic artery and repaired it. Upon repair the child's hemodynamics improved, fluid resuscitation stabilized and vasopressor need decreased in the operating room. Following observation to ensure stabilization the patient's abdomen was closed and the patient was transferred to the intensive care unit.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #10**

Note Type: Discharge Summary
 Date: September 22, XX 14:11 EDT
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: KUTNER MD, MPH, LAWRENCE on September 22, XX 14:18 EDT
 Verified by: TAUB MD, PhD, CHRISTOPHER on September 24, XX 12:59 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

*** Final Report ***

CHILDREN'S HOSPITAL
 4321 WISTERIA LANE
 CITY, USA XXXXX

Encounter Number XXXX
 Date of Birth Feb 22, XX
 Age 2 years old
 Gender Male

Your patient, Brian Hadley, was admitted to Princeton-Plainsboro on 08/27/XX to the Pulmonary Service. The principal admission diagnosis was "MULTIFOCAL PNEUMONIA". Consultations during the hospitalization included Pain Team, Hematology, and Plastic Surgery.

Brian was discharged on 09/22/XX. The principal discharge diagnosis was "MULTIFOCAL PNEUMONIA" which was noted to be improved. Other discharge diagnoses included "ASPIRATION OF THIN AND NECTAR THICK LIQUIDS" which was noted to be unchanged, and "CRANIOSYNOSTOSIS S/P FOA" which was noted to be unchanged.

There were no recent laboratory results before discharge. There are no tests pending at discharge.

There were no complications during the hospitalization.

Discharge medications:

- * ALBUTEROL 0.5% INH SOLUTION: 0.25ML Q4H NEB PRN RESP DISTRESS, WHEEZE
- * ENOXAPARIN: 14 MG SUBCUTANEOUS INJECTION BID
- * CLONIDINE: 25 MCG NG BID FOR ONE WEEK, FOLLOWED BY 12.5 MCG NG BID FOR ONE WEEK, FOLLOWED BY 5 MCG NG BID FOR ONE WEEK
- * MIRALAX: 8.5 G NG DAILY
- * BECLOMETHASONE 40 MCG/INH: MDI 1 PUFF BID
- * PANTOPRAZOLE: 8 MG NG DAILY

Discharge diet:

THICKEN LIQUID FEEDS TO HONEY CONSISTENCY PER FEEDING TEAM INSTRUCTIONS.
 PEDIASURE WITH FIBER AT 35 CC/HR OVERNIGHT FOR 10-12 HOURS

We gave the following instructions to Brian and his family:

PLEASE FOLLOW UP WITH YOUR PEDIATRICIAN WITHIN 48 HOURS OF DISCHARGE
 PLEASE SEEK MEDICAL ATTENTION IF BRIAN HAS FEVER, ALTERED MENTAL STATUS, RAPID BREATHING, VOMITTING, DIARRHEA, COUGHING/GAGGING WITH FEEDS, SEIZURE ACTIVITY OR OTHER CONCERNING SYMPTOMS

Scheduled appointments include:

09/30/XX at 11:20 AM in HEMATOLOGY/MAIN PROGRAM with ALLISON CAMERON

The discharging provider wrote the following lines regarding this hospitalization:

HPI: 2yo M w/ a h/ of craniosynostosis, also w/ h/o kyphosis w/ RLD and sleep apnea here with likely PNA after recent frontal orbital advancement surgery (8/20/XX) at PPH. Patient was noted to have a URI pre-operatively, but underwent successful procedure. Required re-intubation after operation and was extubated approximately one day after. Remained stable on floor and discharged although some tachycardia was noted prior to discharge with stable H&H. Per mom, child was coughing with a fever at the time of discharge (records show that for the two days prior to d/c Tmax was 38.6C). Per mom, fever and non-productive cough progressed. No clear aspiration event. Tmax 102 on 8/25 (day of discharge). AM of admission child appearing more ill, in pain and crying inconsolably, and having irregular breathing. Brought to ED where initially afebrile but developed temp to 38.3 C. CXR showed b/l infiltrates concerning for PNA and patient started on CTX + Vanco. Given 10cc and then 20cc/kg NS bolus for tachycardia. Patient noted to have increasing tachypnea and then respiratory distress with retractions. Placed on non-rebreather and given xopenex with no effect. VBG was 7.29/69/32. Patient placed on BiPap of 18/6 and admitted to ICU for further care. Of note, patient had had no BMs x 4d prior to admission.

PMH: Craniosynostosis, Kyphosis/RLD, Sleep/Central apnea (doesn't tolerate CPAP at home). Baseline is 0.5-3L O2 prn.

Surgery (8/20/XX)

1. Frontal orbital advancement.
2. Particulate bone cranioplasty.
3. Left supraorbital cranial bone graft for supraorbital rim contouring

Meds: Omeprazole 7mg daily, Pulmicort bid, albuterol prn

All: NKDA

Imm: UTD

PICU/ICU Course (8/27-9/16)

CV: Initially required pressors in the PICU, but has been HD stable off dopamine since 9/1/XX.

Resp: Admitted with b/l PNA and increased WOB. Baseline home O2 0.5-3L while asleep or drinking. Airway: DL Grade I view, previously intubated with wisc 1 and 3.0 ETT. Initially maintained on CTX + Vanco, but repeat CXR on HD#2 showed concern for worsening infiltrates b/l. Therefore given aspiration risk, patient transitioned to Unasyn. His respiratory status was noted to be tenuous on BiPap; he was observed and it was decided to intubate the patient on 8/29/XX. He remained intubated on the ventilator until 9/07 when he was extubated to NC O2. The following day he was placed on HFNC for increased WOB, which helped stabilize the patient. He completed his 2 week course of Unasyn on 9/10/XX. His home budesonide was changed to inh beclamethasone and he was started on standing albuterol q4h to treat his RAD component.

After transfer to the ICP Brian was weaned from HFNC at 8L 40% FiO2 as tolerated. He transiently needed increased respiratory support over the night of 9/12/XX after his NJ tube was pulled out and his sedation medications were switched to IV. Subsequent CXR showed no evidence of aspiration, and starting 9/13/XX he was weaned successfully to 2L regular NC. His albuterol was weaned to PRN and he was continued on beclamethasone. He continues to have intermittent tachypnea to the 60s, as well as moderate amounts of thin white secretions that require suctioning and chest PT. He has had occasional desats

associated with plugging that resolved with suctioning, the last one being on the morning of 9/15/XX.

FEN/GI: Initially kept NPO on IVF and IV PPI. NG was placed to suction to decompress stomach while on BiPap. After respiratory status improved, patient started again on home feeds, slowly advancing to goal feeds of Pediasure with fiber 30 kcal/oz 32 mL/h via NJT. On 9/12/XX his NJT was accidentally pulled and was replaced on 9/13/XX. On 9/16/XX his NJT was pulled back to NG as he no longer required HFNC. Placement was confirmed with x-ray. He was initiated on PPI for GI prophylaxis which was switched to enteral. Because of the concern for an aspiration event that led to his hospitalization, as well as his history of needing O2 with feeds, Brian was scheduled for modified barium swallow study.

ID: Brian was initially started on vancomycin and ceftriaxone, then treated with a 14 day course of unasyn for a presumed aspiration pneumonia completed on 9/10/XX. He had fevers on 9/6/XX and 9/8/XX, and received vancomycin from 9/8/XX through 9/10/XX for a 48 hour rule out. All blood cultures (8/27/XX, 9/6/XX, 9/8/XX) and urine cultures (9/6/XX, 9/8/XX) were negative. On arrival to the ICP a viral DFA and respiratory culture were sent due to his secretions and were negative. He was afebrile throughout his course in the ICP.

Heme: The patient received pRBCs x 1 for anemia while in the ICU.

Plastics: The plastics team continues to follow.

Neuro: While intubated, Brian was maintained on morphine + midazolam gtt. He required frequent bolusing and uptitration to properly sedate him. After extubation, an appropriate wean of his sedation was started. He was transitioned to intermittent methadone and lorazepam, and was started on a clonidine patch for agitation. On arrival to the ICP, pain service was consulted and recommended an aggressive wean of his methadone and lorazepam due to his relatively short sedation course. Methadone and ativan were weaned by 20% daily from 1mg to 0.2mg as of 9/15/XX. On 9/16/XX his dosing was spaced from Q4hr to Q6hr. WAT scores were followed and were never greater than 1. Per pain team the plan is to space the medications daily to Q12hr, then go down to 0.1mg Q12hr, then to Q24hr, and then observe for at least 24 hours off medication.

Social: Parents upset about readmission and initially threatening to file against hospital. Parents were offered reassurance and kept well informed.

=====
Pulmonary Service Hospital Course (9/16-9/22)
=====

Pulm: Remained on supplemental O2 at 0.5 L (home requirement has been 0.5 to 3L). No active issues during the patient's course on the pulmonary service.

FEN/GI:

-Brian tolerated NG feeds after NJ tube was pulled back.
-Modified barium swallow study was performed on 9/18. Brian showed a decline in swallow function from previous MBS evidenced by silent aspiration of both thin and nectar thick liquids. Previously, Brian had demonstrated adequate airway protection from above with the nectar consistency. Brian should

receive all liquids thickened to the honey consistency. He may continue to have purees and dissolvable solids as tolerated.

-Brian demonstrated good PO intake of solid foods. He had difficulty taking honey-consistency liquids through the nipple so NG feeds were provided overnight at a rate of 35 cc per hour.

Heme: Brian continued enoxaparin injections twice daily. Levels were measured weekly and remained in the therapeutic range. He will need a low molecular weight heparin level one week after discharge for which the hematology service will arrange and follow.

Neuro: Ativan and Methadone wean was continued. Ultimately weaned off completed on the morning of 9/22. Pain team plan for clonidine wean was communicated by the pain team and is listed in the medication section of this document.

Social: Attending phone calls were made daily at 11:00 am to keep the parents informed of the plan.

Discharge exam:

Gen: NAD

HEENT: MMM

CV: RRR, normal S1, S2

Lungs: mild coarse breath sounds bilaterally. No tachypnea

Abd: soft, nontender, non-distended

Ext: warm, well-perfused

Thank you for allowing us to participate in the care of your patient, and for continuing to refer your patients to Princeton-Plainsboro.

Attending Physician: Christopher Taub , Phone XXX-XXX-XXXX

Discharging Provider: Lawrence Kutner , Pager (XXX) XXX-XXXX

Note Type: PICU Admission MD
 Date: August 27, XX 20:32 EDT
 Status: Auth (Verified)
 Subject: PICU Provider Admission Note
 Created by: HOUSE MD, GREGORY on September 01, XX 09:47 EDT
 Verified by: HOUSE MD, GREGORY on September 01, XX 09:47 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

PICU Provider Admission Note Entered On: 08/30/XX 20:33 EDT
Performed On: 08/30/XX 20:32 EDT by HOUSE MD, GREGORY

Admission

The patient was admitted to the ICU for: Respiratory distress, Risk of respiratory insufficiency
Presenting History: 2 y.o. male w/ craniosynostosis, also w/ h/o kyphosis w/ RLD and sleep apnea here with likely PNA after recent frontal orbital advancement surgery (8/20/XX) at Princeton-Plainsboro. Patient was noted to have a URI pre-operatively, but underwent successful procedure. Required reintubation after operation and was extubated approximately one day after. Remained stable on floor and discharged although some tachycardia was noted prior to discharge with stable H&H. Per mom, child was coughing with a fever at the time of discharge (records show that for the two days prior to d/c Tmax was 37.6C). Per mom, fever and non-productive cough progressed. No clear aspiration event. Tmax 102 on 8/25 (day of discharge). AM of admission child appearing more ill, in pain and crying inconsolably, and having irregular breathing. Brought to ED where initially afebrile but developed temp to 38.3 C. CXR showed b/l infiltrates concerning for PNA and patient started on CTX + Vanco. Given 10cc and then 20cc/kg NS bolus for tachycardia. Over the ensuing several hours, patient noted to have increasing tachypnea and then respiratory distress with retractions. Placed on non-rebreather and given xopenex with no effect. VBG was 7.29/69/32. Patient placed on BiPap of 18/6 and admitted to ICU for further care. Of note, patient had had no BMs x 4d prior to admission.

PMH: Craniosynostosis, Kyphosis/RLD, Sleep/Central apnea (doesn't tolerate CPAP at home). Baseline is 0.5-3L O2 prn.

Surgery (8/20/XX)

1. Frontal orbital advancement.
2. Particulate bone cranioplasty.
3. Left supraorbital cranial bone graft for supraorbital rim contouring

Airway: DL Grade I view, intubated with wisc 1 and 3.0 ETT

Meds: Omeprazole 7mg daily, Pulmicort bid, albuterol prn

All: NKDA

Imm: UTD

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Primary Diagnosis : The patient has a primary diagnosis of Pneumonia

HOUSE MD, GREGORY - 08/27/XX 20:32 EDT

Past Medical History : The patient has a past medical history that is significant for Craniosynostosis s/p FOA on 8/20, Kyphosis/RLD, Sleep/Central apnea

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Physical Exam

Current Vital Signs : Reviewed in EMR. Currently afebrile with RR in 30s-40s

General Appearance : BiPap in place, lying comfortably in bed but with tachypnea and mild-mod increased WOB

HEENT : BiPap in place. PERRL 2-1.5mm. Neck without swelling or masses
Respiratory/Chest : Increased WOB with mild subcostal retractions and intermittent grunting. Coarse BS throughout with moderate air entry. Rhonchi b/l R >L.
Cardiovascular : RRR, no M/R/G noted
Gastrointestinal : Mildly distended belly, but soft and no HSM noted. + BS
Genitourinary : Deferred
Musculoskeletal : MAE equally with symmetric extremities, WWP with 2+ distal pulses and cap refill < 2s
Skin : Dry without significant bruising
Neuro : Sleeping but arousable. MAE, no focal deficits
Access : PIV x 2 (left arm and left leg)

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Lab and Diagnostic Studies

. : I have reviewed the available laboratory data and diagnostic imaging studies

Significant results include : VBG: 7.29/69/32

Radiology studies today show : CXR (8/27): IMPRESSION: Extensive bilateral pulmonary consolidation in keeping with pneumonia. In addition, there is volume loss in the right lower lobe with mild elevation of the right hemidiaphragm.

CXR (6/30) #2: IMPRESSION: No significant change in the appearance of the chest compared to the preceding study.

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Impression/Plan

Overall Assessment : A/P: 2yo M w/ a h/o craniosynostosis, also w/ h/o kyphosis w/ RLD and sleep apnea here with likely PNA after recent FOA surgery (8/20/XX) at PPH. Concern is for hospital acquired PNA and treating with broad spectrum abx. Currently on BiPap.

CV: HD stable, tachycardia in setting of fevers, continue to monitor

Resp: Here with PNA and increased WOB

- Continue BiPap
- Repeat VBG, if improved, consider sprinting to HFNC
- Continue CTX/Vanc for concern for hosp acquired PNA
- Continue home pulmicort, alb prn

FEN/GI:

- NPO for now, NG to suction while on BiPap
- IV PPI for now - return to PO when tolerating feeds
- D5NS @ maintenance, repeat chem in AM
- Has pooped here, continue to monitor

ID:

- F/U blood cultures
- Continue CTX, Vanc; monitor vanc troughs
- If worsens, resend cx and consider anaerobic coverage

S/P FOA:

- Plastics aware and will follow
- Oxycodone if in pain

Social: Parents upset about readmission and initially threatening to file against hospital.

- Offer reassurance and keep well informed.

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Note Type: PICU Admission Attending MD
 Date: August 27, XX 21:38 EDT
 Status: Auth (Verified)
 Subject: PICU Attending Admission Note
 Created by: CUDDY MD, PhD, LISA on August 27, XX 21:38 EDT
 Verified by: CUDDY MD, PhD, LISA on August 27, XX 21:38 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

PICU Attending Admission Note Entered On: 08/27/XX 21:38 EDT
Performed On: 08/27/XX 21:38 EDT by CUDDY MD, PhD, LISA

Addendum

. . : Brian is admitted to the PICU for NIV at risk of respiratory failure in setting of bilateral PNA. PMH sig for recent craniostomy surgery. Several day h/o URI/worsening RD. CXR bilateral atelectasis/PNA. In ED in severe distress. VBG 7.29/69/32. Transitioned to BIPAP in the ED with some improvement.

On exam here he is febrile, HR 140s, BP 85/50, 95% saturated on BIPAP/60% FiO2. RR 40-60s. G/F/R. Chest is coarse bilaterally. Abd is soft. He is sleepy but arousable. WWP throughout.
 Lytes 132/4.4/97/32/9/02
 VBG 7.32/55/HCO3 28
 CBC 5>27<375

As the patient's attending physician in the intensive care unit, I have personally reviewed the medical record on admission, including available consultant's notes, laboratory reports and imaging data. I have directed decision-making and the development of the current treatment plan.

By my assessment, Brian remains in critical condition and ongoing treatment in the intensive care unit is necessary today. His ongoing critical illness acutely impairs one or more organ systems and therefore a high probability of clinically significant or life-threatening deterioration remains. The prevention of further deterioration is necessary and the abrupt withdrawal of our present treatment regimen would potentially result in a clinically significant or life-threatening deterioration.

The essential physiologic derangements today remain need for NIV and risk for respiratory failure and need for mechanical ventilation. Our management priorities at this time are to monitor and support oxygenation and ventilation; assure adequate tissue perfusion; monitor for changes in the neurologic examination; provide surveillance for infection; BSABX; monitor and correct significant metabolic and hematologic abnormalities; and assure adequate symptom relief.
 Lisa Cuddy

I the critical care attending physician in the intensive care unit have provided direct patient care-not inclusive of teaching-to this critically ill patient have been immediately available to provide full attention to the patient at the bedside.

CUDDY MD, PhD, LISA - 08/27/XX 21:38 EDT

Note Type: ICU Admission Nursing
 Date: August 29, XX 03:35 EDT
 Status: Auth (Verified)
 Subject: ICU Admission Nursing Note
 Created by: WILSON RN, JAMES on August 29, XX 05:26 EDT
 Verified by: WILSON RN, JAMES on August 29, XX 05:26 EDT
 Encounter info: 6109996021, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

*** Final Report ***

ICU Admission Nursing Note Entered On: 08/29/XX 04:26 EDT
Performed On: 08/29/XX 03:35 EDT by WILSON RN, JAMES

ICU Admission Nursing Note

Past Medical History : Brian is a former 34 week preemie, reflux, kyphosis, coronal craniosynostosis and obstructive sleep apnea with restrictive lung disease. Swallow study done on past admission under fluroscopy showing aspiration of thin liquids, purees but nectar thick liquids ok. To OR 8/20 for fronto-orbital advancement. Remained in ICU intubated for several days post-op due to lung disease. Transfer to PICU on 8/23. Readmit through ER 8/27/XX.

Recent Events : ED visit following vomiting & increased irritability & irregular breathing at home

WILSON RN, JAMES - 09/01/XX 03:35 EDT

Review of System : Pt arrived to PICU from ED on BIPAP for resp distress.

ROS:

Resp: Ls sl coarse throughout, NP suction x2 with minimal secretions. + cough, non productive. Bipap settings 12/6, 60% FIO2. RR 40-70's. Pt desaturated into the 50's, requiring bagging when taken off of BIPAP for skincare. FIO2 titrated to accommodate for O2 requirement. VBg sent overnight, PCO2 down. will recheck in am.

Neuro: Pt waking appropriately. Crying with cares, requiring morphine x1. Unable to open Pt's R eye d/t swelling. L eye 3/2 & brisk. Tylenol given x1 for agitation.

CV: WWP, 2+ pulses to all extremities. 3 second cap refill. PIV's intact, flushing easily. Afebrile. IVF continue to infuse. Afebrile overnight, continues on abx. Vanco lvl due to be drawn this am. HR 110-160. BP stable with MAPs in the 50-60's.

GI/GU: Sump to LWCS, green bilious drainage. Abd soft & round, min BS. No BM, per aunt had large one in ED. Voiding QS amts of CYU to diaper. NPO & continues on IVF.

Social: Mom & father at bedside last night. All family members understandably upset. Angry for sending them home "too early". Will cont to update and support.

WILSON RN, JAMES - 09/01/XX 04:21 EDT

Note Type: PICU Progress Attending MD
 Date: August 29, XX 12:45 EDT
 Status: Auth (Verified)
 Subject: PICU Attending Progress Note
 Created by: FOREMAN MBBS, ERIC on August 29, XX 12:45 EDT
 Verified by: FOREMAN MBBS, ERIC on August 29, XX 12:45 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

PICU Attending Progress Note Entered On: 08/29/XX 12:59 EDT
Performed On: 08/29/XX 12:45 EDT by FOREMAN MBBS, ERIC

Addendum

. : Attending Progress note

Brian is a 2yo boy who was admitted to PICU yesterday evening with incipient respiratory failure necessitating close supervision and monitoring. Three weeks ago he underwent a cranial vault remodeling procedure under general anesthesia.

Overnight:

Brian had progressive worsening with hypercapnia (pH 7.29, PCO2 69 mm Hg, HCO3 32 mmol/L) and required nasal/face-mask CPAP. This morning there was no improvement in gas exchange with BiPAP settings of 12/6 cm H2O and FiO2 0.8 (pH 7.29, PCO2 63 mm Hg, HCO3 30 mmol/L). Of note, he desaturates down to 50% whenever the mask is removed. The chest x-ray shows worsening diffuse changes.

Supervision of care:

As the patient's attending physician in the intensive care unit, I have personally reviewed the medical record over the past 24 hours, procedural note, available consultants' notes, laboratory reports and imaging data. I supervised admission, reviewed the physical examination and interpretation of all relevant data, and directed decision-making and the development of the current treatment plan.

Condition: Serious

Assessment:

Brian requires continued care on PICU. He has acute or chronic respiratory failure and, in view of his progressive deterioration, we have elected to intubate and mechanically ventilate him. I was present during this procedure. As a precaution I spoke with the Neurosurgery service about his recent operation and the stability of his craniocervical junction. I note the foramen magnum stenosis on recent MRI.

We will continue with prudent mech ventilatory support, sedation and analgesia as required, and follow vital signs and resolution of the current pneumonic changes. Of concern, however, is the history of obstructive sleep apnea, home oxygen dependence, and raised bicarbonate. This will require further investigation in regard to drive to breathing, and respiratory control, and the possibility of GER.

Eric Foreman MD

I, the critical care attending physician in the ICU have been immediately available to provide full attention to the patient at the bedside and have spent a minimum of 75 min providing direct care-not inclusive of teaching-to this critically ill patient.

FOREMAN MBBS, ERIC - 08/29/XX 12:45 EDT

Note Type: Hematology Consultation
 Date: August 30, XX 14:28 EDT
 Status: Auth (Verified)
 Subject: Hematology Initial Consult note
 Created by: CAMERON MD, ALLISON on August 30, XX 15:00 EDT
 Verified by: CAMERON MD, ALLISON on August 31, XX 06:31 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

* Final Report *

Requesting physician/service: Foreman/PICU

Reason for consultation: Line-associated DVT

History of Present Illness: Brian is a 2 yo ex-34 wk M w/ kyphosis, restrictive lung disease requiring home O2, and now POD#9 from craniostomy repair (cranial vault advancement) who was readmitted 2 days ago for fever and found to have multifocal PNA. Worsened yesterday and was thus intubated and R. femoral CVL placed. Ultrasound showed clot along the end of the CVL and extending into the common and superficial femoral vein. The ICU's plan is to remove the CVL after PICC is placed, as Brian is getting PRBCs and IV antibiotics.

Review of Systems: low-grade fever yesterday, intubated, no oozing, bleeding, or bruising noted. Has been urinating well.

Past Medical/Surgical History:

1. 34-week ex-premature.
2. kyphosis
3. restrictive lung disease
4. L. coronal synostosis s/p repair
5. spinal stenosis

Family History: No family history of easy bruising, bleeding, heavy periods, unexpectedly needing transfusions during surgery. Also no family history of clots, including DVTs, PEs, CVAs, or MIs. No cancers, no persons requiring splenectomy or cholecystectomy.

Social History: Brian and his sister and brother live with their parents in Stevensville.

Active Medication Orders

Scheduled Medications

ampicillin-sulbactam (Unasyn) 400 mg IV Q6hr *Com Last admin: 400 mg IV (08/30/XX 12:17)
 beclomethasone (beclomethasone 40 mcg/inh inhalation aerosol with adapter) 1 puff MDI BID *Com Last admin: 1 puff MDI (08/30/XX 11:26)
 budesonide (Budesonide Respule (neb)) 1 mg NEB BID *Com Last admin: 1 mg NEB (08/30/XX 11:30)
 metoclopramide 0.8095 mg IV 1time Stop: 08/30/XX 11:00 *Com
 pantoprazole (PANToprazole) 8 mg IV Q24hr *Com Last admin: 8 mg IV (09/01/XX 19:07)
 vancomycin 160 mg IV Q6hr *Com Last admin: 160 mg IV (08/30/XX 13:53)

PRN Medications

acetaminophen 100 mg PR Q4hr PRN Fever/Pain Last admin: 100 mg PR (08/30/XX 21:28)
 acetaminophen 100 mg PO Q4hr PRN Fever/Pain
 albuterol (albuterol 0.5% inhalation solution) 0.25 mL NEB Q2hr PRN Respiratory Distress *Com Last admin: 0.25 mL NEB (09/01/XX 06:42)
 fentanyl (fentanyl IV) 16 mcg IV Q1hr PRN Pain
 heparin flush (heparin Flush 10 unit/mL) 20 unit IV Q8hr PRN Line Maintenance
 midazolam 0.4 mg ICU-IV Q1hr PRN Agitation *Com Last admin: 0.4 mg ICU-IV (08/30/XX 13:18)
 morphine (morphine IV) 0.4 mg ICU-IV Q1hr PRN Pain Last admin: 0.4 mg ICU-IV (08/30/XX 13:19)

ocular lubricant (ocular lubricant drops) 1 drop OPTH Q2hr PRN Dry eyes *Com Last admin: 1 drop OPTH (09/01/XX 20:59)

Continuous Medications/Fluids

D5W NS 1,000 mL + potassium CHLORIDE, IVF 20 mEq IV *Com Last admin: 32 mL IV (08/30/XX 13:59)

midazolam infusion [0.07 mg/kg/hr] + syringe contains *Com Last rate: 1 mg

morphine infusion [0.07 mg/kg/hr] + D5W *Com Last rate: 1 mg

NS 50 mL + heparin, continuous flush 50 unit IV *Com

Allergies: No known allergies

Examination:

Basic Vital Signs

Vitals Signs since (09/01 14:28)	24 h min	24 h max	Most recent (Time)
Temperature	36.1	38.1	36.5 (12:45)
Heart Rate	116	163	130 *13:22*
BP Systolic	73	100	91 *13:22*
Diastolic	32	75	75 *13:22*
Respiratory Rate	23	36	28 *13:22*
Oxygen Saturation (SPO2)	60%	100%	99% *13:22*
Percent FiO2	0.5	0.6	0.5 (13:45)

Input/Output (Daily totals are 0:00-23:59)

In/Out/Bal: Yesterday 891.05/399/492.05; Today (as of 14:28) 784.9/660/124.9

Physical Exam:

Gen: intubated, sedated, pale

HEENT: intubated, blonde hair

Neck: no LAD

Chest: coarse ventilator breaths bilaterally, riding the ventilator

CV: RRR, nl S1 & S2, no murmurs

Abd: +Bs, soft, NT, ND, no masses or HSM palpable

Groin: Right femoral line in place

left thigh and leg WWP, TP 2/4, Cr< 2 sec

Skin: no oozing, petechiae, bruising

Labs (Reported 08/30/XX 12:28 - 08/27/XX 12:28)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
08/27 06:30	143	3.55	110	26	2 L	0.2	97
08/27 02:30	142	2.50 C	108	26	2 L	0.2	104 H
08/27 01:50	140	2.70 C	107	26	2 L	0.2	103 H

Chem	Ca	Mg	Phos
08/27 06:30	8.7	2.1	3.5
08/27 02:30	8.2	2.1	2.9 L
08/27 01:50	7.7 L	2.0	2.8 L

CBC	WBC	HBG	HCT	PLT
08/27 06:30	8.86	6.9 C	21.8 L	466 K
08/27 02:30	8.21	7.1 C	21.7 L	469 K

Pre-operative coags on 8/14: PT 10.8, PTT: 25.3, fibrinogen: 203. last set on 8/20 were intraoperative. None since then.

No recent U/As or stool Guaiacs

Diagnostic Imaging: prelim report of right leg dopplers: FINDINGS: The venous catheter is noted in the right iliac vein and common femoral vein. Common iliac vein is patent. There is reduced flow in the external iliac vein. There is no or very minimal flow in the common femoral vein, superficial femoral vein, and popliteal veins. Clot is not well visualized. However, the superficial and popliteal veins are not compressible. The corresponding arteries have normal high resistance arterial flow. IMPRESSION: Findings as described above suggestive of right lower extremity deep venous thrombosis as described.

Assessment/Recommendations: Brian is a 2 yo, ex-34 wk M w/ kyphosis, restrictive lung disease requiring home O2, POD#9 from craniosynostosis repair (cranial vault advancement), with multifocal PNA and respiratory failure requiring mechanical ventilation, and now with new line-associated DVT. No FH concerning for underlying bleeding disorder or hypercoagulable state, and patient's exam not consistent with DIC. Drop in his hemoglobin probably related to hydration; however could be possibly from bleeding that is not yet clinically detected.

Would send off coags from non-heparin contaminated line/peripheral stick. Assuming these are normal and post-PRBC transfusion hemoglobin shows expected bump, we would recommend anticoagulating with Enoxaparin at 1 mg/kg (or 8mg) q12hr and checking a LMWH level 4-6 hours after his 2nd dose, with a goal range of 0.5-1. See below table for titration based on levels. However, should he develop bleeding or his hemoglobin be dropping further, please contact us to discuss any dose adjustments to his LMWH goal range to the high-risk of bleeding of 0.4-0.6.

We agree with removing the femoral line as soon as able.

We anticipate that Brian will need anticoagulation for at least 6 weeks, at which point we would likely re-image the area.

Thank you for this interesting consult. We will continue to follow. Please feel free to contact us with any questions.

Allison Cameron, MD

Pediatric Hematology/Oncology Fellow

Pager XXXX

ATTENDING ADDENDUM

Data and history reviewed. Patient Examined by me. This appears to be a provoked DVT related to femoral line. The family history doesn't suggest an obvious thrombophilia. Most thrombophilic evaluation in this setting should be deferred until the patient is stable and clot free. The anticoagulation service will pick up monitoring of lovenox as of September 2, and can help with discharge planning. We suspect that lovenox via insufflon will be the easiest way to do entire course of anticoagulation. Sunday AM, right lower extremity is pink but cooler than left with moderate swelling and delayed cap refill, all related to increased tissue fluid, not decreased arterial flow. The risk in large DVTs of this type is of pulmonary embolism which is rare in young children, but would be poorly tolerated with his present pneumonia. Hence, full dose anticoagulation as outlined above by Dr. Cameron is indicated. The bleeding risk in children without known bleeding problems is small but not negligible, so ongoing monitoring of hemoglobin status is also important. We'll continue to follow with you and we are available to answer questions from the family as needed. Thanks for asking us to see him.

Robert Chase MD, PhD

Associate Chief, Hematology

pXXXX

Enoxaparin Dosage Titration

Antifactor Xa Level (units/mL)	Hold Next Dose	Dose Change?	Repeat Antifactor Xa Level
*SR = Standard Risk,			
Deviations from 6th ACCP Consensus Conference on Antithrombotic Therapy <i>Italicized</i>			
<0.35 - *SR	No	Increase dose by 25%	4 h after next AM dose (or at clinician discretion)
0.35-0.49 - *SR	No	Increase dose by 10%	4 h after next AM dose (or at clinician discretion)
0.5-1 - *SR	No	No	<i>Repeat weekly while inpatient</i> <i>Repeat monthly when outpatient</i>
1.01-1.5 - *SR	No	Decrease dose by 20%	4 h after next AM dose Trough before next dose, and post 4 h after next dose may be considered if clinically indicated i.e. severe renal insufficiency and/or any signs of bleeding.
1.51-2 - *SR	3 h	Decrease dose by 30%	4 h after next AM dose Trough before next dose, and post 4 h after next dose may be considered if clinically indicated i.e. severe renal insufficiency and/or any signs of bleeding
>2 - *SR	Until Anti-factor Xa <0.5 units/mL	Decrease dose by 40%	Trough before next dose if not <0.5 units/mL, repeat q12h

Note Type: Hematology Consultation
 Date: September 17, XX 12:02 EDT
 Status: Auth (Verified)
 Subject: Anticoagulation Service - Div. of Hematology Sign Off Note
 Created by: CAMERON MD, ALLISON on September 17, XX 12:04 EDT
 Verified by: CAMERON MD, ALLISON on September 17, XX 15:18 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

*** Final Report ***

Anticoagulation Service - Sign off Note

Brian is a 2 yo, ex-34 wk M w/ kyphosis, restrictive lung disease requiring home O2, who is status post a craniostomy repair and PNA with respiratory failure requiring mechanical ventilation. He developed a line provoked deep vein thrombosis and is now requiring a 6 week course of enoxaparin therapy. His goal range LMWH level is 0.5-1. Last LMWH level was 0.5 on 9/11.

Focused Exam:
 Lower extremities symmetrical in size, no erythema, no swelling and WWP.

Recommendations:

- 1) Continue to check LMWH levels weekly while inpt, drawn 4-6 hours after his enoxaparin dose and with a goal level of 0.5-1.
- 2) He will need a level one week after discharge for which our service will arrange and follow.
- 3) Follow up hematology appt will be with me on September 20th at 11:20 am on 7R. Follow up doppler US is scheduled for 2:30 on that same day.
- 4) Kai Park RN met with mother this afternoon and reviewed anticoag precautions/ed/ and sc admin
- 5) If you need assistance with discharge enoxaparin scripts, please do not hesitate to contact our service.

Edward Vogler RN, CPNP #XXXX

Thrombosis Program & Anticoagulation Service
 Div. of Hematology/Oncology

Attending Addendum

Pt seen with NP Ms. Warner, recommendations as above

Robert Chase MD, PhD

Associate Chief, Hematology
 pXXXX

Appendix L. GAPPs Training Records (Annotated)

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #1**

Note Type: Discharge Summary
 Date: May 10, XX 11:15 EDT
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: HADDAD MD, PhD, MARK on May 10, XX 09:41 EDT
 Verified by: TIPTON MD, TARA on June 03, XX 15:41 EDT
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 5/10/XX

*** Final Report ***

DR. BRITNEY FISCHER
 455 WISTERIA LANE
 XXXX, CHICAGO IL USA

Encounter Number XXXX
 Date of Birth Sept 03, XX
 Age 15 years 8 months old
 Gender Male

Your patient, Isaiah Akers, was admitted to County General Hospital on 03/16/XX to the General Pediatrics Firm Floor D Service. The principal admission diagnosis was "RESPIRATORY FAILURE". Consultations during the hospitalization included Speech Pathology, Neurology, Respiratory Therapy, Psychiatry, and Gastroenterology.

Isaiah was discharged on 05/10/XX. The principal discharge diagnosis was "L PNA AND L PLEURAL EFFUSION WITH ASSOCIATED ARDS" which was noted to be resolved. Other discharge diagnoses included "TRISOMY 21" which was noted to be unchanged, "S/P CARDIAC ARREST ON 03/16/XX" which was noted to be resolved, "HYPOTHYROIDISM" which was noted to be unchanged, "SEIZURE DISORDER" which was noted to be unchanged, "SEDATION WEAN" which was noted to be unchanged, and "DECONDITIONING" which was noted to be improved.

Comment [AS1]: First trigger (#19): Any code, arrest, or rapid response team activation.

There were no recent laboratory results before discharge. There are no tests pending at discharge.

There were no complications during the hospitalization.

Discharge medications:

- * LEVOTHYROXINE: 75 MCG VIA G TUBE DAILY
- * KEPPRA: 475 MG VIA G TUBE BID
- * GLYCERIN SUPPOSITORY: 1 SUPP PR AS NEEDED FOR CONSTIPATION
- * OCULAR LUBRICANT: OPTH 1 APP EVERY 2HR PRN FOR DRY EYES
- * ACETAMINOPHEN: 650MG PR Q4HRS PRN PAIN/FEVER
- * ACETAMINOPHEN: 650MG PGT Q4HRS PRN PAIN/FEVER
- * SODIUM CHLORIDE NEBULIZED: 3ML INHALED Q 4HOURS PRN FOR SECRETIONS
- * RISPERIDONE: 0.125 MG GTUBE Q LUNCH
- * RISPERIDONE: 0.375MG VIA G TUBE Q AM
- * IPRATROPIUM: 0.5MG NEBULIZED TID
- * EUCERIN: 1 APP EVERY TWO HOURS PRN
- * CLONAZEPAM: 0.75MG QAM, 1MG QLUNCH, 1.5MG QPM
- * ALBUTEROL MDI: 2 PUFFS EVERY 4HOURS AS NEEDED FOR WHEEZING
- * RISPERIDONE: 0.375 MG VIA G TUBE Q BEDTIME
- * CLONIDINE PATCH: 200 MCG / DAY WEEKLY FRIDAY
- * BENZOTROPINE: 0.5 MG G TUBE BID
- * LORAZEPAM: 2 MG VIA G TUBE Q 4 HOURS

* PANTOPRAZOLE: 40 MG VIA G-TUBE DAILY
 * POLYETHYLENE GLYCOL 3350: 17 GRAMS VIA G TUBE DAILY
 * PYRIDOXINE: 50 MG VIA G TUBE DAILY
 * SENNA: VIA G TUBE BEDTIME
 * MELATONIN: 3 MG VIA G TUBE BEDTIME PRN INSOMNIA
 * ZOLPIDEM: 10 MG VIA G TUBE BEDTIME PRN INSOMNIA

Discharge diet:

NUTREN 1.0 AT 80ML/HR WITH WATER AT 15ML/HR FOR 24HRS/DAY TO GIVE
 ~1920KCAL/DAY, 1.4 G PROTEIN/KG AND 1990ML FREE WATER/DAY

We gave the following instructions to Isaiah and his family:

IF PATIENT HAS RECURRENT RESPIRATORY DISTRESS, INCREASED WORK OF
 BREATHING, INCREASED LETHARGY, OR ANY OTHER CONCERNS PLEASE CALL DOCTOR OR
 COME TO THE HOSPITAL.

There were no scheduled County General Hospital appointments at discharge.

The discharging provider wrote the following lines regarding this
 hospitalization:

Isaiah is a 15 y.o. male with Trisomy 21, seizure disorder and hypothyroidism
 and general baseline good health who presented to the PICU as a transport
 from Chicago Hope Hospital for increased respiratory distress in the setting
 of worsening pneumonia. En route to County General Hospital, he developed
 hypotension requiring aggressive fluid resuscitation. When he arrived in the
 PICU he had worsening respiratory distress with a failed attempt at NIPPV. In
 the setting of induction for emergent intubation, the ETT was inadvertently
 inserted into patient's esophagus and he developed a bradycardic arrest,
 required 6 minutes of chest compressions and multiple doses of epinephrine
 with recovery of spontaneous circulation. He was started on pressors of epi
 and dopa and required aggressive ongoing fluid resuscitation. An emergency
 CT was also performed due to dilated, nonreactive pupils and poor neuro exam
 despite no sedative medications s/p arrest. Head CT was read as normal. He
 had ongoing electrolyte derangements, high ventilatory support, and high
 pressor requirements.

PMH: Trisomy 21, GERD, G-tube, s/p Nissen, hypothyroidism, aspiration on
 liquids

ICU Hospital course per system:

NEURO: Escalating on sedation given increased agitation requiring morphine
 and midazolam drips and eventually a clonidine patch. Improved neuro exam
 with appropriate responses to care and appropriate agitation, moving all 4
 extremities. Continued on keppra and followed daily inpatient by the
 neurology ICU consult service. Brain MRI to evaluate post-arrest damage was
 read as no change from previous with no sign of stroke or hemorrhage. He was
 transferred to the ICP with plans for ongoing sedation wean.

RESP: He was intubated and developed ARDS like physiology. Developed pleural
 effusion on left with also likely LLL consolidation, continue with chest PT;
 chest tube was placed for effusion. He was eventually extubated to non-
 invasive ventilation prior to transfer to the ICP.

CV: Initial ECHO with moderate to severely depressed function with improved
 function on the most recent ECHO. Required pressor support and also received
 stress dose steroids after low baseline cortisol and borderline low cortisol

Comment [AS2]: First trigger (#19): Any code,
 arrest, or rapid response team activation is shown
 here again.

Comment [AS3]: Adverse event #1: Bradycardic
 arrest
 Preventability: Probably not preventable
 Severity: H

Trigger #19 helps identify this adverse event. After
 the patient had a cardiac arrest (trigger #19), he
 received epinephrine during the resuscitation
 attempt. Although the presence of a trigger does not
 necessarily mean there is an adverse event, in this
 case, hospital care greatly contributed to the arrest
 and consequently the arrest is classified as an
 adverse event.

Comment [AS4]: Key lesson #5: An H represents
 measures that needed to be taken to save the
 patient's life.
 -The interventions need to have occurred over a
 relatively short period of time (e.g., within an hour)
 to be in this category.

The chest compressions and epinephrine
 administrations are measures undertaken to recover
 spontaneous circulation in the patient.

stimulation response on 3/24, since then able to wean significantly on dopamine. S/p epinephrine gtt. Off all pressors prior to transfer to the ICP.

F/GI: Initially on PN and IL, advanced to Gtube feeds prior to transfer.

Endocrine: Continue home levothyroxine, received stress dose steroids restarted on 3/24 as noted above.

HEME: INR elevated with fibrinogen 650. Treated with Vit K, no evidence of bleeding. Smear review showed evidence of significant infection. HIT panel was negative - while pending had held heparin out of all fluid, now restarted. Transient thrombocytopenia now improving most likely secondary to sepsis and acute infection.

ID: Initiated on broad-spectrum antibiotics - no pathogen identified. At the time of transfer, he was on Azithromycin day 5/10, zosyn day 9/10 course. Vancomycin dc'd on 3/23 for decreased likelihood of MRSA. Influenza negative. Plan for total of 10 day course of Zosyn and 10 day course of azithromycin but can be discontinued if urine legionella returns negative.

ICP Course (4/30 - 5/03)

CV: HD stable, no concerns during ICP Course

Resp: Isaiah was initially on BiPAP 12/7 while sleeping and was subsequently weaned to CPAP 5 while sleeping on 5/01, then to RA overnight on 5/02, with normal VBGs. He continued to need frequent suctioning for desats down to 70s and 80s, at times as frequently as q30 minutes for a 2 hour period. He was transferred to the floor with plans for ongoing monitoring off oxygen and ongoing suctioning and chest PT.

FEN/GI: Initially on Nutren 1.0 Continuous feeds per his GT. He has a history of a swallow study that cleared him for pureed foods in small amounts, however he was kept NPO due to some difficulty swallowing and pocketing yogurt with initial attempts to take Poon 4/30. Nissen intact on upper GI via Gtube. He was subsequently transitioned to bolus feeds in the daytime on 5/02 which he tolerated well, but kept overnight on continuous due to increased secretions with bolus feeds.

ID: S/p broad spectrum coverage for presumed aspiration PNA (empiric Vancomycin, Zosyn and azithromycin), in setting of ARDS and septic physiology. No active ID issues at the time of transfer.

Endo: Continued levothyroxine at home dose. S/p stress steroids x 2 (during ICU course), with no concern for adrenal insufficiency

Neuro: Seizures stable on Keppra (LEV), which carries many behavioral side-effects for him but has made a huge difference in seizure control, and he is on several medications to improve these. He remains on Risperidone as per home regimen. Pyridoxine has been added as per Neurology/Psychiatry for Keppra rage with good effect. Ativan weaned by 0.5mg/dose every other day (ON EVEN DAYS) to a dose of 5.5 q4 hrs prior to transfer to floor 9S. Plan is, once the total daily dose of 13 to 26 mg per day is reached then the patient will then resume his Clonazepam regimen of 0.75 mg q AM, 1 mg midday, and 1.5 mg at bedtime. The Ativan will then continue to wean to off.

Psych/behavior: Patient needed sitter when family not at bedside; not aggressive but very low functioning. Many of his home medications were

Comment [AS5]: Adverse event #2: Behavioral side-effects of Keppra
Preventability: Definitely not preventable
Severity: E

This adverse event was not identified by a trigger. Occasionally, attributing behavioral changes to a medication is challenging but since the clinical notes are clear that the behavioral changes are due to the Keppra, a primary reviewer can comfortably document this as an adverse event.

Comment [AS6]: Key lesson #4: Not all adverse events will have an associated trigger. You should still record events you find without the help of a trigger.

unaltered during his stay in the ICP: melatonin at bedtime, risperidone & pyridoxine for side effects of Keppra. He was monitored for agitation as the lorazepam was weaned down and showed no signs/symptoms of withdrawal.

Other:PT and OT performed co-therapy to work on gross motor skills/deconditioning from prolonged bedrest. RT followed along as well.

Floor Course (05/03 to 05/10)
CV: Stable, no issues.

Resp: Isaiah initially required frequent chest PT and suctioning upon arrival to the floor. Pulmonary was consulted given the severity of this Pulmonary insult. They recommended GI consult to consider the functional integrity of the Nissen, recommended Atrovent, ongoing chest PT, and Pulmonary follow-up at discharge. Over the first 48hrs the suctioning requirements decreased with improvement in his oxygenation. He was stable overnight on room air without need for supplemental oxygen over the entire course of his floor stay. At time of transfer he was being suctioned 2-3x per day.

GI/FEN: Isaiah was transferred from the ICP on near continuous gtube feeds (3hrs on, 1hr off x 4 cycles during the day and then continuous overnight). These were adjusted to full continuous feeds per nutrition recs for increased water and caloric goals. At the time of discharge the family was adjusting his feed rate to allow him several hours off during the day. His goal intake per nutrition was: Nutren 1.0 at 80ml/hr with water at 15ml/hr for 24hrs/day to give ~1920kcal/day, 1.4 g pro/kg and 1990ml free water/day. Can be run faster if he tolerates it. GI consult was obtained and recommended gastric emptying study which the parents declined due to concerns for possible aspiration. Follow-up will be in GI clinic and the clinic should call the parents for an appointment. Clinic phone number is XXX-XXX-XXXX. Isaiah was kept NPO over the entire floor course given concerns for ongoing oromotor dysfunction (though he did pass an MBS), with plan for ongoing evaluation of his oral feeding abilities as an outpatient.

Endocrine: His levothyroxine was continued without issue.

Neuro: His Ativan wean was continued at a decrease of the every 4 hour dose by 0.5mg every other day. When his Ativan dose was reduced to a total of 24mg per day he was transitioned back to his home clonazepam (3.25mg per day total = 13mg Ativan) plus 12mg of Ativan (2mg q 4 hours)per Neurology's recommendations. He is also on clonidine 200mcg patch at the time of transfer. His ongoing sedation wean plan is as follows: Continue to wean the Ativan by 0.5mg per dose every other day on even days (next wean 3/22 to 1.5mg q 4 hours). When Ativan is weaned completely off for 5 days, wean Clonidine off. Reduce to a single 100mcg patch for 1 week, and then discontinue completely. Please contact Dr. Charles Xavier (XXX-XXX-XXXX) for further assistance if needed. Dr. Tipton was in email communication with Isaiah's primary neurologist, Dr. Zhang, and Dr. Xavier to communicate this sedation wean. Additionally, Isaiah continued on his home neuropsychiatric medications at unchanged doses.

Dispo: We worked with the patient care coordinator and Isaiah's family, and ultimately felt that a rehab placement would be optimal for Isaiah's ongoing suctioning, sedation wean, and intensive PT and OT needs. In the meantime, we continued to work with the family and home care companies to arrange in home services.

Isaiah was accepted and transferred to St. Hugh's for ongoing care and recovery from this critical illness. Dr. Tipton spoke with the accepting physician, Dr. Max Eisenhardt to communicate the three major goals of rehab 1) reconditioning 2) sedation wean and 3) advancement of feeding regimen as tolerated. Dr. Tipton also spoke with Isaiah's primary care physician, Dr. Fischer, to discuss Isaiah's floor hospital course, discharge and rehab planning, and planned follow-up as outlined above. Family was comfortable with plans for transfer.

Thank you for allowing us to participate in the care of your patient, and for continuing to refer your patients to County General Hospital.

Attending Physician: Tara Tipton, Phone XXX-XXX-XXXX
Discharging Provider: Mark Haddad, Pager (XXX) XXX-XXXX

IdNote Type: PICU Admission Attending MD
 Date: March 16, XX 04:26 EST
 Status: Auth (Verified)
 Subject: PICU Attending Admission Note
 Created by: NELSON RN, SOPHIA on March 16, XX 04:26 EST
 Verified by: NELSON RN, SOPHIA on March 16, XX 04:26 EST
 Encounter info: XXXX, Hospital, Inpatient, 3/16/XX - 5/10/XX

PICU Attending Admission Note Entered On: 03/16/XX 04:46 EST
Performed On: 03/16/XX 04:26 EST by PATEL MD, NEIL

Attending Admission Note

The patient was admitted to the ICU for: Respiratory failure

Diagnosis and History: Isaiah is a 15 y.o. young man with trisomy 21 who was transferred to County General Hospital from Chicago Hope Hospital with severe respiratory distress. Transported on non-rebreather with sats in the 90's. Patient was agitated and hypoxic and rapidly decompensated upon arrival to the PICU. A rapid sequence intubation was performed. An endotracheal tube was inadvertently placed in the esophagus and not immediately recognized. Patient had extreme hypoxia that led to bradycardic arrest following the intubation with return of spontaneous circulation 6 minutes after epinephrine and chest compressions. Blood pressure fluctuated over the next hour with multiple doses of epinephrine required and eventually placed on epinephrine drip with stable pulses and blood pressures.

Comment [AS7]: First trigger (#19): Any code, arrest, or rapid response team activation is shown here again.

Comment [AS8]: Adverse event #1 is again stated here.

Patient was admitted from: Outside facility

. : I have received a handoff from Dr. Zhang, attending physician at the time of transfer.

. : I have personally performed a physical exam

Pertinent Findings Include: Intubated on intermittent sedation.

Pupils 3 mm bilaterally and sluggishly reactive.

Lungs with moderate aeration and coarse rhonchi left more than right.

Abdomen soft

. : I have reviewed the available laboratory data and diagnostic imaging studies

Significant results include: infiltrate left lung on CXR

WBC count 18 with 27% bands prior to admission.

Supervision of Care:

As the patient's attending physician in the intensive care unit, I have personally reviewed the medical record, including available consultant's notes, laboratory reports and imaging data. I have supervised the house staff and fellows in formulation of the treatment plan and directed decision-making.

My assessment is that the patient is in: Critical Condition

Our plan is to: Support blood pressure and perfusion with epinephrine drip.

Continue ventilatory support for respiratory failure.

Continue broad-spectrum antibiotics to cover likely pneumonia.

Communication with: Family

. : CVL and central Aline placed during resuscitation.

. : I, the critical care attending physician in the ICU, have been immediately available to provide full attention to the patient at the bedside and have spent a minimum of 30 min providing direct care-not inclusive of teaching-to this critically ill patient.

Initial Critical Care (1st hr)>60 months: E&M Code XXXX

Critical Care (Subsequent) > 60 months XXXX: 90 minutes

PATEL MD, NEIL - 03/16/XX 04:26 EST

Note Type: ICU Admission Nursing
 Date: March 16, XX 06:28 EST
 Status: Auth (Verified)
 Subject: ICU Admission Nursing Note
 Created by: NELSON RN, SOPHIA on March 16, XX 06:28 EST
 Verified by: NELSON RN, SOPHIA on March 16, XX 06:28 EST
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 5/10/XX

*** Final Report ***

ICU Admission Nursing Note Entered On: 03/16/XX 07:03 EST
Performed On: 03/16/XX 06:28 EST by NELSON RN, SOPHIA

ICU Admission Nursing Note

Past Medical History: Trisomy 21, seizure disorder, nissen fundo with g-tube, hypothyroid, gerd

Recent Events: 3/15/XX Having URI symptoms with fever so parents brought him to primary care practitioner, who sent him home on zithromax. Patient vomiting later in evening and having increased trouble breathing. Parent brought patient to Chicago Hope ED in which his RA O2 saturations were 84%. Patient was placed on nonrebreather, CXR obtained showing LLL pneumonia. Chicago Hope transport team called to bring patient to County General. During transport patient became hypotensive, requiring 2.5 liter NS bolus and the initiation of dopamine to 10mcg/kg/hr. On arrival, patient was agitated, attempting to get out of bed, unable to keep blow by, nonrebreather, or CPAP on face. His O2 saturations were in the 70-80's. Attempted CPAP without success, Patient was given dextrose bolus for agitation with no effect. He continued to be agitated and his airway remained unprotected. At this time, Dr. Patel and Dr. Kaylan decided to intubate the patient for airway protection. The patient was given ketamine and rocuronium in preparation for intubation. Dr. Kaylan initially had some difficulty intubating his patient, initially placing the (ETT?) in the esophagus on the first attempt. . During intubation, patient had extreme hypoxia leading to a bradycardic arrest. Patient was determined to have no pulse, CPR started with 3 rounds of epinephrine given. A pulse was established again. Fluid boluses started. The patient intermittently lost his pulse and required CPR with epinephrine boluses throughout each 3 hour period. Epinephrine drip started after central access was established. A femoral a-line placed. A chest x-ray obtained showed white out on left side.

Review of System: Neuro: Patient received a total of 3mg of midazolam for agitation along with dex bolus prior to intubation. No sedation meds required post bradycardic arrest. Patient pupils initially fixed post bradycardic arrest, but then PERRLA 4/3 sluggishly reactive. Dr. Kaylan and Dr. Andrew made aware. Patient appearing obtunded. Patient has known seizure disorder. No seizure meds given overnight. No seizure activity noted.

Resp: Patient was intubated by Dr. Kaylan. Patient intubated with 6.5 cuffed ETT, retaped 26 at lip overnight. Current settings. Pressure SIMV 21/8 PS 10 rate 24 100% FIO2. LS slightly course with fair aeration throughout. R>L. TV 6-8cc/kilo. ET 20's. O2 saturations 94-98%.

CV: Afebrile tmax 99. Patient was placed on cooling blanket for short period to keep goal core temps 34-36 per Dr. Andrew. HR 110's-150's. NSR. Patient currently on epinephrine drip at 0.4mcg/kg/min, and dopamine at 20mcg/kg/hr to keep goal mean arterial pressures greater than 70. Pt cap refill 4-5 secs. plus two pulses uppers and plus one pulses lowers. ECHO obtained overnight by cardiology. Triple lumen femoral line placed by Dr. Patel. PIV in right hand and left ac. Current IVF D5NS with 20kcl/liter running at 100ml/hr. Electrolytes currently being replaced please see lab section for further charting.

GI/GU: Abdomen soft and rounded. BSx4 absent. Patient with one large stool prior to intubation. Mickey Gtube intact, drainage bag placed for venting prior to intubation. Foley placed overnight. Patient voiding 3c/kilo/hr.

Comment [AS9]: First trigger (#19): Any code, arrest, or rapid response team activation is shown here again.

Comment [AS10]: Adverse event #1 is shown here again.

Skin: Mouth extremely dry, cracked, mouth cares completed. Gtube site appears reddened and excoriated. Dad states this appeared at baseline.

Social: Dad at bedside throughout hypoxic, bradycardic arrest, mom at bedside post arrest. Both updated several times by this RN and Dr. Andrew. Mom and Dad both appear weepy. Catholic priest called to bedside this morning per parents' request. Patient was oriented to unit and its rules. We will continue to provide emotional support and reassurance as needed.

NELSON RN, SOPHIA - 03/16/XX 06:28 EST

Comment [AS11]: First trigger (#19): Any code, arrest, or rapid response team activation is shown here again.

Comment [AS12]: Adverse event #1 is shown here again.

Note Type: Neurology Consultation
 Date: March 16, XX 12:01 EST
 Status: Auth (Verified)
 Subject: Neurology ICU Consult
 Created by: HOFF MD, JACOB A on March 16, XX 10:40 EST
 Verified by: HOFF MD, JACOB A on March 17, XX 11:40 EST
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 5/10/XX

* Final Report *

Requesting physician (name and service): Floor D County General Medical ICU

Name of neurology attending staffing the consult: Dr. Jacob Hoff

Reason for consultation: Concern for hypoxic brain injury after 6 minute pulseless arrest

History of Present Illness:

Isaiah is a 15-year-old ambidextrous male with trisomy 21, history of infantile spasms and epilepsy (generalized tonic seizures) who was admitted yesterday with suspected pneumonia and hemodynamic instability. He had had cough, runny nose, and increased work of breath for the past 1-2 days. He was intubated today at 2 AM for worsening respiratory status. During this intubation attempt, the ETT was inadvertently placed in the esophagus. During intubation, he endured extreme hypoxia and he became bradycardic, followed by cardiac arrest. He was in pulseless arrest for 6 minutes, during which time chest compressions and epinephrine were administered. He had return of circulation, but shortly thereafter, had 2 subsequent brief episodes of pulses arrest, each lasting less than 1 minute. Lactate was 15. At 6 AM today, he was noted by the PICU team to have fixed and dilated pupils. Non-contrast head CT was obtained, which did not show evidence of ischemic injury. He is not currently receiving sedation. He received ketamine and rocuronium at the time of intubation, and Ativan 4 mg IV around 6 AM this morning, in addition to keppra IV, for seizure coverage while he is NPO. He continues to receive dopamine and epinephrine gtt for blood pressure instability. His most recent sodium is 150. He has been hypothermic, with recent T of 91.

Comment [AS13]: First trigger (#19): Any code, arrest, or rapid response team activation is shown here again.

Comment [AS14]: Adverse event #1 is shown here again.

According to his mother, he is non-verbal at baseline but can follow some basic commands. He is able to walk.

He is on klonopin and keppra for seizure management, and is followed by Dr. Nathan Zhang. His mother reports that he has had good seizure control for the past 2 months, with the exception of last week, when he sustained a generalized tonic clonic seizure the day after receiving his flu vaccine. She states that this was one of his more severe seizure episodes.

Past Medical History:

Infantile spasms
 Generalized seizures: tonic
 Trisomy 21
 Hypothyroidism
 h/o pancreatitis

Family Medical History:

Non-contributory to current illness.

Active Medication Orders

Scheduled Medications

azithromycin (azithromycin IV) 500 mg IV 1time Stop: 03/16/XX 11:05 *Com
 azithromycin (azithromycin IV) 250 mg IV 4 dose Q24hr Stop: 03/20/XX 00:14
 hydrocortisone 32 mg IV Q8hr Last admin: 32 mg IV (03/16/XX 09:00)
 levetiracetam 500 mg IV BID Last admin: 500 mg IV (03/16/XX 08:57)
 levothyroxine 40 mcg IV Q24hr *Com Last admin: 40 mcg IV (03/16/XX 10:42)
 oseltamivir 75 mg GTUBE 5 day BID Stop: 03/22/XX 06:00 *Com

piperacillin-tazobactam (Zosyn) 4,125 mg IV Q6hr *Com Last admin: 4,125 mg IV (03/16/XX 09:00)
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) 20 mEq ICU-IV 1time Stop: 03/16/XX 11:01

*Com

ranitidine 60 mg IV Q8hr Last admin: 60 mg IV (03/16/XX 08:57)
 vancomycin 750 mg IV Q8hr *Com Last admin: 750 mg IV (03/16/XX 06:10)

PRN Medications

lidocaine-tetracaine topical (Synera topical film) 2 film TOP 1time PRN Procedure(s) *Com
 midazolam 5.5 mg ICU-IV Q1hr PRN Agitation *Com
 morphine (morphine IV) 5.5 mg ICU-IV Q1hr PRN Pain Last admin: 5 mg ICU-IV (03/16/XX 11:23)

Continuous Medications/Fluids

D5W 1/2NS 500 mL + sodium ACETATE, IVF 37.5 mEq + potassium CHLORIDE, IVF 10 mEq + potassium PHOSPH IV
 DOPamine [20.00 mcg/kg/min] + D5W *Com
 epinephrine [0.50 mcg/kg/min] + D5W *Com
 insulin regular [0.01 unit/kg/hr] + NS *Com

Additional Medications Admin within last 24 hours (or since 03/15 12:01)

dexmedetomidine (dexmedetomidine.) Last admin: 55 mcg IV Loading Dose (03/16/XX 00:08)
 hydrocortisone Last admin: 55 mg IV (03/16/XX 02:00)
 lorazepam (Ativan) Last admin: 4 mg IV (03/16/XX 06:01)
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) *Com Last admin: 11 mEq IV (03/16/XX 05:56)
 potassium PHOSPHATE (potassium PHOSPHATE dose (CVL)) *Com Last admin: 15 mmol IV (03/16/XX 06:20)
 sodium chloride 0.9% (NS bolus) Last admin: 500 mL ICU-IV (03/16/XX 08:00)

*Com: Order comment exists. Consult Order Profile or MAR for details

Allergies: Tegretol (Rash)

Physical Examination:

General: Intubated, non-responsive
 CVS: regular rate and rhythm, no murmur, rubs or gallops
 Resp: CTAB in anterior lung fields
 Abd: soft, non-distended
 Ext: WWP, 2+ DP pulses

Neurological

Eyes closed. No spontaneous eye opening. No eye opening with pressure to supraorbital area. PERRL 6->5. Eyes midline and conjugate. No oculoccephalic reflex on dolls maneuver. Absent corneal reflex bilaterally. Gag not assessed. No spontaneous movement. No withdrawal to noxious stimuli in the extremities. Biceps, patellar, and ankle reflexes 2+. Toes downgoing.

Labs (Reported 03/15/XX 12:01 - 03/16/XX 12:01)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
03/16 10:18	148	2.32 C	112 H	15 C	23 H	1.1 H	330 H
03/16 07:00	148	2.21 C	111	12 C	26 H	1.2 H	304 H
03/16 04:30	150 H	1.75 C	112 H	12 C	26 H	1.2 H	177 H
03/16 03:35	150 H	1.76 C	113 H	14 C	26 H	1.1 H	121 H
03/16 01:25	140	2.93 C	111	15 C	29 H	1.4 H	108 H

Chem	Ca	Mg	Phos
03/16 10:18	7.8 L	2.0	2.0 L

03/16 07:00	7.5 L	2.1	2.3 L
03/16 04:30	7.6 L	2.0	1.8 L
03/16 03:35	7.5 L	1.9	1.3 C
03/16 01:25	7.8 L	1.9	3.9

LFTs	AST	ALT	Bili T	Bili D	ALK	ALB	LDH
03/16 10:18	73 H	49 H	1.1	0.6 H	83	3.5	
03/16 07:00	66 H	45 H	0.7	0.3	109	2.7 L	351 H
03/16 01:25	27	23	0.3	0.1	94	2.0 L	193

CBC	WBC	HBG	HCT	PLT
03/16 10:18	19.57 H	14.5 H	42.6 H	118 K L
03/16 04:30	22.50 H	16.0 H	47.3 H	210 K
03/16 03:35	21.17 H	15.3 H	45.8 H	231 K
03/16 01:25	17.75 H	12.7	38.9	227 K

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
03/16 10:18	18.1 H	1.77 H	31.9	427 H	549 H	
03/16 04:30	19.7 H	1.94 H	30.8	504 H	617 H	
03/16 01:25	16.8 H	1.63 H	31.5		423 H	

Micro Results: Updates since 03/16 12:01. Collection date displayed.

Viral DFA Respiratory: (Nasopharyngeal Swab) 03/16. **Final Report:** No antigen detected by DFA. This specimen was tested for RSV, Influenza A/B, Adenovirus and Parainfluenza 1,2,and 3.

Diagnostic Studies:

Head CT 03/16/XX: Cortical ribbon appears intact without obscuration of the grey white border. Basal ganglia appear normal signal. No midline shift. 4th ventricle appears patent without compression.

Assessment & Recommendations:

Isaiah is a 15 y.o. male with Trisomy 21 and seizure disorder, admitted for probable pneumonia/sepsis with hemodynamic instability, who sustained a 6 minute episode of pulseless arrest during airway intubation at 2 AM today, followed by 2 subsequent brief episodes of cardiac arrest thereafter. During intubation, his endotracheal tube was inadvertently placed in his esophagus and not immediately recognized. Neurology team consulted when patient was thought to have fixed and dilated pupils at 6 AM. Exam is consistent with a comatose state, without sedative agents on board, but pupils are in fact reactive at this time (08:30 AM). Head CT does not show overt evidence of ischemic injury or cerebral edema.

He is at risk for hypoxic ischemic related brain injury, including cerebral edema, and current exam is suggestive of this. He will require close monitoring. Neurological exams are limited because of his deficits, but pupils should be checked at least hourly.

Recommendations as follows:

1. Frequent serial neurological exams, with hourly pupil checks. If pupils become fixed, then patient should have repeat stat head CT, and page Neuro ICU resident.
2. ICP/hypoxic injury precautions:
 - keep HOB elevated above 30 degrees
 - Maintain sodium above 150, using hypertonic saline and/or mannitol if necessary.
 - Maintain pCO₂ <35
 - Maintain euthermia

Comment [AS15]: First trigger (#19): Any code, arrest, or rapid response team activation is shown here again.

Comment [AS16]: Adverse event #1 is shown here again.

3. Continue AED coverage with keppra 500 mg IV BID. Hold benzo and other sedating medications at this time. If patient has evidence of clincial seizure activity, administer Ativan 2 mg IV x1, or versed drip.
4. As per Dr. Hoff, Neurology ICU attending, please consult Neurosurgery with regard to placement of a bolt to monitor ICP pressures.
5. MRI brain when patient stable for travel

Eve Okafor MD
Neurology Resident

Neuro ICU Attending
Exam above carried out by myself and Dr. Okafor. Agree with assessment and plan as above.

Jacob A Hoff, MD

Note Type: Cardiology Consultation
 Date: March 20, XX 20:56 EST
 Status: Modified
 Created by: DELGADO MD, MAYA C on March 20, XX 21:02 EST
 Verified by: DELGADO MD, MAYA C on March 20, XX 21:02 EST
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 5/10/XX

*** Final Report ***
Document Contains Addenda

Requesting physician/service: Floor D PICU/Wazowski

Reason for consultation: 15 y.o. with Down syndrome, pneumonia, septic/hypovolemic shock. Arrest last week required CPR. Patient remains on inotropes, though weaning. Intubated, with low vent settings.

Noted to have some irregular and slower heart rates today; asked to review EKG for concerns of heart block.

Comment [AS17]: First trigger (#19): Any code, arrest, or rapid response team activation is shown here again.

Comment [AS18]: Adverse event #1 is shown here again.

Active Medication Orders

Scheduled Medications

azithromycin 500 mg PO daily
 levetiracetam 500 mg IV BID Last admin: 500 mg IV (03/20/XX 09:30)
 levothyroxine 40 mcg IV Q24hr *Com Last admin: 40 mcg IV (03/20/XX 10:29)
 nystatin 5 mL Swish/Swab Q6hr Last admin: 5 mL Swish/Swab (03/20/XX 14:10)
 piperacillin-tazobactam (Zosyn) 4,125 mg IV Q6hr *Com Last admin: 4,125 mg IV (03/20/XX 14:23)
 ranitidine 60 mg IV Q8hr Last admin: 60 mg IV (03/20/XX 18:54)
 vancomycin 750 mg IV Q12hr *Com Last admin: 750 mg IV (03/20/XX 06:55)

PRN Medications

acetaminophen 650 mg PO Q4hr PRN Fever/Pain *Com Last admin: 650 mg PO (03/18/XX 22:30)
 calcium gluconate (calcium GLUCONATE dose (CVL)) 500 mg IV Q6hr PRN Other - See Order Comments
 *Com Last admin: 500 mg IV (03/17/11 10:39)
 lidocaine (lidocaine (buffered) 1% (local anesthesia) order in mL) 0.5 mL ID 3 dose Q1min PRN Procedure(s)
 *Com Last admin: 0.5 mL ID (03/19/XX 12:15)
 lidocaine-prilocaine topical (Emla topical cream) 2.5 g TOP Q3hr PRN Procedure(s) *Com
 midazolam 2.5 mg ICU-IV Q1hr PRN Agitation *Com Last admin: 2.5 mg ICU-IV (03/20/XX 19:10)
 morphine (morphine IV) 3.85 mg ICU-IV Q1hr PRN Pain Last admin: 3.85 mg ICU-IV (03/20/XX 19:57)
 ocular lubricant (ocular lubricant ointment) 1 appl OPTH Q2hr PRN Dry eyes Last admin: 1 appl OPTH (03/18/XX 11:23)

Continuous Medications/Fluids

DOPamine [2.00 mcg/kg/min] + D5W *Com Last rate: 20 mcg/kg/min
 epinephrine [0.03 mcg/kg/min] + D5W *Com Last rate: 0 mcg/kg/min
 fat emulsion 20%, intravenous 432 mL 432 mL IV *Com
 midazolam infusion [0.07 mg/kg/hr] + D5W *Com Last rate: 0 mg/kg/hr
 morphine infusion [0.07 mg/kg/hr] + D5W *Com Last rate: 0 mg/kg/hr
 Parenteral Nutrition 1,440 mL 1,440 mL

Additional Medications Admin within last 24 hours (or since 03/19 20:57)

azithromycin (azithromycin IV) Last admin: 250 mg IV (03/20/XX 11:36)
 hydrocortisone *Com Last admin: 7.25 mg IV (03/20/XX 00:41)
 metoclopramide (Reglan) Last admin: 2.5 mg IV (03/20/XX 09:04)
 midazolam Last admin: 2.75 mg ICU-IV (03/19/XX 18:00)
 morphine (morphine IV) Last admin: 2.75 mg ICU-IV (03/19/XX 17:45)
 potassium CHLORIDE *Com Last admin: 20 mEq ICU-IV (03/20/XX 08:00)
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) *Com Last admin: 11 mEq IV (03/16/XX

05:56)

vecuronium Last admin: 5.5 mg ICU-IV (03/20/XX 13:50)

Labs (Reported 03/19/XX 20:57 - 03/20/XX 20:57)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
03/20 15:00	153 H	3.18 L	115 H	29	23 H	1.0	80
03/20 06:20	154 H	2.67 C	116 H	30	25 H	1.0	122 H
03/20 02:00	154 H	2.85 C	116 H	31 H	25 H	1.0	107 H

Chem	Ca	Mg	Phos
03/20 15:00	8.2	2.1	3.2
03/20 02:00	8.7	2.2	2.5 L

CBC	WBC	HBG	HCT	PLT
03/20 15:00	7.88	11.4	34.8	50 K C
03/20 02:00	10.74 H	11.8	34.2	46 K C

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
03/20 15:00	11.3	1.06		531 H	540 H	
03/20 02:00	11.6	1.10	31.8	570 H	614 H	

Diagnostic Imaging:

EKG (03/20): Sinus arrhythmia with occasional sinus slowing and probable junctional escape. Low amplitude P waves. No heart block noted.

Echo (03/20): Trivial tricuspid regurgitation. Right ventricular pressure ~ 27 mm Hg plus the right atrial v-wave. No mitral regurgitation.

No aortic stenosis or regurgitation. No pulmonary stenosis or regurgitation. Mild biventricular dysfunction. No pericardial effusion.

Assessment & Recommendation:

No evidence of heart block; appears to have sinus rhythm.

Improved ventricular function, consistent with typical course for myocardial depression secondary to sepsis. Agree with continuing to wean inotropes as tolerated.

Maya Delgado
Cardiology Fellow

Seen with Dr. E Pierce, Cardiology Attending

Addendum by PIERCE MD, ERIK R on March 22, XX 04:25 EST (Verified)

Attending: Patient evaluated, ECG reviewed, Echo reviewed, and discussion with ICU staff. I agree with the above findings and recommendations.

Erik Pierce MD

Note Type: Pediatrics Admission MD
 Date: May 03, XX 13:14 EDT
 Status: Auth (Verified)
 Subject: ICP Accept Note
 Created by: HADDAD MD, PhD, MARK on May 03, XX 13:21 EDT
 Verified by: HADDAD MD, PhD, MARK on May 04, XX 02:21 EDT
 Encounter info: XXXX, County General Hospital, Inpatient, 3/16/XX - 05/10/XX

* Final Report *

History of Present Illness: Isaiah is a 15 y.o. male with T21 and seizure disorder with multiple past admissions for pneumonia who was transferred to County General ICU from Chicago Hope Hospital on 03/16 for worsening pneumonia. He had a difficult course which included accidental insertion of ETT into esophagus initially, followed by cardiac arrest, hypotension requiring pressors, ARDS, and prolonged wean from mechanical ventilation. He is transferred to Floor D PICU from the ICP where he recently weaned from BiPAP to CPAP and came off nighttime CPAP on 5/02 to 5/03 with good morning VBG. He has returned to full feeds of Nutren + water (105mL/hr Nutren + 13mL/hr water 3hrs on/1hr off during the day and 90mL/hr Nutren + 10mL/hr water continuous overnight). He is currently cleared for purees via modified barium, but family is holding until in better physical shape as he did not tolerate well in ICP. He continues on his Synthroid for hypothyroidism. He is s/p antibiotics for PNA. The last active issue for him is a sedative wean.

Comment [AS19]: First trigger (#19): Any code, arrest, or rapid response team activation is shown here again.

Comment [AS20]: Adverse event #1 is shown here again.

Past Medical History: Trisomy 21, GERD, G-tube, s/p Nissen, hypothyroidism, aspiration on liquids

Active Medication Orders

Scheduled Medications

benztropine 0.5 mg GTUBE BID Last admin: 0.5 mg GTUBE (05/03/XX 06:27)
 clonidine (clonIDINE TTS-1 patch [2 patches = 200 mcg/day]) clonIDINE TTS-1 patch [2 patches = 200 mcg/day] *Com
 clonidine patch check 1 check TOP Q12hr Last admin: 1 check TOP (05/03/XX 06:00)
 levetiracetam 475 mg GTUBE BID Last admin: 475 mg GTUBE (05/03/XX 06:27)
 levothyroxine 75 mcg GTUBE daily *Com Last admin: 75 mcg GTUBE (05/03/XX 10:02)
 lorazepam 5.5 mg GTUBE Q4hr Last admin: 5.5 mg GTUBE (05/03/XX 10:02)
 pantoprazole (PANTOprazole) 40 mg GTUBE daily *Com Last admin: 40 mg GTUBE (05/03/XX 10:02)
 polyethylene glycol 3350 (MiraLax) 17 g GTUBE daily *Com Last admin: 17 g GTUBE (05/03/XX 08:07)
 pyridoxine 50 mg GTUBE daily Last admin: 50 mg GTUBE (05/02/XX 20:10)
 risperidone 0.375 mg GTUBE QAM Last admin: 0.375 mg GTUBE (05/03/XX 06:27)
 risperidone 0.375 mg GTUBE bedtime Last admin: 0.375 mg GTUBE (05/02/XX 20:10)
 risperidone 0.125 mg GTUBE QLunch Last admin: 0.125 mg GTUBE (05/03/XX 10:02)
 senna 10 mL GTUBE bedtime *Com Last admin: 10 mL GTUBE (05/02/XX 20:10)

PRN Medications

acetaminophen 650 mg PR Q4hr PRN Fever/Pain *Com Last admin: 650 mg PR (04/07/XX 16:26)
 acetaminophen 650 mg PO Q4hr PRN Fever/Pain *Com Last admin: 650 mg PO (04/14/XX 06:30)
 aerochamber (Aerochamber (large mask)) 1 EA MDI daily PRN Per nursing assessment
 albuterol (albuterol CFC free 90 mcg/inh inhalation aerosol) 2 puff MDI Q4hr PRN Respiratory Distress *Com Last admin: 2 puff MDI (05/02/XX 14:06)
 emollients, topical (Aquaphor topical ointment) 1 appl TOP Q4hr PRN Dry skin *Com
 emollients, topical (Eucerin topical cream) 1 appl TOP Q2hr PRN Dry skin *Com
 glycerin (glycerin Supp Adult) 1 supp PR daily PRN Constipation Last admin: 1 supp PR (05/01/XX 10:14)
 melatonin 3 mg GTUBE bedtime PRN Insomnia Last admin: 3 mg GTUBE (04/27/XX 20:42)
 ocular lubricant (ocular lubricant ointment) 1 appl OPTH Q2hr PRN Dry eyes Last admin: 1 appl OPTH (03/18/XX 11:23)
 zolpidem 10 mg GTUBE bedtime PRN Insomnia Last admin: 10 mg GTUBE (04/27/XX 19:28)

Allergies: Tegretol (Rash)

Social History: Cared for by parents and a cousin, one of whom is usually at the bedside.

Examination:

Gen: lying in bed, awake, playing with toy
 HEENT: dysmorphic facies, dry mouth and lips, no thrush noted
 Neck: full ROM
 Resp: CTA BL
 CV: rrr, nml s1, s2, no murmur
 Abd: soft, ntnd, mild g-tube erythema, no HSM
 Ext: wwp, good pulses, no edema

Basic Vital Signs

Vitals Signs since (05/02 13:15)	24 h min	24 h max	Most recent (Time)
Temperature	35.6	36.7	36.7 (11:58)
Heart Rate	55	96	76 (11:58)
BP Systolic	83	101	101 (11:58)
Diastolic	44	60	56 (11:58)
Respiratory Rate	14	20	20 (11:58)
Oxygen Saturation (SPO2)	78%	99%	97% (11:58)
Percent FiO2	0.21	0.21	0.21 (11:58)

Labs: VBG (Post-CPAPfree night) 7.40/42

Admission Diagnoses:

1. T21
2. Pneumonia
3. GERD
4. Hypothyroidism
5. Sedation wean
6. Seizures

Assessment and Plan: 15 y.o. male with T21 and seizure disorder who is transferred from step down unit having a prolonged and severe (cardiac arrest) ICU course for presumed pneumonia (despite negative BCx). He is now improving. Isaiah is off all ventilatory support, back on full g-tube feeds and s/p antibiotics, and is weaning on sedation.

1. CV: S/p pressors in ICU, 2 rounds stress-dose steroids, echo with mildly decreased function (3/20) resolved by repeat echo 3/31.
 - Continuous monitoring
2. Resp: Last night of CPAP was 5/01, with trial off on 5/02. Follow-up VBG good.
 - Aggressive pulmonary toilet with frequent (q 2-3 hr) suctioning
 - Pulmonary consult - repeat admissions for PNA/ARDS
 - PRN albuterol
3. FEN/GI: now on full feeds via G-tube. Passed modified barium, ok for purees, hold off for now.
 - Nutren + water (105mL/hr Nutren + 13mL/hr water 3hrs on/1hr off during the day and 90mL/hr nutren + 10mL/hr water continuous overnight)
 - Miralax and PRN glycerin suppository for h/o constipation
 - Last electrolytes 5/01 normal

Comment [AS21]: First trigger (#19): Any code, arrest, or rapid response team activation is shown here again.

Comment [AS22]: Adverse event #1 is shown here again.

Comment [AS23]: Key lesson #11: Triggers and adverse events can often be mentioned in multiple notes for a given hospitalization.

4. Endocrine: hypothyroidism. S/p stress dose steroids, but no underlying adrenal insufficiency
- Continue synthroid at home dosing

5. Heme: no recent blood products. Last H/H 5/01 normal.

6. ID: s/p antibiotics. Blood cultures all negative. Afebrile.

7. Neuro: Post-arrest MRI with no acute changes. Patient was ambulatory before admission. On morphine, midazolam, and clonidine in ICU. Now weaning on Ativan. Has clonidine patch. Keppra for seizures. Will need to restart home clonazepam (used for "Keppra rage") when Ativan partially weaned (see below). Neuro following and recs appreciated re: weaning.

- Continue Keppra for seizures (no seizures in ICU)

- Continue clonidine patch until Ativan weaned

- Wean Ativan: 0.5mg every other day (even days). 5/02 weaned to 5.5mg q 4hrs. Will restart clonazepam (0.75mg qAM, 1mg at noon, 1.5mg qPM) when total daily dose is 13-26mg of Ativan (now 33mg/day)

- continue pyridoxine

- PT for reambulation

8. Psych: On risperdone. PRN melatonin and zolpidem for insomnia. Psych following. Appreciate recs.

9. Dispo: When at respiratory baseline, tolerating feeds, weaned off Ativan back to home clonazepam, and ambulating better.

Dr. Mark Haddad

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #2**

Note Type: Discharge Summary
 Date: September 03, XX 00:00 EDT
 Status: Auth (Verified)
 Subject: Discharge Order Form
 Verified by: QUINTANA PNP, STEPHANIE on September 03, XX 00:00 EDT
 Encounter info: XXXX, Sacred Heart Hospital, Documents, 8/29/XXXX - 9/3/XXXX

*** Final Report ***

ATTENDING PHYSICIAN: Dr. KYLIE BACA

DATE OF BIRTH: 09/24/XX

ADMITTED: 08/29/XX

HOUSE OFFICER:

STEPHANIE QUINTANA

ADMITTING DIAGNOSIS:

LEAKING LUMBAR WOUND

PRINCIPAL DIAGNOSIS:

LEAKING LUMBAR WOUND

SECONDARY DIAGNOSES:

NONE

PRINCIPAL PROCEDURE:

NONE

COMPLICATIONS:

NONE

SUMMARY OF HOSPITAL COURSE:

see dictation per resident

DISCHARGE DISPOSITION:

ROUTINE DISCHARGE

DIET:

REGULAR DIET FOR AGE

LISTED ALLERGIES:

NONE LISTED

MEDICATIONS:

MULTIVITAMIN

1 TAB DAILY

VITAMIN D

PER HOME DOSE

ACETAMINOPHEN

325MG PO Q 4HR PRN PAIN

SPECIAL INSTRUCTIONS:

KEEP OVERALL ACTIVITY LEVEL LOW, LIMIT RUNNING, JUMPING, PUSHING, PULLING OR LIFTING UNTIL FOR AT LEAST 2 WEEKS.

REPORT S/S OF WOUND INFECTION; REDNESS, SWELLING, DRAINAGE AT SITE, FEVER, VOMITING OR ANY PARENTAL CONCERNS TO NEUROSURGERY

F/U IN SPINA BIFIDA CLINIC IN ONE MONTH

PATIENT/FAMILY EDUCATION:

UNSCHEDULED AND EXTERNALLY SCHEDULED APPOINTMENTS:

OREGANO CLINIC DR TABUCHI CALL TO SCHEDULE FOR ONE MONTH

TESTS PENDING AT DISCHARGE:

BLOOD CULTURE PRELIM RESULTS NEGATIVE

CONSULTATIONS:

PHYSICAL THERAPY

REFERRING/PRIMARY CARE PHYSICIAN :

DISCHARGING HOUSE OFFICER:

STEPHANIE QUINTANA (BY ELECTRONIC SIGNATURE 09/03/XX)

Note Type: Emergency MD
 Date: August 29, XX 21:43 EDT
 Status: Modified
 Subject: Other
 Created by: TIZAZU MD, MPH, AMARE on August 29, XX 21:52 EDT
 Verified by: TIZAZU MD, MPH, AMARE on August 30, XX 05:41 EDT
 Encounter info: Sacred Heart Hospital, Inpatient, 8/29/XX - 9/3/XX

*** Final Report ***
Document Has Been Updated

Other

Patient: **VARSHNEY, ADITYA**
 Age: **7 years** Sex: **Male** DOB: **9/24/XX**
 Associated Diagnoses: **Disruption of Internal Operation (Surgical) Wound**
 Author: **TIZAZU MD, MPH, AMARE**

Basic Information

Time seen: Immediately upon arrival.
History source: Mother, father.

History of Present Illness

7 y.o. boy with tethered cord, s/p untethering on 8/8/XX, presents with slow leakage of clear fluid from his surgical site since 8 pm today. He has otherwise been at his neurological baseline. No headache, no fever, no mental status changes, no visual changes, no vomiting. On 8/20/XX he was seen in Neurosurgery clinic for a follow-up visit because his mother was concerned that there was a bulge at the surgical site; on exam this appeared to have resolved. He has a history of myelomeningocele repaired at birth, a history of VP shunt (now disconnected), and spastic diplegia, and lacks bowel or bladder control at baseline.

Review of Systems

Constitutional symptoms: denies fever.
Eye symptoms: denies recent vision problems.
ENMT symptoms: denies ear pain.
Respiratory symptoms: denies shortness of breath.
Cardiovascular symptoms: denies chest pain.
Gastrointestinal symptoms: no abdominal pain.
Genitourinary symptoms: Negative except as documented in HPI.
Musculoskeletal symptoms: no Neck pain.
Neurologic symptoms: no headache.
Psychiatric symptoms: Negative except as documented in HPI.
Endocrine symptoms: Negative except as documented in HPI.
Hematologic/Lymphatic symptoms: Negative except as documented in HPI.
Allergy/immunologic symptoms: Negative except as documented in HPI.
Additional review of systems information: All other systems reviewed and otherwise negative.

Health Status

Allergies: .

Allergic Reactions (All)
Severity not Documented
 Chocolate- Diarrhea.
 Lactose intolerance- Diarrhea.

Medications: had been taking ditropan; discontinued this past week due to headaches.

Past Medical/ Family/ Social History

Comment [AS1]: First trigger (#18): Hospital readmission within 30 days is shown here again.

Procedure was done on 8/8/XX during a prior admission whereas the current admission is 8/29/XX.

Comment [AS2]: Adverse event #1: Slow leakage of clear fluid from patient's surgical site
 Preventability: Probably not preventable
 Severity: F

Trigger #18 helps identify this adverse event. Three weeks prior to this admission, the patient underwent a surgery that led to this adverse event. While there doesn't seem to have been any deviations in care, the leakage of clear fluid from the surgical site is still an unintended outcome that has resulted in harm and required additional treatment.

Comment [AS3]: Key lesson #1: All complications of surgery are adverse events. Post-operative complications should not be excluded because they are "known" to occur in a certain percentage of cases or because the patient was advised of the risk before surgery. Surgical complications do not necessarily indicate or imply that an error has occurred.

Comment [AS4]: Key lesson #2: Adverse events present when a patient arrives at your hospital are counted, regardless of who caused it or where the adverse event initiated.

Medical history

Neurological: cerebral palsy, spina bifida, tethered cord.

Physical Examination

Vital signs: Vital Signs,

8/29/XX 21:00 EDT

Temperature 35.4 DegC LOW
 Temperature Route Tympanic
 Heart Rate 80 bpm
 Pulse Source Apical
 Respiratory Rate 24 br/min
 Systolic Blood Pressure 111 mmHg
 Diastolic Blood Pressure 69 mmHg
 Blood Pressure Method Automated
 Blood Pressure Location Left upper

8/29/XX 20:59 EDT

Temperature 35.4 DegC LOW
 Temperature Route Tympanic
 Systolic Blood Pressure 111 mmHg
 Diastolic Blood Pressure 69 mmHg
 Blood Pressure Method Automated
 Blood Pressure Location Left upper
 Vital Signs Posture Sitting

Measurements.

8/29/XX 21:00 EDT

Weight 22.000 kg
 Weight for calculation 22.000 kg

8/29/XX 20:59 EDT

Weight 22.000 kg

General: Alert. cooperative. smiling. interacting. playing.

Skin: Warm. dry. pink. intact.

Head: Normocephalic. atraumatic.

Neck: Supple

Eye: Pupils are equal, round and reactive to light. extraocular movements are intact. normal conjunctiva. no discharge.

Ears, nose, mouth and throat: Oral mucosa moist. No pharyngeal erythema or exudate.

Cardiovascular: Regular rate and rhythm. No murmur.

Respiratory: Lungs are clear to auscultation

Back: 1x small drop of clear fluid leaking from surgical site

Chest wall

Gastrointestinal: Soft. Nontender. Non distended.

Genitourinary

Neurological: Alert. CN II-XII intact. neuro exam at baseline with minimal movement of RLE and small movements or LLE.

Psychiatric: Cooperative. appropriate mood & affect.

Medical Decision Making

7 y.o. boy with [redacted] presents with [redacted] Asymptomatic and neurologically at baseline. Admit to neurosurgery for MRI and surgical exploration.

Impression and Plan

Complaint of Disruption of Internal Operation (Surgical) Wound (ICD9 998.31, Discharge, Medical)

Plan

Condition: Unchanged.

Disposition: Admit: Neurosurgery.

Addendum

Teaching-Supervisory Addendum-Brief

Comment [AS5]: Adverse event #1 is shown here again.

Comment [AS6]: First trigger (#18): Hospital readmission within 30 days is shown here again

Comment [AS7]: Adverse event #1 is shown here again.

I participated in the following activities of this patient's care: the medical history, the physical exam, medical decision making.

I personally performed: supervision of the patient's care, the medical history, the physical exam.

The case was discussed with: the resident.

Evaluation and management service: I agree with the evaluation and management decisions made in this patient's care.

Results interpretation: I agree with the study interpretation in this patient's care.

Notes: 7 yo hx spinabifida, hydrocephalus, recent spinal surgery for tethered cord several weeks ago today parents noted clear fluid from suture lines. No fevers acting well otherwise here for evaluation. Details of hx as above. On exam is afebrile well appearing, EOMI, PERRL, chest is CTA, there is RRR no murmur, the belly is soft and non-tender, the suture line on back is intact minimal erythema. There is bilateral weakness of the lower extremities which is at baseline per parents. Seen by neurosurgery. Plan is for MRI then admission for possible exploration and repair. I have verified that the neurosurgical attending is aware of the patient and agrees with the plan.

Comment [AS8]: Adverse event #1 is shown here again.

I have transferred care to my colleague Dr. Bennett.

Amare Tizazu,

No events while waiting transfer to the floor. TR Bennett, MD

Note Type: Nursing Admission Assessment.
 Date: August 30, XX 01:15 EDT
 Status: Auth (Verified)
 Subject: Nursing Admission Assessment
 Created by: MARTINEZ RN, PAULA T on August 30, XX 01:15 EDT
 Verified by: MARTINEZ RN, PAULA T on August 30, XX 01:15 EDT
 Encounter info: XXXX, Sacred Heart Hospital, Inpatient, 8/29/XX - 9/3/XX

Nursing Admission Assessment Entered On: 08/30/XX 01:21 EDT
Performed On: 08/30/XX 01:15 EDT by MARTINEZ RN, PAULA T

Weights and Measurements

Initial Measures Documented on Flowsheet : Yes

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Patient Profile

Admitted From: ER

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Contact Info During Admission Grid

<i>Name :</i>	Pooja Varshney	Prashanth Varshney
<i>Relationship :</i>	Mother	Father
<i>Cell Phone :</i>	XXX XXX-XXXX	XXX XXX-XXXX
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Individuals Living with Patient Grid

<i>Name :</i>	Sister
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Languages : English

Interpreter Needed - Patient : No

Interpreter Needed - Parent : No

MARTINEZ, RN PAULA T - 08/30/XX 01:15 EDT

Specialist Grid

<i>Name :</i>	F O'Connor	A Uribe	D Metz	B Hayes
<i>Specialty :</i>	neurosurg	uro	CCS	ortho
<i>Location :</i>	SHH	SHH	SHH	SHH
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

<i>Name :</i>	L Douglas
<i>Specialty :</i>	primary
<i>Location :</i>	SHH
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Allergy History

Allergies (Active)

Chocolate

Estimated Onset Date: Unspecified ; *Reactions:* Diarrhea ;
Created By: DOUGHERTY RN, KAREN B ; *Reaction Status:*
Active ; *Substance:* Chocolate ; *Updated By:* DOUGHERTY
RN, KAREN B ; *Reviewed Date:* 08/29/XX 21:43 EDT

Lactose intolerance

Estimated Onset Date: Unspecified ; *Reactions:* Diarrhea ;
Created By: DOUGHERTY RN, KAREN B ; *Reaction Status:*
Active ; *Substance:* Lactose intolerance ; *Updated By:*
DOUGHERTY RN, KAREN B ; *Reviewed Date:* 08/29/XX 21:43
EDT

Latex

Estimated Onset Date: Unspecified ; *Created By:* MARTINEZ
RN, PAULA T ; *Reaction Status:* Active ; *Substance:* Latex ;
Type: Allergy ; *Updated By:* MARTINEZ RN, PAULA T ;
Reviewed Date: 08/30/XX 01:16 EDT

Transfusion History

Transfusion History: No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Communicable Disease Screening

Mumps Exposure History

Chicken Pox: No known exposure, Immunized/Had illness

Measles: No known exposure, Immunized/Had illness

Mumps: No known exposure, Immunized/Had illness

Pertussis: No known exposure, Immunized/Had illness

Rubella: No known exposure, Immunized/Had illness

Other: No known exposure, Immunized/Had illness

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Immunizations Current: Yes

Precautions for Current Encounter: Standard Precautions Only

Antibiotic Resistant Organism - Patient: No

Antibiotic Resistant Organism - Family Member: No

TB (exposure): No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Pain Review

Pain Questions answered by: Patient with Parent/Guardian

Painful Experiences: Yes

Painful experiences text: past procedures

Pain Relief: Acetaminophen like drug (Tylenol)

Patient In Pain Now: No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Reason for Admission/ Past Medical History

Arrival Time to Floor: 08/30/XX 01:05 EDT

Admitting Location: Floor C-5

Reason for Admission: CSF leak

Past Medical History: 7 year old myelo with shunt placed at birth. Untethering done 8/8/XX, returns with clear drainage from wound.

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

General Med/Surg History

Chief Complaint: repair leak

History of Present Illness - Parent: leakage noted today when getting up to bathroom

Concerns About Hospitalization: none

Suggestions for Care - Parent: no

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Comment [AS9]: First trigger (#18): Hospital readmission within 30 days is shown here again.

Comment [AS10]: Adverse event #1 is shown here again.

Comment [AS11]: Adverse event #1 is shown here again.

Past Surgical History Grid

<i>Surgery Description :</i>	Other: closure of spina bifida	Other: hydrocephalus shunt
<i>Surgery Date :</i>	9/24/XX	x2 first week of life
<i>Comment :</i>	OSH ?Michigan	
	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT	MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Fall Risk Screen*Patient Greater than 1 Year Old :* Yes*Length of Hospital Stay :* 1-4 days (0)*IV/ Heparin Lock :* Yes (0)*PT/OT- Recent Past, Current, Near Future :* Yes (1)*Anti-Seizure Medications- For Any Reason :* No (0)*Acute/Chronic Ortho/Musculoskeletal Dx :* Yes (1)*History of Fall Within the Past Month :* No (0)*Fell During This Hospitalization :* No (0)*Fall Risk Total Score :* 2*Education Completed :* Yes

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Suicide Risk Screen*Current Behavioral/Emotional Treatment :* No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Functional Health Patterns- Part 1*Diet :* Regular, Age Appropriate

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Nutritional Screen*Failure to Thrive :* No*Malnutrition :* No*Eating Disorder :* No*Metabolic Disease :* No*New Onset DM :* No*Special formula > 24 Kcal/oz :* No*NPO >3 days prior to admission? :* No*Multiple food allergies - 2 or more :* No*TPN Feedings :* No*Significant Weight Loss or Weight Gain :* No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Nutrition/Metabolic Details : Open*Toileting Pattern :* Straight catheter*Elimination Details :* Open*Problems Sleeping :* None*Sleep/Rest Details :* Open

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Bathing : Self*Dressing :* Self*Mobility :* Self*Feeding :* Self*Toilet :* Assist

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Activity/Exercise Details : Open

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Functional Screen*New Weakness, Atypical Movement, Deformity :* No

Parent States Level Not Age Appropriate : No
 Cardiopulmonary Issues Requiring PT : No
 Fracture Risk Screen Risk Factors : Cerebral palsy or myelomeningocele
 Fracture Risk Screen Total Score : 1

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Functional Health Patterns- Part 2

Patient a Newborn and Never Been Home : No
 Speech Issues : No
 Hearing Issues : No
 Visual Issues : No
 Cognitive/Perceptual Details : Open
 Adult Staying with Child at Hospital : parent
 Threats of Harm : No
 Coping Stress Details : Open

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Substance Use

Tobacco Use/Exposure : None
 Substance Use/Exposure : None

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Value Belief Pattern

Religious/Spiritual Preference : Unable to collect
 Chaplaincy Visit During Stay : No

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Discharge Planning Needs

Formal/Informal Support Systems at Home : Yes
 Any Existing Services at Home? : No
 New/Additional Services Needed at Home : No
 Tracheostomy : No
 Medical/Surgical Devices Used at Home : No
 Car Seat Child Under the Age of 8 Years : Yes, under 8 years old
 Education Needs For Discharge : Defer to service, Discharge instructions, Disease process, Equipment, Medications, Pain management, Rehab techniques, Wound care
 Learning Style - Patient : Explanation from parent/guardian
 Learning Style - Parent/Guardian : Verbal explanation/instruction, Written explanation/instruction

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Admission Checklist

Physical Assessment Complete : Yes
 Pressure Ulcer Present Upon Arrival : No
 Informant : Mother, Father
 Consent Signed : Yes
 Advanced Directive in Chart : No
 Parent ID Obtained : Yes
 Unit Overview/Handouts Provided : No
 Visitor Policy Reviewed : Yes

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Problem List

Diagnoses (Active)

Disruption of Internal Operation (Surgical) Wound Date: 08/29/XX ; Diagnosis Type: Discharge ; Confirmation: Complaint of ; Clinical Dx: Disruption of Internal Operation (Surgical) Wound ; Classification: Medical ; Clinical Service: Non-Specified ; Code: ICD-9-CM ; Probability: 0 ; Diagnosis Code: 998.31

Other

Date: 08/29/XX ; Diagnosis Type: Reason For Visit ; Confirmation: Complaint of ; Clinical Dx: Other ; Classification: Medical ; Clinical Service: Emergency medicine ; Code: SNOMED CT ; Probability: 0 ; Diagnosis Code: 124502016

Nutrition/Metabolic Pattern

Appetite : Good
Feeding Ability : Self
Swallowing Difficulty : None

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Elimination Pattern

Voiding Difficulties : Other: intermittent straight cath, 5xday
Stooling Difficulties : Other: incontinent

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Sleep/Rest Pattern

Where Does Child Sleep : Bed
Does Child Sleep Alone : Yes

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Activity/Exercise Pattern

Ambulatory Devices History : Other: AFOs

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Cognitive/Perceptual Pattern

Cognitive Developmental Concerns : No
Special Learning Needs : None

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Coping Stress Tolerance Pattern

Stressors : None
Adequate Support Systems Available : Yes

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Car Seat Safety Screen

Parent/Guardian Available : Yes
Car Seat Yes or No : Yes
Car Seat New : Yes
Car Seat Crash : No
Car Seat Leaving : No
Car Seat Information : No
Car Seat Request : No

MARTINEZ RN, PAULA T - 08/30/XX 01:15 EDT

Note Type: Neurosurgery Consultation
 Date: August 30, XX 00:38 EDT
 Status: Modified
 Subject: Neurosurgery Consultation in ED
 Created by: GOLDSTEIN MD, FRANK on August 30, XX 00:40 EDT
 Verified by: GOLDSTEIN MD, FRANK on August 30, XX 00:40 EDT
 Encounter info: XXXX, Sacred Heart Hospital, Inpatient, 8/29/XX - 9/3/XX

*** Final Report ***
Document Contains Addenda

REQUESTING PHYSICIAN/SERVICE: ER

PHYSICIAN/ATTENDING REQUESTING CONSULT: Addison

REASON FOR CONSULT/VISIT: Leaking wound

DATE OF VISIT: 08/29/XX

PRESENTING COMPLAINT: Leaking wound

HISTORY OF PRESENT COMPLAINT:

This is a delightful 7YO RHM well known to our service. Briefly, he had myelomeningocele closed at birth and had undergone placement of a ventriculoperitoneal shunt in the first week of life. He has had most of his care at either All Saints Hospital in Michigan or in Indiana where the family had lived previously. He did not appear to be shunt dependent pre-operatively. A spine MRI demonstrated no hydromyelia aside from a small distal syrinx near the tethered end of his spinal cord.

His pre-operative symptoms included some signs directly related to a distally tethered spinal cord; including a mild scoliosis of around 20 degrees, some mild interning of one foot, and a change in his gait which was marked by increased waddling with his exaggerated Trendelenburg type of gait. Urodynamic studies have demonstrated direct evidence of ongoing lower motor neuron loss which was felt to be virtually pathognomonic for distal tethering. He had pre-operative diminished sensation in his groin and buttocks as well as difficulty sensing when he needed to urinate or move his bowels. Indeed, he was self-catheterizing at home with the help of his parents. It was elected to proceed with untethering of the spinal cord. The MRI scan had demonstrated what appeared to be a tightly tethered distal cord with a dorsal spinal cord plastered up against the last intact lamina rostral to the spina bifida defect and a distal syrinx.

He was admitted for detethering on August 8-12. He had an uncomplicated surgery and a routine hospital stay. Post-op outpatient follow-up August 20 demonstrated some swelling about the incision-site, but no drainage or indication of infection. In fact, the wound looked to be healing well. He has continued to do well in the post-operative period per his parents present at the bedside in the ER. In fact, his level of activity may be too high at times as they have had to try and limit his activity. He has been running around without his braces and running up and down the steps at home and even has had an occasional fall onto his bottom. Both parents were excited

following surgery when he was able to communicate the sensation of needing to void or have a BM, but they feel that lately he has not been able to tell them as frequently. Additionally, he had 2-3 days of headache earlier in the week associated with some nausea, but it is difficult for them to say in hindsight whether there was any positionality to them although Aditya does note they improved when he awoke from napping with them. Earlier this evening for the first time, while he was straining to use the bathroom, the family noticed clear fluid leaking from incision worse with straining. They called into the hospital and I asked them to come in to the ER. They deny any headache for the last 2 days, back pain, fever, chills or vomiting and his strength and bowel/bladder function are as above.

Comment [AS12]: Adverse event #1 is shown here again.

PAST MEDICAL HISTORY AND REVIEW OF SYSTEMS:

1. L3-4 spina bifida.
2. Hydrocephalus s/p VPS in XX year
3. Right hip dysplasia.
4. Scoliosis.
5. tethered cord s/p detethering 8/8/XX
6. neurogenic bladder retention requiring straight catheterization at home

Active Medication Orders

PRN Medications

lidocaine-tetracaine topical (Synera topical film) 1 film TOP 1time PRN Procedure(s) *Com

*Com: Order comment exists. Consult Order Profile or MAR for details

Allergies: Unclassified: Chocolate (Diarrhea), Lactose intolerance (Diarrhea)

IMMUNIZATIONS: UTD

SOCIAL AND FAMILY HISTORY: Lives at home with both parents and older sister. Home schooled.

PHYSICAL EXAMINATION:

alert, awake and oriented
 CN grossly intact
 No signs of meningismus
 No drift of upper extremities
 lower extremity exam in detail (R/L):
 hip flexors 4+/4+
 knee extensors 4/4
 dorsiflexors 1/4-
 plantarflexors 1/1

sensation diminished in the groin and over the buttocks to PP/LT with some reconstitution distally over the calves/shins and minimally in the feet L>R.
 reflexes are trace bilaterally
 toes downgoing

wound looks intact
 healing well without evidence of infection
 no obvious drainage on inspection

on palpation there are multiple small areas of clear fluid drainage in drops that worsen slowly after I sit Aditya up. There is no tenderness, major swelling or erythema and multiple sutures are still present and intact.

No Lab Results

No Micro Results in past 24 hours

DIAGNOSTIC STUDIES:

ASSESSMENT: 7 YO M, recent detethering procedure 8/8/XX with approximately 3 hour history of leaking incision; neurologically likely at baseline to slightly improved per patient's parents. Impression is that of pseudomeningocele versus subcutaneous seroma versus persistent CSF leak without evidence of superficial infection or CNS involvement. Given that the patient has known deficit in the area that may be affected by any possible fluid collection it is prudent to obtain imaging. The wound will likely need to be over sewn versus revised and in the interim we will obtain imaging, draw labs, observe neurologically.

Comment [AS13]: First trigger (#18): Hospital readmission within 30 days is shown here again.

Comment [AS14]: Adverse event #1 is shown here again.

PLAN:

- admit to Neurosurgery Floor C-3
- MRI L spine +/- Gad
- pre-op labs
- NPO overnight
- neuro obs
- will hold abx for now
- lay flat
- may require bedside oversewing of the wound (will dose pre-procedural abx for this)

I did discuss this plan with the neurosurgery senior resident on call who in turn discussed the plan with Dr. Baca and this document reflects his evaluation and plan of care. This information was communicated to the family and all questions were answered. The emergency room staff was told of our evaluation and plan of care; everyone verbalized understanding and agreement with this plan.

Frank Goldstein MD
Neurosurgery

ATTENDING NOTE:

Addendum by BACA MD, KYLIE P on August 30, XX 07:57 EDT (Verified)

Agree with plan and management entirely. The sutures placed this morning by Dr. Goldstein seem to be holding well, no leak. Spoke with Dr. Tabuchi, who prefers keeping him flat through weekend. I discussed the issues in detail with parents, who understand well what is at stake and agree with plan. KPB

Note Type: Neurosurgery Inpatient MD
 Date: September 03, XX 06:52 EDT
 Status: Auth (Verified)
 Created by: BERGSTRAND MD, GISELLE on September 03, XX 06:52 EDT
 Verified by: TABUCHI MD, AKIO on September 03, XX 10:00 EDT
 Encounter info: XXXX, Sacred Hospital, Inpatient, 8/29/XX - 9/3/XX

* Final Report *

INTERVAL HISTORY: No overnight events.

Extended Vital Signs

Vitals Signs since (09/02 06:51)	24 h min	24 h max	Most recent (Time)
Temperature	35.5	37.1	35.5 (03:00)
Temperature Route			Axillary (03:00)
Heart Rate	64	94	68 (03:00)
Respiratory Rate	18	20	18 (03:00)
Systolic Blood Pressure	103	114	103 (03:00)
Diastolic Blood Pressure	41	62	50 (03:00)
Mean Arterial Pressure (Device)			73 *09/02 10:00*
Blood Pressure Location			Left lower (03:00)
Blood Pressure Method			Automated (03:00)
Vital Signs Posture			Supine (03:00)
Observations/Comments			playroom *09/02 14:00*

No Lab Results

No Micro Results in past 24 hours

DIAGNOSTIC STUDIES:

Input/Output (Daily totals are 0:00-23:59)

I&O	09/02/XX - 09/02/XX	09/03/XX as of 06:51
In: PO	1080	0
In: enteral total	1080	0
In: TOTAL	1080	0
Out: urine	675	0
Out: TOTAL	675	0
Balance: TOTAL	405	0

Active Medication Orders

Scheduled Medications

docusate 50 mg PO BID Last admin: 50 mg PO (08/31/XX 07:52)

senna 5 mL PO BID *Com Last admin: 5 mL PO (08/31/XX 07:52)

PRN Medications

acetaminophen 325 mg PO Q4hr PRN Fever/Pain *Com Last admin: 325 mg PO (09/01/XX 11:25)

bisacodyl 5 mg PR daily PRN Constipation

lidocaine-tetracaine topical (Synera topical film) 1 film TOP 1time PRN Procedure(s) *Com
morphine (morphine IV) 2.2 mg IV Q4hr PRN Pain Last admin: 2 mg IV (08/30/XX 02:30)

Continuous Medications/Fluids

D5W NS 1,000 mL + potassium CHLORIDE, IVF 20 mEq IV *Com Last admin: 55 mL IV (08/30/XX 07:59)

*Com: Order comment exists. Consult Order Profile or MAR for details

PHYSICAL EXAM: AVSS

sleeping but awoke easily

EOMI

FSM

maex4

I/C/D/I.

ASSESSMENT & PLAN: This is a 7 yr old with CSF leak s/p recent detherring. He also has a h/o myelomeningocele.

Clinically he is doing well with no s/o CSF leak. Our plan is as follows:

--Continue mobilization

--d/c later today once patient seen by Dr Tabuchi

ASSESSMENT & PLAN:

ATTENDING NOTE:

Aditya has been up and around now for 2 days, after several days of being flat. He remains without headache or any sign of leak. In the upright position there is no palpable subcutaneous fluid collection and no fullness. There is no hint of leak. He feels great, wants to go home, and has had no fever. They will go home today with the understanding that if there is another episode of leakage we will plan to take him to surgery for exploration and repair.

Akio Tabuchi MD
Attending Neurosurgeon

Comment [AS15]: Adverse event #1 is shown here again.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #3**

Note Type: Discharge Summary
Date: June 31, XX 08:00 EDT
Status: Auth (Verified)
Subject: Discharge Summary
Created by: GUSTAFSON PA, NATALIE M on June 30, 20XX 10:40 EDT
Verified by: BARR MD, RON C on July 12, 20XX 13:19 EDT
Encounter info: XXXX, Community General Hospital, Inpatient, 6/26/XX - 6/31/XX

*** Final Report ***

DATE OF ADMISSION: 06/26/XX.

DATE OF DISCHARGE: 06/31/XX.

SERVICE: Otolaryngology.

ATTENDING PHYSICIAN: Barr, Ron C, MD.

HISTORY OF PRESENTING ILLNESS: This 14-year-old presents to the emergency room complaining of left neck pain that began four days ago. She also reports fever for a few days with maximum temperature of 101F. She complains of fatigue and myalgias in the legs and arms. She was seen at an outside hospital two days prior to admission, where a CT scan showed a 1 x 1.5 fluid accumulation in the left sternocleidomastoid muscle area. At that time, her white blood cell count was 14, and Monospot testing was negative. She was sent home on oral antibiotics and was followed up by her pediatrician, who referred her to the Community General Hospital Emergency Department for evaluation. Of note, the patient had recently returned from a 3-week trip to Costa Rica and did not take malaria prophylaxis.

MEDICAL HISTORY: Noncontributory.

SURGICAL HISTORY: Tympanostomy tube placement.

ALLERGIES: NO KNOWN DRUG ALLERGIES.

SOCIAL HISTORY: She lives at home with her family.

FAMILY HISTORY: Noncontributory.

PHYSICAL EXAMINATION: Temperature 36.4C, pulse 90, respiratory rate 18, blood pressure 109/56.

General appearance -- She is in no acute distress and is well developed and well nourished.

HEENT -- Normocephalic, atraumatic. Tympanic membranes are intact. No tonsillar enlargement or exudate. No oral mucosal lesions. No stridor. Neck is supple, with the left side over the sternocleidomastoid area showing edema and mild warmth but no erythema or induration. There is mild tenderness to palpation.

HOSPITAL COURSE: The patient was started on intravenous vancomycin and intravenous Unasyn. An otolaryngology consultation was obtained, and a CT

scan of the neck was performed, demonstrating left posterior neck abscess. After reviewing the CT scan, the decision was made to perform needle drainage of the neck abscess. A small amount of thick pus was collected and sent for culture. Wound cultures demonstrated scant skin flora and a few Staphylococcus aureus. After needle drainage of the abscess, the patient was transferred to the surgical floor and continued on intravenous antibiotics with continued monitoring.

Despite being on antibiotics, the patient continued to have daily fevers, so a repeat ultrasound was obtained on 06/28/XX. The ultrasound suggested phlegmon with no definitive abscess seen in the left posterior neck area. The decision was made to continue intravenous antibiotics and watch for improvement. An Infectious Disease consult was also obtained. On 06/29/XX, the patient again spiked with a maximum temperature of 38.7C. Due to relatively slow clinical improvement, the decision was made to bring the patient back to the operating room for incision and drainage of the area. The area was incised, and pus was drained. Please see the operative note for details. Wound cultures were sent, and a Penrose drain was placed to facilitate drainage in the postoperative period. The patient slowly began to clinically improve. Drain output decreased, and the drain was discontinued on postoperative day #2 after the incision and drainage. She was transitioned to oral antibiotics and was deemed ready for discharge home on 06/31/XX. A ten-day course of oral Augmentin will continue.

DISPOSITION: Home.

CONDITION ON DISCHARGE: Good.

DISCHARGE INSTRUCTIONS: The parents were advised to return to the emergency department if the patient develops fever, increased drainage from the neck site, decreased range of motion of the neck, or any worsening clinical symptoms.

DISCHARGE MEDICATIONS:

1. Augmentin 500 milligrams by mouth three times per day.
2. Tylenol with Codeine one tablet by mouth every four to six hours as needed for pain.

FOLLOW UP: The patient is to follow up with her PCP in one for removal of sutures.

Comment [AS1]: First trigger (#23): Return to surgery.

Comment [AS2]: Adverse event #1: Prolongation of illness
Preventability: Probably preventable
Severity: F

Trigger #23 helps identify this adverse event. Rather than receiving definitive treatment for her abscess, a needle aspiration was performed. This would commonly be considered inadequate treatment for this condition. Therefore, her inadequate treatment of the condition led to a repeat procedure, resulting in additional treatment.

Comment [AS3]: Key lesson #1: All complications of surgery are adverse events. Post-operative complications should not be excluded because they are "known" to occur in a certain percentage of cases or because the patient was advised of the risk before surgery. Surgical complications do not necessarily indicate or imply that an error has occurred.

Note Type: ED Note
 Date: June 26, XX 07:45 EDT
 Status: Auth (Verified)
 Subject: ED Note
 Verified by: LOMBARDI MD, ANTHONY on June 27, XX 14:04 EDT
 Encounter info: XXXX, Community General Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

Patient seen: 08:15 Patient walked into the emergency department.
 Historian: patient and her mother CC: neck pain HPI: 14 year old female presents left-sided neck pain that started 4 days ago and fever x 3 days peaking around 101 F. She also reports fatigue, myalgias in her legs and somewhat in her arms, substernal chest pain with inspiration, and dark-yellow urine this morning (believes was well-hydrated). Was seen 2 days ago at Sidewinder Hospital, where CT showed 1x1.5 cm accumulation of fluid (presumed abscess) in left SCM; wbc was 14000 and monospot negative. She was seen this morning by her pediatrician, who referred her here recommending evaluation by ORL. No respiratory difficulty, throat pain, trouble swallowing, or other complaint. She returned last week from a 3-week trip to Costa Rica in which she travelled to both coasts; she did not take malaria prophylaxis.

ROS: rash on buttocks from "wet bathing suit," otherwise all systems negative except those noted in HPI.

PMH: tympanostomy tubes, otherwise unremarkable MEDICATIONS: Augmentin 500/125 x 48 hrs, Motrin last at 7:30 am ALLERGIES: NKDA IMMUNIZATIONS: UTD SH: lives with family, just back from CR

PE: T 36.4, P 90, RR 18, BP 109/56, Wt 50.3 APPEARANCE: Well nourished, well developed, flushed face, in no acute distress. SKIN: No rashes or lesions besides bug bites on legs. HEAD: Normocephalic, atraumatic. EYES: PERRL. EOMI. No conjunctival injection. EARS: TM's intact. Light reflex normal. No retraction or perforation.

MOUTH & THROAT: No tonsillar enlargement. No pharyngeal erythema or exudate. No stridor. NECK: Supple. Left side of neck over SCM larger than right with mild warmth, no erythema, no induration, mild pain, not well-defined. NODES: No cervical or axillary lymph node enlargement. CHEST: Lungs clear to auscultation bilaterally. CARDIOVASCULAR: Normal S1, S2. No rubs, murmurs or gallops. ABDOMEN: Slight tenderness of the RUQ, no rebound tenderness or guarding. Not distended. Soft. No masses. No hepatomegaly or splenomegaly. NEUROLOGIC: grossly intact

RESULTS:

Creatinine		0.6	Total Protein	
6.5	Bilirubin, Direct		0.1	ALT
41 H	Albumin		3.4	Alkaline
Phosphatase	98	AST (Aspartate Aminotransferase)		
25	Bilirubin, Total	0.4	ESR	
(Erythrocyte Sedimentation Rate)	43 H	Hematocrit		
35.6	Hemoglobin	12.5	Platelet	
255	Mononucleosis Screen, Rapid	Negative	C-Reactive	
Protein	6.70 H	Eosinophil		

8 H	Absolute Neutrophil Count	10.07 H	Lymphocyte
5 L	Cells Counted, Manual Differential	100	Morphology
Comment	Normal	Atypical	Lymphocyte
3	Absolute Lymphocyte Count	0.64 L	Monocyte
5	Left Shift	Absent	
Neutrophil/Band	79 H	Absolute Eosinophil Count	
1.02 H			

TREATMENT: Patient treated with acetaminophen and ibuprofen for pain, and given a 500 mL bolus of fluid I&D of neck abscess performed by ORL - a small amt of thick pus was collected. Aerobic and anaerobic cultures, AFB, fungal culture, and gram stain were sent, along w/ MRSA-specific culture. Lab results noted above. CT revealed abscess/fluid collection between muscles of left neck with surrounding lymphadenopathy. Radiology report pending. The patient remained stable while in the ED. This patient appears to have an abscess of undetermined etiology. She reports no history of trauma to the neck, and her skin barrier has remained intact around the site of abscess. Besides the most common causes of abscesses - and PCP's covering colleague notes that neck abscesses are more likely to be MRSA than in other sites - more uncommon etiologies such as tuberculosis and fungal infection need to be considered because of patient's recent travel history. Given the patient's clinical presentation and epidemiology, her neck soft-tissue mass is very unlikely to be neoplastic.

DISPOSITION/PLAN: Admitted to ORL in stable condition. Discussed w/ Dr. Elizondo from Waubonsie Pediatrics, covering for PCP Dr. Layla Ali

ASSESSMENT: 1. Abscess. 682.9.

ATTENDING XXXX. I reviewed the history above notable for continued neck pain and swelling. On my exam, Aubrey had minimal tenderness along her sternocleidomastoid on the left but no discrete mass. WBC was 12.7K. ESR 43. Mono negative. CT scan showed a collection measuring 1 x 2 cm under the SCM muscle. Aspirated by ORL and sent for culture. Transfer of care to ORL attending verbally in ED.

Note Type: Nursing Admission Assessment.
 Date: June 26, XX 19:40 EDT
 Status: Auth (Verified)
 Subject: Nursing Admission Assessment
 Created by: WILLIAMS RN, NEVAEH G on June 26, XX 20:09 EDT
 Verified by: WILLIAMS RN, NEVAEH G on June 26, XX 20:09 EDT
 Encounter info: XXXX, Community General Hospital, Inpatient, 6/26/XX - 6/31/XX

Nursing Admission Assessment Entered On: 6/26/XX 20:16 EDT
Performed On: 6/26/XX 19:40 EDT by WILLIAMS RN, NEVAEH G

Weights and Measurements

Initial Measures Documented on Flowsheet: Yes

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Patient Profile

Admitted From: ER

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Contact Info During Admission Grid

<i>Name:</i>	Tracy
<i>Relationship:</i>	Mother
	WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Languages: English

Interpreter Needed - Patient: No

Interpreter Needed - Parent: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Allergy History

Allergies (Active)

No known allergies

Estimated Onset Date: Unspecified ; *Reaction Status:* Active ;

Category: Drug ; *Substance:* No known allergies ; *Type:*

Allergy ; *Reviewed Date:* 6/26/XX 10:03 EDT

Transfusion History

Transfusion History: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Communicable Disease Screening

Mumps Exposure History

Chicken Pox: No known exposure

Measles: No known exposure

Mumps: No known exposure

Pertussis: No known exposure

Rubella: No known exposure

Other: No known exposure

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Immunizations Current: Yes

Precautions for Current Encounter: Contact

Reason for Precautions: Pending MRSA culture

Antibiotic Resistant Organism - Patient: No

Antibiotic Resistant Organism - Family Member: No

TB (exposure): No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09 EDT

Pain Review

Pain Questions answered by: Patient with Parent/Guardian

Painful Experiences: No

Pain Relief: Acetaminophen like drug (Tylenol), Ibuprofen like drug (Motrin)

Patient In Pain Now: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

General Med/Surg History

Chief Complaint: Left neck abscess

History of Present Illness - Parent: left neck swelling, febrile

Concerns About Hospitalization: none

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Fall Risk Screen

Patient Greater than 1 Year Old: Yes

Factors Causing Risk for Fall: None

Patient at Risk for Falls: No

Education Completed: Not applicable

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Functional Health Patterns- Part 1

Diet: Regular, Age Appropriate

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Nutritional Screen

Failure to Thrive: No

Malnutrition: No

Eating Disorder: No

Metabolic Disease: No

New Onset DM: No

Special formula > 24 Kcal/oz: No

NPO >3 days prior to admission?: No

Multiple food allergies - 2 or more: No

TPN Feedings: No

Significant Weight Loss or Weight Gain: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Toileting Pattern: Independent

Problems Sleeping: None

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Bathing: Self

Dressing: Self

Mobility: Self

Feeding: Self

Toilet: Self

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Functional Screen

Contracted, Deformed, or Weak Joints: No

Parent States Level Not Age Appropriate: No

Cardiopulmonary Issues Requiring PT: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Functional Health Patterns- Part 2

Patient a Newborn and Never Been Home: No

Speech Issues: No

Hearing Issues: No

Visual Issues: No

Substance/Tobacco Use: No

History of Uncomfortable Touch: No

Adult Staying with Child at Hospital: Mom

Threats of Harm: No

Restraint History: No

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Value Belief Pattern

Religious/Spiritual Preference: Unable to collect
Chaplaincy Visit During Stay: Unable to assess

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Discharge Planning Needs

Formal/Informal Support Systems at Home: Yes

Any Existing Services at Home?: No

New/Additional Services Needed at Home: No

Learning Style - Patient: Explanation from parent/guardian, Receive little info at a time, Verbal explanation/instruction, Written explanation/instruction

Learning Style - Parent/Guardian: Receive info all at once, Verbal explanation/instruction, Written explanation/instruction

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Reason for Admission/ Past Medical History

Reason for Admission: Needle aspiration of left neck abscess

Past Medical History: Ear tubes placed

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Admission Checklist

Physical Assessment Complete: Yes

Consent Signed: Yes

Advanced Directive in Chart: Not applicable

Patient ID Applied and Verified: Yes

Parent ID Obtained: Yes

Unit Overview/Handouts Provided: Yes

Visitor Policy Reviewed: Yes

WILLIAMS RN, NEVAEH G - 6/26/XX 20:09EDT

Problem List

Note Type: Operative Note
 Date: June 26, XX 00:00 EDT
 Status: Modified
 Subject: Operative Note
 Created by: BELLAMY MD, PIERRE T on June 29, XX 08:24 EDT
 Verified by: BARR MD, RON C on July 12, XX 07:33 EDT
 Encounter info: XXXX, Community General Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

DATE OF PROCEDURE: 06/29/XX.

PRE-OPERATIVE DIAGNOSIS: Left neck abscess.

POST-OPERATIVE DIAGNOSIS: Left neck abscess.

PROCEDURES PERFORMED: Incision and drainage of left neck abscess.

SURGEON: Barr, Ron C, MD.

ASSISTANTS: Bellamy, Pierre, MD.

ANESTHESIA: General endotracheal.

ESTIMATED BLOOD LOSS: Less than 10 mL.

INTRAVENOUS FLUIDS: 250 mL.

INDICATIONS FOR PROCEDURE: Aubrey is a 14-year-old girl who presented with a left neck infection. She underwent a trial of needle drainage, as well as intravenous antibiotics. She continued to have fevers and induration at that site. Given her lack of response to these measures, the decision was made to bring her to the operating room to undergo operative intervention.

Comment [AS4]: First trigger (#23): Return to surgery is shown here again.

FINDINGS: There was an area of induration about 4 centimeters x 4 centimeters in size that was superficial. Upon entry to the cavity, we found approximately 3 mL of purulent material. The abscess rind was noted. Purulent material was sent for culture. A biopsy of the abscess rind was sent to pathology.

DETAILS OF PROCEDURE: The patient was identified in the preoperative holding area, and consent was verified. She was brought to the operating room and laid on the operating table in the supine position. She underwent uneventful general anesthesia induction and intubation.

She was then prepared and draped in standard fashion. Approximately 1 mL of lidocaine 0.5% with epinephrine 1:200,000 was injected into the pre-defined incision site. The incision was marked over the area of the abscess, which was noted to be overlying the sternocleidomastoid in the superior left neck. The area of induration was approximately 4 centimeters x 4 centimeters. Using a #15 blade, an incision was made. Using a combination of a Jake and snap, the soft tissues were dissected down to an abscess cavity. Using a retractor, the sternocleidomastoid was retracted anteriorly, exposing the abscess area. The abscess cavity was entered with a Jake, with immediate return of purulent material in the amount of approximately 3 mL. Loculations were broken up with use of a hemostat, after which the wound was copiously

irrigated with normal saline. A quarter-inch Penrose was placed into the abscess cavity. Hemostasis was obtained with Bovie cautery. Using a 4-0 fine nylon suture, the Penrose was tacked to the skin. The remainder of the 1 centimeter incision was loosely closed with 6-0 nylon. A dressing was applied.

The patient was awakened from anesthesia uneventfully and transferred to the post anesthesia care unit in stable condition.

Dr. Ron Barr was present for and involved in the entire procedure.

COMPLICATIONS: None.

Note Type: Otolaryngology Clinic Note
 Date: June 29, XX 00:00 EDT
 Status: Auth (Verified)
 Subject: Otolaryngology Clinic Note XXXX
 Created by: BARR MD, RON C on June 29, XX 15:37 EDT
 Verified by: BARR MD, RON C on July 12, XX 11:16 EDT
 Encounter info: XXXX, Community General Hospital, Documents, X/X/XXXX - X/X/XXXX

*** Final Report ***

Dear Dr. Ali,

Your patient, Aubrey Leblanc was taken to the operating room today, June 29, XX, and underwent incision and drainage of her left neck infected lymph node. As we discussed on the phone, this was not responsive to intravenous antibiotics and Aubrey continued to have intermittent fevers, as well as an elevated white blood count. An ultrasound performed June 28, XX did not suggest that there was frank abscess present at that time.

Today in the operating room we did in fact find an abscess cavity and approximately 5 mL of pus within this infected/necrotic lymph node abscess was drained and cultures as well as tissue taken for microbiology evaluation and pathology examination. Aubrey did well with this procedure. I expect that she will have a rapid improvement in her clinical course and we expect that she will be able to be discharged to home on p.o. antibiotics in the very near future.

Sincerely yours,

Ron C Barr, MD

CC: Layla Ali, MD
 125 Wisteria Lane
 Suite 462
 Wisteria, CA XXXXX

Comment [AS5]: First trigger (#23): Return to surgery is shown here again.

Comment [AS6]: You may detect a trigger or an indication that a trigger exists based on prior documents in a hospitalizations. Here, even though the initial needle drainage procedure is not mentioned in this clinical note, we know that the needle drainage procedure was conducted based on the discharge summary and the 6/29 operative note. Consequently, we note that trigger #23 (return to surgery) is present in this document.

Comment [AS7]: Adverse event #1 is shown here again.

Note Type: Anesthesia Followup
 Date: June 30, XX 16:25 EDT
 Status: Auth (Verified)
 Subject: Post Anesthesia Visit
 Created by: BRINKMAN MD, JAMES C on June 30, XX 16:27 EDT
 Verified by: BRINKMAN MD, JAMES C on June 30, XX 16:27 EDT
 Encounter info: XXXX, Community General Hospital, Inpatient, 6/26/XX - 6/31/XX

*** Final Report ***

Patient found on bed awake, alert and comfortable. Mother claims that she had a good night; received enough pain medications and was able to ambulate today without vomiting. Nausea had been consistent for five days but patient now says nausea has been greatly reduced. Post General Anesthesia day # 1 without apparent anesthesia related complications

Comment [AS8]: Adverse event #2: Prolonged nausea
 Preventability: Probably preventable
 Severity: E

No triggers are associated with this adverse event. The patient's prolonged nausea was an unintended consequence of medical care and is therefore considered an adverse event.

Comment [AS9]: Key lesson #3: Symptoms such as nausea or itching are not always adverse events. They are only considered adverse events when they are long episodes and/or high in severity.

In this case, we consider the patient's nausea to be adverse event #2. The patient required further treatment and ultimately another procedure for her symptoms to improve.

Comment [AS10]: Key lesson #4: Not all adverse events will have a clear trigger. You should still record events you find without the use of a trigger.

Note Type: Infectious Diseases Consult XXXX
 Date: June 31, XX 00:00 EDT
 Status: Auth (Verified)
 Subject: Infectious Diseases Consult XXXX
 Created by: THAO MD, PhD, JESSICA A on June 31, XX 10:39 EDT
 Verified by: HAMILTON MD, RUPERT N on June 31, XX 11:50 EDT
 Encounter info: XXXX, Community General Hospital, Documents, X/X/XXXX - X/X/XXXX

*** Final Report ***

INPATIENT INFECTIOUS DISEASES CONSULT SIGN OFF NOTE
 6/31/XX

Aubrey is a 14yo F who was admitted with left neck swelling and fever and treated for a left neck abscess. Her CT showed a ~1x2cm rim enhancing lesion in her posterior neck and she had an initial needle aspiration of the fluid. The fluid grew moderate MSSA. She continued to have persistent fever and minimal clinical improvement and was therefore taken to the OR for an incision and drainage. There was drainage of about 3ml of pus. In consultation with the ORL service, she was treated with Unasyn and was discharged on 6/31/XX to complete a 10day course of Augmentin 500mg po TID. Her Toxoplasma IgM was 1.01 which is equivocal and repeat testing is recommended in 2 weeks. She has Bartonella and tularemia titers pending. She will follow up with her PMD.

We would be happy to see her in ID clinic if any tests return positive or if any concerns arise.

Jessica Thao, MD
 ID fellow pXXXX

As above, cultures and findings c/w staphylococcal lymphadenitis which should respond to excision and antibiotics. We did not identify any precipitating events leading to the adenitis.
 Agree with the above.

Rupert N. Hamilton, MD
 ID Staff, XXXX

Note Type: Discharge Plan Report
Date: June 31, XX 07:17 EDT
Status: Auth (Verified)
Created by: CASTRICONE RN, RACHEL L on June 31, XX 07:17 EDT
Verified by: CASTRICONE RN, RACHEL L on June 31, XX 07:17 EDT
Encounter info: XXXX, Community General Hospital, Inpatient, 6/26/XX - 6/31/XX

Name: LEBLANC, AUBREY
MRN: XXX-XX-XX
Date of Birth: 04/23/XX
Admission Date: 06/26/XX 09:45 am

General

Discharge Date: 06/31/XX 06:55 am
Primary Care Physician: ALI MD, LAYLA C

Attending Physician: BARR MD, RON C

Discharge Diagnosis: neck abscess

Disposition

Discharged To: Home

Follow-up Appointment 1

Follow-up Appointment Location: ORL clinic

Follow-up Appointment Provider: BARR MD, RON C

Follow-up Appointment Phone Number: XXX-XXX-XXXX

Follow-up Appointment 1 Scheduled: To be scheduled

Follow-up Appointment 1 Instructions: Please follow up in 1-2 weeks, call for appointment

Diet

Discharge Diet: Regular

Instructions

Additional Instructions:
Please call MD or go to nearest emergency room if your child:
-experiences a fever over 101 (F)
-has increased drainage/bleeding from incision site
-has increased redness around incision site
-has prolonged vomiting/diarrhea
-is unable to tolerate diet or shows signs of dehydration such as lethargy
-or for any other serious concerns

Activity Level: quiet activity x 2 weeks, please keep incision clean and dry (use tegaderm when showering)

See "Medications at Discharge" page for home medication information.

I acknowledge my participation, review of and agreement with the above plan. I have been told in a timely manner of the need to plan for discharge or transfer to another facility, and I have been told of the reason for transfer and available alternatives to transfer. I have been given an opportunity to select the provider for any post-hospital services. I have received a written copy of the plan, my questions have been answered, and I understand the contents. I understand that, in order to arrange necessary services, relevant medical and other information is being shared with post-hospital providers.

Signature of Patient/Parent/Legal Guardian Date _____

Signature of discharging nurse Date _____

If Patient/Parent/Legal Guardian does not sign above, state reasons for not signing, including any objections to the plan in progress note.

IMPORTANT! Be sure to bring this form with you on your next visit to the clinic or your doctor.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #4**

Note Type: Discharge Summary
 Date: April 03, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: BRANDON MD, NATHALIE L on April 03, XX 10:41 EST
 Verified by: BILEN MD, DOMINIC P on April 03, XX 10:57 EST
 Encounter info: XXXX, Richmond Trinity Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

ATTENDING PHYSICIAN: Dr. DOMINIC BILEN

DATE OF BIRTH: 03/20/XX

ADMITTED: 03/31/XX [11 days old]

HOUSE OFFICER:

JAMES VAN DER BERG

ADMITTING DIAGNOSIS:

RSV BRONCHIOLITIS

PRINCIPAL DIAGNOSIS:

RSV BRONCHIOLITIS

SECONDARY DIAGNOSES:

NONE

PRINCIPAL PROCEDURE:

SPINAL TAP

COMPLICATIONS:

NONE

SUMMARY OF HOSPITAL COURSE:

Chief complaint:

Fever and cough x 1 day

DISCHARGE CONDITION:

IMPROVED

DISCHARGE CONDITION:

IMPROVED

DISCHARGE CONDITION:

DATE:

03/31/XX

HPI:

11 days old male who was born FT, AGA and C/S due to repeat was doing well at home until 1 day before admission when he started to have cough and cold symptoms. He was feeding well on breast milk. He presented to the Kingdom Hospital on day of admission with the parents c/o decreased feeding and a fever of 101F. He was also noted to be fussy and less active. The elder sibling at home was also sick with URI symptoms. He was found to be dehydrated, lethargic with dry mucus membranes. His VS were; T 98.6, HR 160, RR 60, BP 101/63 (71) and O2 sat 95% with 6L oxygen at 100%. A respiratory viral panel was done and he was found to be RSV positive and his CBC was left shifted with 14 bands. CXR showed RUL collapse vs infiltrate. ABG was done and showed 728/58/55/24. He was found to have a delayed cap refill and he was given a NS bolus 20ml/kg x 1. He was given further hydration with IVF and was given Ampicillin and Cefotaxime and then he was transferred from the pediatric floor at Kingdom to NICU at RTH for further care.

Comment [AS1]: First trigger (#24): Transfer to a higher level of care.

PMHx:

He was born at Kingdom Hospital on 03/20/XX at 8AM. Mother is a 27 years old. She was O+/-, RI, RPR NR, HepBsAg -, GBS -. The delivery was via C/S due to repeat and a concern that the fetus is macrosomic. He had APGAR of 8 and 9 at one and five minutes respectively. BW 3430g. He received Hepatitis B vaccine at birth and he passed his hearing screen.

Transport History:

RTH transport team was set up for transport of the baby to RTH. The team found the baby to be lethargic and in moderate to severe respiratory distress: his O2 saturation levels were 72% for several minutes, and they decided to intubate him before transport. He was pre-medicated with Atropine 0.1mg, Versed 0.8mg, Fentanyl 24 micrograms and Succinylcholine 8mg. He was intubated with 3.5 non cuffed tube and taped at lip mark of 9cm. He started to have low MAP after intubation and was given NS bolus 10ml/kg x 2. He was given further Fentanyl 8 micrograms and Versed 0.4mg x 2 during transport. He continued to have low MAPs (40s) and was started on Dopamine 5 micrograms/kg/min en route to RTH. He was kept at PIP 22, PEEP 5, Rate 20 and FiO2 70%.

NICU Course at RTH:

The patient was received intubated and sedated with D5 1/4 NS running at 60 ml/kg/day. He was continued on same respiratory settings and an arterial blood gas and a spinal tap was performed after parental consent. His MAP was 55 and Dopamine was stopped 10 minutes after his arrival to NICU. Versed 0.3 mg and Fentanyl 10 micrograms were continued for sedation.

Admission Physical Exam:

Weight: 3.7kg (50-75th percentile)

Length: 52cm (50-75th percentile)

HC: 36cm (90th percentile)

VS: Temp 37, HR 186, MBP 55, O2 sat 95% on 75% FiO2.

4-limb blood pressures were recorded. RA 84/28 (48), RL 80/43 (55), LA 75/32 (48) and LL 78/33 (50)

Gen: Intubated and on SIMV. Sedated.

HEENT: Sedated, Pupils equal and sluggish response to light. Neck supple. Ropalgic and ETT in place. Skull atraumatic and AF is flat. Copious oral secretions present.

Resp: On SIMV and has equal breath sounds B/L with slight decreased breath sounds on the right base. No crackles or wheezing noted.

CVS: Normal heart sounds with no added sounds. Peripheral perfusion fair. Radial and femoral pulses B/L and Symmetrically palpable.

GI: Soft mild abdominal distension. No visceromegaly. BS present. Umbilical stump dry and clean.

Genitalia: Normal male external genitalia with testes descended B/L and there is a right hydrocele present.

Neuro: Sedated

Extrem: Poor cap refill.

Labs:

CBC: WBC 15, P 46, B14, L 32. Hct 40. Platelets 391.

UA: Yellow, Cloudy. SG 1024. pH 6. WBC 0-2. Rest of exam negative.

Blood and Urine culture sent from Kingdom Hospital ER and pending.

ABG: 733/46/117/24

CSF: Clear and colorless. WBC 3, L13, M84. RBC 0, Glucose 71 and Protein 48.

CSF gram stain and culture pending.

SMA: 133/4.8/99/28/101/16-0.4

CXR: RUL collapse and indistinct right heart border. ETT high and was advanced.

Tracheal aspirate: pending

RSV positive

MRSA Cx done

RICHMOND TRINITY HOSPITAL COURSE BY SYSTEMS:

Comment [AS2]: Adverse event #1: Shock following intubation
Preventability: Probably preventable
Severity: H

Trigger #24 helps identify this adverse event since the medical staff decided to transfer the patient from the pediatric floor to the NICU. The team needed to perform treatments to manage hypotension in the face of sedative and analgesic medications. Dosing would suggest that overly aggressive amounts of these medications led to these low blood pressures.

Comment [AS3]: Key lesson #5: An H represents measures that needed to be taken to save the patient's life.

-The interventions need to have occurred over a relatively short period of time (e.g., within an hour) to be in this category.

CV: On admission Oliver had a brief pressor requirement. Dopamine was weaned and discontinued 03/31. Oliver has remained hemodynamically stable since.

ACCESS: Peripheral access was maintained

RESP: On admission, Oliver was placed on SIMV settings of 25/5 and rate of 22 with FiO2 40%. Received CPT and racemic epi nebs with noted thick secretions. RSV + resp panel from Kingdom Hospital. Uncomplicated intubation period and was weaned and extubated. Soon after extubation, child was noted to have low respiratory rates, consistent, decreased O2 sats requiring stimulation for over 10 minutes as well as hypotension. As a result, child received flumazenil and haloxone x4 over the course of 2 hours with good response until mental status consistently improved. Once stable, child was managed on Nasal cannula 120 mls and Mist tent 28%. He continues to receive CPT and prn suctioning for copious secretions.

FEN/GI: Initially NPO with IV fluids of D10 with maintenance electrolytes @ 60 ml/kg/ay. Serum electrolytes and glucoses were normal. Enteral feeds of Breast milk were restarted 4/1 and advanced to full PG feeds @ 150 ml/kg/day 1/2 after extubation. Given tachypnea he continues to require PG feeds of BM20 calorie/ounce @ 150 ml/kg/day.

HEME: Admission HCT 03/31: 40%

ID: Continued on ampicillin and cefotaxime on admission. Known temperature to 101F, CBC with bandemia. Blood, urine and CSF culture were negative. Resp panel RSV positive @Kingdom Hospital. CXR with RUL infiltrate on follow up film improved. Repeat resp panel with strep pneumoniae sensitive to ceftriaxone, clindamycin, erythromycin and vanco. Given these findings of probable superimposed strep pneumoniae from sputum culture, likely RUL infiltrate, ampicillin was discontinued. Oliver is completing a 10 day course of cefotaxime. He is currently day 4 of a 10 day course. If iv lost im ceftriaxone could be used.

NEURO: Received minimal doses of fentanyl on admission. Activity has remained appropriate.

RHCM:

PCP: Dr Saul Morris

Hepatitis B: recommended prior to discharge

Car Seat test recommended prior to discharge

vs:

Wt: 3575 kg 36.8 141 69 78/39 (53) 95% on 30cc NC, 30% Mist Cube

Gen: awake, alert, NAD, pink

Heent: AFOSF, NCAT, mucous membranes moist, eyes and nares clear

Chest: coarse breath sounds bilaterally, good aeration, mild subcostal retractions

CV: RRR, no murmurs

Abd: soft, non tender, non distended, + BS, no HSM

Ext: warm, well perfused, 2 + pulses bilaterally

GU: right sided hydrocele, left sided testes descended

Neuro: normal tone, 2 + reflexes, + moro, suck, grasp reflex

DISCHARGE DISPOSITION:

ACUTE CARE FACILITY (OUT OF STATE)

DIET:

Comment [AS4]: Second trigger (#26): Racemic epinephrine administration (on a patient mechanically ventilated within the last 24 hours).

Comment [AS5]: Key lesson #6: Not all triggers lead to an adverse event. They only provide clues that an adverse event may have occurred.

Here, although trigger #26 – racemic epinephrine administration (on a patient mechanically ventilated within last 24 hours) – exists, the trigger does not identify an adverse event. The racemic epinephrine was given because of the patient's underlying disease, bronchiolitis, not because of a complication of intubation so there is no adverse event in this situation.

Comment [AS6]: Third trigger (#11): Naloxone administration.

Comment [AS7]: Adverse event #2: Oversedation upon extubation
Preventability: Probably preventable
Severity: H

Here, trigger #11 helps identify this adverse event. This patient was extubated while still under the strong influence of narcotics. Oversedation following extubation is commonly a preventable event. The patient was given naloxone (trigger #11) immediately after being extubated to sustain his life.

ENFAMIL 20 150CC/KG/DAY PG
LISTED ALLERGIES:
NONE LISTED
MEDICATIONS:
CEFOTAXIME
200 MG IV Q8HRS
SPECIAL INSTRUCTIONS:
RETROTRANSFER TO JAMES RIVERS HOSPITAL
PATIENT/FAMILY EDUCATION:

UNSCHEDULED AND EXTERNALLY SCHEDULED APPOINTMENTS:
NONE
TESTS PENDING AT DISCHARGE:
NONE
CONSULTATIONS:
NONE
REFERRING/PRIMARY CARE PHYSICIAN:

DISCHARGING HOUSE OFFICER:
NATHALIE BRANDON (BY ELECTRONIC SIGNATURE 04/03/XX)

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #5**

Note Type: Discharge Summary
 Date: March 15, XX 07:17 EST
 Status: Auth (Verified)
 Subject: Discharge Summary.
 Created by: MARSH MD, STEPHANIE E on March 15, XX 07:22 EST
 Verified by: KHOURI MD, PhD, SABRINA J on March 16, XX 11:25 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 2/3/XX - 3/15/XX

* Final Report *

Discharge Summary.

Patient: SOLGOS, NAOMI
 Age: 4 years Sex: Female DOB: 11/13/XXXX
 Associated Diagnoses: Leukemia; Febrile neutropenia
 Author: MARSH MD, STEPHANIE E

Discharge Information

Discharge Summary Information: Admitted 2/3/XX, Discharged 3/15/XX.
 Attending Physician: KHOURI MD, PhD, SABRINA J.
 Admitting diagnosis: Complaint of Leukemia
 Discharge diagnosis: Leukemia - Working, Febrile neutropenia - Working

Hospital Course

Hospital Course

Admitted from: from emergency department.
 Arrival via: by car.
 Admission disposition: admit to medical bed.
 OTHER:

Presenting History:

4yo previously healthy girl presenting with petechiae, anemia, thrombocytopenia, and leukocytosis concerning for acute leukemia. Per parents, they first noted just a few small petechiae on her left upper chest one week ago. Within the past 3 days, she also developed a couple of areas of bruising on her back. On day prior to admission, patient woke up sweating and was noted to have an increase in number of petechiae on her chest. Parents note that patient has had a viral URI for the past week, notably cough with rhinorrhea, associated with low-grade fevers (Tm99), but otherwise has been afebrile. Family has not noticed any pallor but did see darker circles under her eyes which they attributed to her URI. Naomi has not been acting more tired and she has maintained a good appetite, with normal urine and stool output. Given concern for increased petechiae and bruising, parents brought Naomi to her PMD today. At PMD's office, labs notable for WBC 25 (1S, 27L, 71Blast), Hgb 7.3, Hct 23.6, Plt 18. Patient was therefore referred to ED.

In the ED, patient well-appearing, afebrile. Repeat labs confirmed 30% lymphs, 70% blasts, with ANC 0; Plt 24. LDH elevated, but chem and LFT's wnl. CXR negative. Heme/Onc team consulted, who met and updated family in ED. Per Oncology team, sent flow cytometry, Varicella Ab titer, and Coags. Patient admitted for further management.

Review of Systems: No headaches or vision changes, no difficulty breathing, no epistaxis, no bleeding from gums, no nausea/vomiting, no abdominal pain, no hematuria/dysuria, no joint pain or swelling. Sick contacts include Mom and younger brother with URI symptoms.

Past Medical History: FT. h/o eczema and otitis media x 2, h/o constipation

Family History: FamHx: notable for MGM with breast ca, MGF with prostate ca, PGM with esophageal ca. No history of childhood cancers, including leukemia, in family. No history of anemia or clots.

Psychosocial History: Lives with Mom, Dad, and younger brother.

Hospital Course:

Oncology:

Naomi is a 4 yo F with a new diagnosis of ALL via bone marrow biopsy who was placed on 03-001 protocol.

Her LP was negative for evidence of CNS disease. Her cytogenetics showed no high risk translocations, + hyperdiploidy. Prior to receiving chemo she had an Echocardiogram 2/5 demonstrating normal biventricular function, ophtho exam with no leukemic infiltrates and a dental exam with no evidence of leukemic disease (dental exam did demonstrate caries and recommended follow up in 1 month). She received induction chemotherapy starting on 2/5/XX with steroids days 1-32, asparaginase day 7, VCR: days 4, 11, 18, 25, doxorubicin days 4, 5, LP with IT triples + BM on day 18. Overall she tolerated this regimen well. She was on allopurinol and hyperhydration but did not develop tumor lysis syndrome so these were stopped on 2/16. On 3/6/XX she had a repeat bone marrow biopsy demonstrating remission. She then began consolidation chemo on 3/6/XX with IT methotrexate, vincristine day 1, and 6-MP days 1-3. Her 6-MP was stopped on 3/8/XX because of an absolute phagocytic cell (APC) count of <500. She received hyperhydration and leucovorin until her MTX level cleared. Throughout her course she was transfused red blood cells and platelets as needed based on standard transfusion parameters (Hb <7; PLT <10).

ID:

Following her chemotherapy Naomi developed neutropenia. She had fevers and was placed on ceftazidime per protocol. She developed a blistering red rash on her left arm at the site of an old PICC dressing following her consolidation chemo. She was started on vancomycin as a result in order to cover her for possible skin infection in the setting of neutropenia. Dermatology was consulted for the rash and felt it was a hypersensitivity rash from the methotrexate at the site of the old PICC dressing and recommended supportive care. Prior to discharge Naomi was taken off of the vancomycin and placed on clindamycin PO to cover her arm for potential infection for a planned course of 7 days following count recovery. Her ceftazidime was stopped once her counts recovered. She was placed back on ceftriaxone prior to discharge on 3/13 for fever to 38.0 C twice. She received two doses of ceftriaxone and her fever curve improved. She was afebrile for 24 hours prior to discharge. She received a dose of ceftriaxone prior to discharge on 3/15 and her mother was given clear instructions to call for any 2 fevers >38.0 or 1 fever >38.4. Addendum: At discharge, pt had a temperature of 38.0, in the context of a normal PE with excellent overall appearance and activity level, ANC>500, BCX NGTD. She received a dose of ceftriaxone to cover her for an additional 24 hours. Blood cultures were also sent. Fever instructions, management, and indications to call the oncology team and return for medical care were carefully reviewed. The family agreed with the discharge plan.

Comment [AS1]: Adverse event #1: Skin rash
Preventability: Probably not preventable
Severity: E

This rash was identified without a trigger but was felt to be related to methotrexate.

Comment [AS2]: Key lesson #4: Not all adverse events will have an associated trigger. You should still record events you find without the help of a trigger.

FEN/GI:

Naomi tolerated a regular diet and received PRN miralax for constipation.

Access: Naomi has a left sided PICC.

Results Review**General Results****Today's results (24 hrs): Results**

3/15/XX 11:14 EST	Temperature	36.8 DegC
3/15/XX 08:03 EST	Temperature	37.3 DegC
3/15/XX 07:57 EST	Specific Gravity, Urine Refract	POCT
1.005		
	pH, Urinalysis POCT	6.0
	Glucose, Urinalysis POCT	Negative
	Ketones, Urinalysis, POCT	Negative
	Protein, Urinalysis POCT	Negative
	Blood, Urinalysis POCT	Negative
	Leukocytes, Urinalysis POCT	
Negative		
	Nitrite, Urinalysis POCT	Negative
	Urobilinogen, Urinalysis POCT	
0.2 (normal)		
	Bilirubin, Urinalysis POCT	
Negative		
3/15/XX 04:00 EST	Temperature	37.5 DegC
3/15/XX 00:20 EST	WBC	4.01 K cells/uL
LOW		

LOW	WBC Corrected	3.98 K cells/uL
	Hemoglobin	9.9 g/dL LOW
	Hematocrit	29.7 % LOW
	Platelet	231 K cells/uL
	MPV	8.5 fL HI
LOW	RBC	3.37 M cells/uL
	MCV	88.0 fL HI
	MCH	29.4 pg
	MCHC	33.4 g/dL LOW
	RDW	16.6 % HI
LOW	HDW	3.37 g/dL HI
	Absolute Neutrophil Count	0.99 K cells/uL
	Absolute Lymphocyte Count	2.41 K cells/uL
	Absolute Eosinophil Count	0.00 K cells/uL
	Absolute Basophil Count	0.00 K cells/uL
LOW	RBC Morphology	Yes
	Neutrophil/Band	25 % LOW
	Left Shift	Absent
	Lymphocyte	60 % HI
	Monocyte	12 % HI
	Eosinophil	0 % LOW
	Basophil	1 %
	Atypical Lymphocyte	2 %
	NRBC	1
	Anisocytosis, RBC	2+
	Macrocytosis, RBC	1+
	Polychromasia, RBC	1+
	Poikilocytosis, RBC	1+
	Ovalocytes, RBC	1+
	Sodium	140 mmol/L
	Potassium	3.50 mmol/L
	Chloride	105 mmol/L
	CO2	25 mmol/L
	Anion Gap	10.0 mmol/L
	Creatinine	0.2 mg/dL LOW

Physical Examination

Gen: well appearing, NAD, alert, complaining of headache

Heent: pupils reactive, EOMI, MMM, no oral lesions

Resp: comfortable respiratory pattern, good aeration bilaterally

CV: RRR, no murmurs

Abd: soft, NT, ND, BS+

Extrem: WWP, 2+ peripheral pulses, L upper extremity with blistering erythematous rash on upper lateral arm without drainage or purulence in location of prior tape/PICC placement, improved from previous exam

Skin: Port site c/d/i

Neuro: cranial nerves II-XII intact, moves all extremities, obeys commands and answers questions

Discharge Plan**Discharge Summary Plan**

Discharge Status: improved.

Discharge instructions given: written discharge instructions

1. CALL YOUR MD/PNP OR NURSE IMMEDIATELY IF YOUR CHILD HAS A FEVER > 38.0 (100.4F) TWICE IN ONE DAY, OR A FEVER > 38.5C (101.3F) ONE TIME, SHAKING OR CHILLS.
2. CALL IF YOUR CHILD HAS ANY SIGNS OF POTENTIAL INFECTION SUCH AS REDNESS, SWELLING, OR DRAINAGE FROM ANY SORE AREA OR WOUND, PAC/CVL SITES INCLUDED.
3. CALL IF YOUR CHILD HAS ANY SIGNS OF BLEEDING, SUCH AS INCREASED BRUISING OR TINY RED SPOTS (PETECHIAE), ANY BLOOD IN URINE OR STOOL, A CUT THAT DOESN'T STOP BLEEDING AFTER 10 MINUTES, A NOSEBLEED THAT DOES NOT STOP AFTER 15 MINUTES.
4. CALL IF YOUR CHILD HAS ANY SIGNS OF ANEMIA SUCH AS EXTREME TIREDNESS, PALE SKIN, OR SHORTNESS OF BREATH.
5. CALL IF YOUR CHILD HAS ANY SIGNS OF DEHYDRATION SUCH AS: DECREASED OR NO URINATION FOR 6-8 HOURS, FEWER THAN 4-6 WET DIAPERS PER DAY, NOTHING TO EAT OR DRINK FOR >6 HOURS WHILE AWAKE IF UNDER 1 YEAR OF AGE, OR NOTHING TO EAT OR DRINK FOR >8 HOURS IF YOUR CHILD IS OVER 1 YEAR OF AGE.
6. CALL IF YOUR CHILD HAS PROBLEMS WITH CONSTIPATION OR DIARRHEA
7. FOR ANY LIFE THREATENING EMERGENCIES, CALL 911.

Discharge disposition: home with VNA.

Discharge Diet: Age appropriate as tolerated.

Follow-Up: OTHER.

F/up on Thursday at 3/23 with Dr Khouri. No home care labs planned. VNA to visit home for initiation of services on 3/16.

Orders: Medication List (Selected).

Prescriptions

Ordered

DME CVL dressing change kit: Special Instructions: as directed for PAC access
Dispense Quantity: 6 EA Refills: 5 Stop: 03/21/XX 23:59:00 EST See Instructions

Emla 2.5%-2.5% topical cream: See Instructions, Therapy Acute, Dispense Quantity: 30 g Refills: 3 Special Instructions: Apply as directed to injection site and cover with Tegaderm 1/2-1 hour prior to access Stop: 011/12/XX 8:00:00 EDT

Huber Needles 22 gauge, 1 inch: Huber Needles 22 gauge, 1 inch Special Instructions: For implanted port access Dispense Quantity: 1 box Refills: 5 Stop: 03/21/XX 23:59:00 EST See Instructions

MiraLax oral powder for reconstitution: Dose Amount: 0.5 capful PO daily, Therapy Soft Stop, Dispense Quantity: 225 g Refills: 1 Special Instructions: mixed in 2 to 4 ounces water Indication: constipation for pts 5-12 yo

Normal Saline Flush 0.9% injectable solution: 5mL IV As Directed, Therapy Soft Stop, Dispense Quantity: 1 box Refills: 6 Special Instructions: flush before and after blood draws or medication administration

clindamycin 75 mg/5 mL oral liquid: Dose: 150 mg Dose Amount: 10 mL PO TID Take for 6 day, Therapy Acute, Dispense Quantity: 180 mL Refills: 1 Special Instructions: continue thru PM dose on Thursday 3/19. Stop: 03/25/XX 14:06:55 EST

heparin flush 100 units/mL intravenous solution: See Instructions, Therapy Acute, Dispense Quantity: 1 box Refills: 5 Special Instructions: 5 ml flush as directed for PAC care Stop: 011/12/XX 8:00:00 EDT

ondansetron 4 mg/5 mL oral solution: Dose: 2.5 mg Dose Amount: 3.125 mL PO
Q8hr PRN Nausea/Vomiting, Therapy Soft Stop, Dispense Quantity: 120 mL
Refills: 3
oxycodone 5 mg/5 mL oral solution: Dose: 1.5 mg Dose Amount: 1.5 mL PO As
Directed PRN Pain, Therapy Soft Stop, Dispense Quantity: 60 mL Refills: 0
Special Instructions: Frequency: Q4-6 hrs PRN < 50 kg:
sulfamethoxazole-trimethoprim 200 mg-40 mg/5 mL oral suspension: Dose: 80 mg
PO As Directed, Therapy Soft Stop, Refills: 6 Special Instructions: Frequency:
daily 3 days per week. Indication: < 32 kg pt, Dispense supply: 30 day

Note Type: Oncology Admission MD
 Date: February 05, XX 17:42 EST
 Status: Auth (Verified)
 Created by: ECE MD, ZEHRA on February 05, XX 17:49 EST
 Verified by: STEVENSON MD, EPHRAM on February 06, XX 12:11 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 02/5/XX - 3/17/XX

* Final Report *

Chief Complaint: petechiae, CBC concerning for bone marrow suppression with 71% blasts

History of Present Illness: 4yo previously healthy girl presenting with petechiae, anemia, thrombocytopenia, and leukocytosis concerning for acute leukemia. Per parents, they first noted just a few small petechiae on her left upper chest one week ago. Within the past 3 days, she also developed a couple of areas of bruising on her back. On day prior to admission, patient woke up sweating and was noted to have an increase in number of petechiae on her chest. Parents note that patient has had a viral URI for the past week, notably cough with rhinorrhea, associated with low-grade fevers (Tm99), but otherwise has been afebrile. Family has not noticed any pallor but did see darker circles under her eyes which they attributed to her URI. Naomi has not been acting more tired and she has maintained a good appetite, with normal urine and stool output. Given concern for increased petechiae and bruising, parents brought Naomi to her PMD today. At PMD's office, labs notable for WBC 25 (97L, 71Blast), Hgb 7.3, Hct 23.6, Plt 18. Patient was therefore referred to ED.

In the ED, patient well-appearing, afebrile. Repeat labs confirmed 30% lymphs, 70% blasts, with ANC 0; Plt 24. LDH elevated, but chem and LFT's wnl. CXR negative. Heme/Onc team consulted, who met and updated family in ED. Per Oncology team, sent flow cytometry, Varicella Ab titer, and Coags. Patient admitted for further management.

Review of Systems: No headaches or vision changes, no difficulty breathing, no epistaxis, no bleeding from gums, no nausea/vomiting, no abdominal pain, no hematuria/dysuria, no joint pain or swelling. Sick contacts include Mom and younger brother with URI symptoms.

Past Medical History: FT. h/o eczema and otitis media x 2, h/o constipation

Family History: FamHx: notable for MGM with breast ca, PGF with prostate ca, PGM with esophageal ca. No history of childhood cancers, including leukemia, in family. No history of anemia or clots. MGGM with MS.

Psychosocial History: Lives with Mom, Dad, and younger brother (age 2). Parents are in medicine (cardiac surgery PA and work at medical device company). Naomi attends daycare/preschool.

Immunizations: UTD, except for flu shot. (Due for 4yo immunizations)

Home Medications on Admission: Miralax prn constipation.

Documented medications were reviewed and reconciled with the history provided by the patient. All of the medications were listed here and/or the Powerchart medication history was updated.

Allergies: Documented allergies were reviewed and reconciled with the history provided by the patient and Powerchart was updated as needed.

Allergies: No known allergies [updated]

Physical Exam:

Basic Vital Signs

Vitals Signs since (02/04 17:43)	24 h min	24 h max	Most recent (Time)
Temperature	36.5	37.2	37.2 (16:32)

Heart Rate	132	166	143 (16:32)
BP Systolic	98	129	129 (16:32)
Diastolic	58	74	74 (16:32)
Respiratory Rate	20	28	28 (16:32)
Oxygen Saturation (SPO2)	100%	100%	100% (16:32)
Weight (kg)			16.500 *10:40*

Gen: very well-appearing, playing on ipad, NAD

Skin: few, tiny scattered petechiae of L upper chest as well as horizontally along chest below nipple line, few petechiae of L flank and a few on L medial ankle. +echymoses (x2) of mid-lower back as well as on dorsum of L foot (x1). No other rashes or lesions. No jaundice.

HEENT: NC/AT, PERRL, EOMI, sclerae clear, +nasal congestion with clear rhinorrhea, oropharynx clear without obvious lesions, MMM

Neck: supple, +anterior and posterior cervical as well as supraclavicular LAD.

Lungs: CTA with good aeration bilaterally. No increased work of breathing, no wheezing/crackles.

CV: RRR, normal S1 and S2, no murmur appreciated. Cap refill < 2 sec.

Abd: soft, +BS, NT/ND, no hepatomegaly, spleen palpated 1-2cm below costal margin, no masses

GU: deferred

Ext: wwp, no edema, 2+ distal pulses

Neuro: awake, alert, normal tone/strength, 2+ DTR

Labs (Reported 02/04/XX 17:43 - 02/05/XX 17:43)

Chem 7 (02/05 12:15)

138	101	20 H	/ 107 H (Glu)
4.50	23	0.3	\ Ca 9.6 Mg 2.3 H Phos 5.7

LFTs (02/05 12:15)

AST	ALT	Bili T	/ Bili D
36	12	0.1 L	/ 0.1
82 L	4.2		
ALK	ALB		

CBC (02/05 12:15)

31.14 H \	7.7 C	/ 24 K C	MCV 84.3 H
/ 23.0 L \			

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
02/05 12:54	10.1	0.96	25.8		362	

Diagnostic Studies:

CXR (02/5): The lungs are clear without focal consolidation, edema, effusion, or pneumothorax. The cardiomeastinal silhouette is normal in appearance. There is a left aortic arch. No abnormal mediastinal masses are identified. The imaged bony structures are normal in appearance.

Assessment & Plan: 3 yo F presenting with petechiae, with CBC concerning for anemia, thrombocytopenia and leukocytosis consistent with new diagnosis of acute leukemia, lymphoblastic vs myeloblastic, awaiting official flow cytometry and smear results. Patient at risk for hemodynamic instability secondary to tumor lysis syndrome. Will admit for monitoring and further work-up in anticipation of starting induction therapy.

Plan:

Oncology: new diagnosis of acute leukemia, likely lymphoblastic per preliminary reviews of smear, awaiting final report.

- peripheral blood smear to be reviewed by Hematology Pathologist 02/6
- flow cytometry sent 02/5; to be reviewed by Hematology Pathologist 02/6
- Bone Marrow, LP, PICC likely Mon 02/7; will try to schedule for GPU
- pre-chemo evaluation: echocardiogram (to be done 02/6), optho exam, dental exam

Tumor Lysis: concern for tumor lysis syndrome

- allopurinol TID
- hydration per alkalization protocol, urine pH goal: 7-8
- serum electrolytes, uric acid q6 hrs
- rasburicase if uric acid > 6

Heme:

- CBC daily
- f/u Coags
- standard transfusion parameters: hgb <7, platelets <10

ID: afebrile, neutropenic..

- daily blood cultures if febrile
- If febrile, culture and ceftaz . T >38.5 x 1, 38.0 x 2
- f/u Varicella antibody titer

CV/Resp:

- monitor HD: HR and BP
- continuous CR monitor

FEN/GI:

- po ad lib gen diet
- strict I/O
- weight on admission

Pain:

- tylenol, motrin for pain prn

Social:

- Social Work to be contacted on Mon 02/7

Access: PIV currently

- central access to be considered once diagnosis is confirmed.

Zehra Ece, MD

PGY-2, XXXX

ATTENDING ADDENDUM:

I saw Naomi in conjunction with the residents and our fellow, Dr. Dannarzai. I have read the note above and agree with its findings. Naomi's presentation of pancytopenia with peripheral blasts is consistent with likely leukemia and malignant-appearing cells on peripheral smear are most consistent with lymphoblasts. Overnight will focus on tumor lysis prophylaxis and plan for flow cytometry of peripheral blood tomorrow morning. Patient neutropenic so will follow closely for fevers or signs of infection. We disclosed all known diagnostic information to the parents who are now up to date on the plan.

Sabrina Khouri, MD, PhD

Oncology Attending

pager XXXX

Note Type: Brief Operative
Date: February 25, XX 11:19 EST
Status: Auth (Verified)
Created by: BHATNAGAR MD, PhD, RUPAK E on February 25, XX 11:24 EST
Verified by: BHATNAGAR MD, PhD, RUPAK E on February 25, XX 11:24 EST
Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 02/5/XX - 3/17/XX

*** Final Report ***

PROCEDURE PERFORMED: lumbar puncture, administration of intrathecal chemotherapy, unilateral bone marrow aspirate.

DATE OF PROCEDURE: 02/25/XX

PROCEDURE PERFORMED BY: Rani George MD, PhD

Location: OR

INDICATIONS: ALL on PPTH 03-001.

DESCRIPTION OF PROCEDURE: Met mother. Consent verified. Chemotherapy checked with nurse. Time out called prior to procedure. The patient was placed under anesthesia by the anesthesia staff. The patient then was placed in the left lateral decubitus position. The skin overlying the lower spinal column and posterior iliac crests was prepped with Betadine. A 22 gauge spinal needle was inserted into the L4-L5 spinal interspace, and clear CSF was obtained. 6ml CSF was removed. Intrathecal chemotherapy was then administered consisting of Cytarabine, methotrexate and hydrocortisone. The spinal needle was removed. 1ml of bupicaine 0.25% was injected into the periosteum of the right iliac crest. A 15 gauge bone marrow aspiration needle was inserted into the iliac crest, and liquid bone marrow was aspirated. After the needle was removed, the area was cleaned and dressed. The patient tolerated the anesthesia and procedure well. Estimated blood loss was less than 2 ml.

Specimens from the cerebrospinal fluid were sent for glucose, protein, and cell count, and a tube was sent with a requisition stating "ONCOLOGY CSF FOR CORE LAB" for cytopathologic evaluation.

Specimens from the bone marrow were sent as instructed by primary team to lab control for HOLD (one EDTA and one Na Heparin). One EDTA tube brought to 6N for protocol studies.

Note Type: Dermatology Consultation
 Date: March 15, XX 12:19 EST
 Status: Auth (Verified)
 Created by: WOOLRICH MD, JAMIE on March 15, XX 10:19 EST
 Verified by: LEE MD, MARILYN T on March 16, XX 15:39 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 2/5/XX - 3/17/XX

* Final Report *

Requesting physician/service: Dr. Khouri - Oncology

Reason for consultation: Concern for drug rash

History of Present Illness: 4 year old female with new diagnosis of Pre-B ALL, and no other medical history, being treated on PPTH Protocol 03-001, which includes consolidation with methotrexate, who noticed a new area of erythema and blisters on her left upper arm over the last few days.

Comment [AS3]: Adverse event #1 is shown here again.

The patient's mother states she first noticed a rectangular area of erythema, which used to be occluded by an adhesive, on Sunday. The patient was started on broad spectrum antibiotics to help prevent infection. Since Sunday, this area appears "less bright red", but a few vesicles have developed in the area. The area is tender, but otherwise asymptomatic. There are no new lesions. The current area on the arm is not spreading.

Of note, the patient has a hypersensitivity to other adhesives used during this hospitalization as well.

In regards to her medications, she received her last dose of methotrexate on 3/6, her last dose pf 6-MP 3/9. Her current medications are listed below.

Past Medical History: none

Active Medication Orders

Scheduled Medications

cefazidime 750 mg IV Q8hr Last admin: 750 mg IV (03/14/XX 11:55)
 polyethylene glycol 3350 (MiraLax) 17 g PO daily *Com Last admin: 17 g PO (03/14/XX 05:58)
 vancomycin 300 mg IV Q6hr Last admin: 300 mg IV (03/14/XX 10:13)

PRN Medications

acetaminophen 200 mg PO Q4hr PRN Fever/Pain *Com Last admin: 200 mg PO (03/14/XX 10:11)
 heparin flush (heparin Flush 10 unit/mL) 20 unit IV Q8hr PRN Line Maintenance *Com Last admin: 20 unit IV (02/25/XX 00:15)
 heparin flush (heparin Flush 10 unit/mL) 50 unit IV 1time PRN Other - See Order Comments *Com
 lactulose 7.5 mL PO Q2hr PRN Constipation *Com Last admin: 7.5 mL PO (02/24/XX 03:59)
 morphine (morphine enteral) 0.5 mg PO Q4hr PRN Pain *Com
 morphine (morphine IV) 0.825 mg IV Q2hr PRN Pain Last admin: 0.8 mg IV (03/13/XX 05:22)
 nalbuphine 0.33 mg IV Q4hr PRN Itching *Com
 naloxone 16 mcg IV 1time PRN Respiratory depression *Com
 ondansetron 1 mg IV Q8hr PRN Nausea/Vomiting *Com Last admin: 1 mg IV (03/10/XX 06:53)
 oxycodone (oxyCODONE) 1.5 mg PO Q4hr PRN Pain *Com Last admin: 1.5 mg PO (03/12/XX 09:30)
 polyethylene glycol 3350 (MiraLax) 17 g PO daily PRN Constipation *Com Last admin: 17 g PO (03/09/XX 13:38)

Continuous Medications/Fluids

D5W NS 500 mL IV *Com

Allergies: No known allergies

Family History: No history of skin disease or blistering disorder.

Review of Systems: Mother reports otherwise Naomi is feeling well.

Physical Examination:

Basic Vital Signs

Vitals Signs since (03/14 10:13)	24 h min	24 h max	Most recent (Time)
Temperature	36.6	38.8	37.8 (10:00)
Heart Rate	111	145	125 (10:00)
BP Systolic	100	123	123 (10:00)
Diastolic	60	75	70 (10:00)
Respiratory Rate	20	26	22 (10:00)
Oxygen Saturation (SPO2)	98%	100%	100% (10:00)

A complete cutaneous examination of the scalp, face, neck, eyelids, mouth, lips, conjunctiva, chest, abdomen, back, bilateral arms, bilateral legs, buttocks, digits and nails revealed the following significant findings:

- geometric area of dull erythema with vesicles and bullae located centrally on the left upper arm
- linear areas of erythema in the peri-oral area where prior adhesives had been used during anesthesia
- small circular erosion at the tip of the tongue

Labs (Reported 03/14/XX 12:10 - 03/16/XX 12:10)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
03/16 00:05	137	3.83	103	25		0.2 L	

CBC	WBC	HBG	HCT	PLT
03/16 00:05	2.10 L	10.1 L	30.3 L	316 K

3/12 diff showed no eosinophilia

transaminases not checked recently

Assessment & Recommendations:

4 year old girl with ALL with a geometric area of erythema consistent with an area of cutaneous hypersensitivity, perhaps secondary to adhesive use, and exacerbated by recent methotrexate. There is no sign of secondary superinfection as noted above. Per the patient's mother, the area appears to be self resolving.

We therefore recommend the following:

- please keep the area covered with vaseline and vaseline impregnated gauze, then wrapped in kerlex. This will help prevent erosions in the area.
- If desired topical clobetasol ointment may be applied to this area daily x 1 week. This may hasten improvement of area.
- if vesicles and bullae do become un-roofed, please leave skin intact, as even dead skin can provide a barrier to infection
- as patient seems to react to adhesives, please consider using paper tape only
- there is currently no role for prophylactic antibiotics for this process

Thank you for this interesting consult. Please page with any questions or concerns.

Jamie Woolrich, M.D.
Consult Resident
Pager XXXX

Comment [AS4]: Adverse event #1 is shown here again.

Here, an alternate hypothesis is brought up that the rash may have been caused by the type of adhesive used. Whether the rash occurred due to the adhesive material or due to the methotrexate, the rash is still an unintended consequence of medical care and therefore an adverse event.

Patient seen and examined with consult attending, Dr. Lee.
Please see attending note in chart/addendum to be added online

Patient seen and evaluated. I reviewed the history, examination, and plan with the resident. I agree with Dr. Woolrich's 3/16/XX history, examination and plan documented above. Briefly, 4 year old female with ALL and painful rash on left arm. No previous rash in this location. PE - Geometric erythematous patch left arm with clear bulla. Playing game. A/P - Likely contact dermatitis. Topical corticosteroids and dressing if desired but she may prefer no therapy. Will follow with you.

Marilyn Lee, M.D.

Comment [AS5]: Adverse event #1 is shown here again.

Note Type: Oncology Inpatient MD
 Date: March 15, XX 10:32 EST
 Status: Auth (Verified)
 Created by: KHOURI MD, PhD, SABRINA J on March 17, XX 10:34 EST
 Verified by: KHOURI MD, PhD, SABRINA J on March 17, XX 10:34 EST
 Encounter info: XXXX, Princeton-Plainsboro Teaching Hospital, Inpatient, 02/5/XX - 3/17/XX

*** Final Report ***

Solgos, Naomi XXX-XX-XX

ID: 4 year old female with new diagnosis of SR Pre-B ALL being treated on PPTH Protocol 03-001.

I obtained history from the patient and/or parent.
 I obtained history from the resident or clinical fellow.
 I personally examined the patient or supervised the trainee's exam.
 I discussed the plan of care with the resident and/or clinical fellow.
 I agree with the assessment and documented plan of care, with the changes or additions noted below:

Interval History: Tmax 38.3. Several episodes of emesis. One loose stool per day. No mouth pain. ANC now 690.

PE: Patient was alert, interactive, NAD. Alopecia. MMM, no mucositis. No ptosis, no facial drop. No oral lesions. Lungs clear, no wheezes or crackles. Heart sounds normal S1 and S2, no rubs, murmurs, gallops. Abdomen soft, non-distended, non-tender, normal bowel sounds. No HSM. Extremities warm and well-perfused, no edema. Erythematous and papular rash at site of former tape at PICC site now significantly less erythematous, several ruptured blisters; no bruising or petechiae. Neuro exam grossly normal. PERRL. EOMI.

Comment [AS6]: Adverse event #1 is shown here again.

Labs:

Labs (Reported 03/16/XX 10:33 - 03/17/XX 10:33)

Chem 7 (03/17 01:00)

136	103		/ (Glu)
3.12 L	24	0.2 L	\

CBC (03/17 01:00)

2.67 L	\	9.4 L	/	225 K	MCV 88.1 H
	/	28.7 L	\		

Assessment/Plan: 4 year old female with new diagnosis of SR Pre-B ALL being treated on PPTH Protocol 03-001. Consolidation I therapy.

Oncology:

-Pre-B ALL on SR arm of 05001
 -CNS1
 -Cytogenetics: hyperdiploid
 -Consolidation I (3/10/XX): Today 3/17/XX is day 7.

-MTX 24 hr level 30. MTX 48 hr level 0.25, IVF increased per protocol. MTX 72 hr level 0.06. MTX undetectable 3/14/XX.

-6-MP stopped due to APC<500.

Heme: Standard transfusion parameters.

-6-MP stopped due to APC<500.

-pRBC transfusion 3/14/XX.

-ANC 690

ID: Febrile 3/11/XX.

-erythema at former PICC site, likely due to MTX. Started on vancomycin on 3/13/XX for possible cellulitis, though.

-seen by dermatology yesterday who thought the rash was a likely drug reaction to MTX. Recommended Vaseline dressing.

-ceftazidime and vancomycin. Since rash seems more likely related to MTX, rather than cellulitis, we stopped vancomycin on 3/14/XX and changed to oral clindamycin, which she will be discharged on.

Monitoring rash closely after change in antibiotics. No signs of superinfection.

-ANC 690 on 3/17/XX. Since no longer neutropenic, we will stop ceftaz, but continue clindamycin. If febrile, will need ceftriaxone and culture.

Derm:

-rash at site of former PICC dressing

-less red today, but with fluid-filled blisters. Some blisters now ruptured. Seen by dermatology, likely MTX reaction. Will use vaseline gauze as needed. Improving daily.

Comment [AS7]: Adverse event #1 is shown here again.

HA:

-complaining of intermittent HA, which responds to pain medication. Sometimes, seems to often correlate with fever. Also, seemed to improve after pRBC transfusion. Naomi continues to be playful and active. Denied HA on rounds today. Normal neurologic exam. Low concern for serious cause of HA, such as a clot, at this time. Will continue to follow closely and consider imaging if change in clinical status.

GI: PO ad lib. Bowel regimen. Tums.

-good appetite

-several episodes of emesis yesterday

Access:

-PAC 3/9/XX

Prophylaxis:

-bactrim started

Primary Team: Androkites/Kesselheim

Social: followed by psychsocial.

Dispo: Likely today with dose of ceftriaxone prior to departure. Will f/u with Dr Khouri on 3/23/XX.

I spent over 35 minutes today on the inpatient floor coordinating the patient's care and in counseling. This time included discussion with multiple providers on rounds including the fellow/resident/nursing staff, discussion with the patient and family, physical examination of the patient, and reviewing primary lab data.

Sabrina Khouri, MD/PhD
Pediatric Oncology
CHB Pager# XXXX

Addendum: At discharge, patient was well appearing and active, and just completed eating dinner. Temperature was then recorded at 38.0. We administered a parting dose of ceftriaxone to cover the patient for an additional 24 hours and resent blood cultures. We reviewed fever management and the discharge considerations with the parents, who agreed with the discharge plan. We will phone follow up with family tomorrow morning and also follow up all cultures. Indications to call the oncology service and return to the hospital were reviewed in detail.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #6**

Note Type: Discharge Summary
 Date: April 05, XX 13:10 EST
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: IVANOV MD, TRAICHO E on April 05, XX 11:36 EST
 Verified by: RICCA MD, ADAM on June 16, XX 08:53 EDT
 Encounter info: XXXX, St. Sebastian's Hospital, Inpatient, 3/25/XX - 4/5/XX

* Final Report *

DATE OF ADMISSION: 03/25/XX.

DATE OF DISCHARGE: 04/05/XX.

ATTENDING PHYSICIAN: Ricca, Adam, MD.

ADMISSION DIAGNOSIS: Chronic ulcerative colitis.

HISTORY OF PRESENTING ILLNESS: This patient was admitted to the care of the gastroenterology service on 03/25/XX because of a flare of ulcerative colitis refractory to multiple medical treatments. Please see the prior transfer note for full details of the hospital course before her surgery, when she was in the care of the gastroenterology service for approximately one week.

MEDICAL HISTORY: Chronic ulcerative colitis. Chronic idiopathic thrombocytopenic purpura.

PHYSICAL EXAMINATION: For the details of the admission physical examination, please see the transfer summary.

HOSPITAL COURSE FROM 03/30/XX: The patient was transferred to the care of the general surgery service after undergoing a standard bowel prep followed by total abdominal colectomy with ileoanal pull-through and creation of anal J-pouch and ileostomy on 3/30/XX. Please see the operative note for details of the surgery. An epidural was given for pain control. By system:

1. Neurologic. An epidural was in place for postoperative pain control. She was followed by the pain service for most of her stay. The epidural provided adequate pain relief, until she had some bleeding around the entry site on postoperative day #3. A lumbar MRI scan revealed a small hematoma in the posterior epidural space at the level of catheter insertion. However, her neurologic exam was stable. The catheter was removed, and a Dilaudid patient-controlled analgesia was used until intravenous access was lost, when she transitioned to oral medication. Pain control was good, except for some persistent pain in the right shoulder, which was attributed to diaphragmatic inflammation from pneumoperitoneum during surgery. Incidentally, on the spinal MRI was noted a fatty filum. Dr. Rizzo discussed this finding with Neurosurgery and it was decided that Ruby will follow up with Dr. Sean Attenborough of neurosurgery to determine the need for further monitoring or interventions, based on symptomatology. At the time of discharge, neuro exam was normal.

2. Cardiovascular. No issues.

3. Respiratory. No issues.

Comment [AS1]: Adverse event #1: Procedural complication
 Preventability: Probably preventable
 Severity: E

The hematoma that occurred in this patient's epidural space is an adverse event. The bleeding is unintended and a technique-dependent complication. Since the finding requires additional monitoring, it would be considered an adverse event. However, no trigger helped identify this adverse event.

Comment [AS2]: Key lesson #1: All complications of surgery are adverse events. Post-operative complications should not be excluded because they are "known" to occur in a certain percentage of cases or because the patient was advised of the risk before surgery. Surgical complications do not necessarily indicate or imply that an error has occurred.

Comment [AS3]: Key lesson #4: Not all adverse events will have a clear trigger. You should still record events you find without the use of a trigger.

4. Gastrointestinal. The patient initially had a nasogastric tube in place after surgery. This was maintained on wall suction until postoperative day #3, when it was put to gravity. Intravenous access was lost, and she began taking clear liquid to maintain hydration after removal of the nasogastric tube. She tolerated clear liquids with no nausea or vomiting and was able to keep up with stoma output. The stoma started to put out gas and stool on postoperative day #2 and was working well by postoperative day #4. She was able to advance her diet on postoperative day #4 and was tolerating a full diet by discharge. Her stoma remained pink and healthy appearing. Output was starting to thicken by discharge.

The patient was on steroids and tacrolimus preoperatively. The steroids were continued after she received a stress dose with prednisone 20 milligrams by mouth twice per day. After the stress dose steroids were finished, a taper was started on postoperative day #5 and consisted of the following: prednisone 35 milligrams once daily from 04/06/XX until 04/08/XX, followed by 30 milligrams daily from 04/09/XX through 04/12/XX, followed by 25 milligrams daily from 04/13/XX until 04/15/XX, when she will follow up with gastroenterology in clinic to determine her further steroid taper.

5. Genitourinary. A Foley catheter was initially in place while the epidural was in. This was removed when the epidural came out, and she voided without issue.

6. Hematologic. The patient has a history of idiopathic thrombocytopenic purpura. Therefore, her platelet count was followed closely. Prior to surgery, it was greater than 150 and continued to be in the 100s until postoperative day #5, when it was 94. A repeat CBC was stable at 136. The hematology service was consulted for management during the steroid taper. Prednisone 20 milligrams twice per day was being given, with a taper beginning at discharge. Hematology recommended checking daily CBCs while in the hospital to watch her platelet count as the steroids decreased, with the recommendation that if the platelet count dropped as the steroids were weaned she may need IVIG treatment. She will receive a repeat CBC at follow up with GI.

7. Infectious disease. The patient's white blood cell count remained elevated, but this was attributed to steroid use. She remained afebrile. There were no issues with infection.

8. Endocrine. No issues.

CONDITION ON DISCHARGE: The patient was discharged in stable condition on 04/05/XX, tolerating a full diet, with good urine output and good ostomy output. She and her mother received stoma care teaching. Supplies were sent to their home.

FOLLOW UP: She will follow up with the gastroenterology service in one week and with Dr. Buck in one to two weeks. She will call for an appointment w/ Dr. Sean Attenborough of neurosurgery.

DISCHARGE MEDICATIONS:

1. Prednisone taper. Prednisone 35 milligrams by mouth daily on April 5 and April 6, then prednisone 30 milligrams by mouth daily on April 7, 8, 9, and 10, then prednisone 25 milligrams by mouth daily on April 11, 12, and 13 when she will f/u w/ GI to determine further taper.

2. Oxycodone 5-10 milligrams by mouth every four to six hours as needed for pain.
3. Tylenol 650 milligrams by mouth every four hours as needed for pain and fever.
4. Nystatin powder to stoma site as needed for skin care.

TESTS PENDING AT DISCHARGE: Pathology specimen results.

Note Type: ED Consultation
 Date: March 27, XX 00:00 EST
 Status: Auth (Verified)
 Subject: ED Consultation
 Created by: BANERJEE MD, SANDEEP A on March 27, XX 12:13 EST
 Verified by: MIZRAHI MD, ALEXA E on March 31, XX 19:36 EST
 Encounter info: XXXX, St. Sebastian's Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

GI Consult Note:

Service/Attending Requesting Consult: Emergency Department
 Reason for Consult: Abdominal Pain, Hematochezia, UC

HPI: This is a 13 yo female with a history of UC (diagnosed 10/XX) and ITP who presents now with worsening abdominal pain, hematochezia. She was recently discharged from the hospital (3/12/XX) after a UC flare requiring reintroduction of steroids. Due to the persistence of symptoms she was transitioned to tacrolimus to be used as a transition to eventual colectomy.

For the first week after discharge she was feeling very well. She had no blood in her stools. Her stools were well formed and she had a BM 1 - 2 times a day. However, ~ 1 week ago she began to complain of a recurrence of symptoms. She noted the onset of lower quadrant abdominal pain. Mother reports that she began to notice blood in her stool with worsening frequency and urgency. She spoke with her primary GI doctor who started her on cortifoam enemas without significant improvement. Her symptoms persisted and increased till this AM when mom reports frank blood in the toilet and significant abdominal pain, so she sought care at the ED.

No fevers. + Nausea, no vomiting. + Decrease PO intake. Father is sick at home with URI like symptoms

PERTINENT GI HISTORY: as above

HISTORY OF LIVER DISEASE: none

DIET: Normal age appropriate

PAST MEDICAL HISTORY:

- ITP diagnosed 12/XX: followed by hematology. Responds well to IVIG

MEDICATIONS:

- Tacrolimus 5 mg BID
- Prednisone 40mg qDay
- Bactrim 160mg q M/W/F
- Protonix 40mg qDay
- Zofran
- Cortifoam enemas

ALLERGIES: NKDA

PREVIOUS GI STUDIES:

- Endoscopy: last in 10/XX showing pancolitis

PREVIOUS SURGERY: none

Comment [AS4]: First trigger (#18): Hospital readmission within 30 days.

This document shows that the patient was discharged on 3/12/XX during a prior admission and then readmitted for the current hospitalization on 3/27/XX.

Comment [AS5]: Key Lesson #6: Not all triggers lead to an adverse event. They only provide clues that an adverse event may have occurred.

Here, although trigger #18 – hospital readmission within 30 days – exists, the trigger does not identify an adverse event. The patient was readmitted because her ulcerative colitis symptoms returned. The return of her symptoms is not an adverse event because they are due to her disease process rather than as a result of medical care.

FAMILY HISTORY:

- unremarkable

SOCIAL HISTORY:

- Hasn't been back to school since discharge from the hospital

REVIEW OF SYSTEMS

EAR, NOSE & THROAT: Normal

CARDIAC: Normal

MUSCULOSKELETAL: Normal

RESPIRATORY: No dyspnea or wheezing.

BLOOD DISORDERS: Normal

GENITOURINARY: Normal

SKIN: Normal

ENDOCRINE/METABOLIC: Normal

NEUROLOGIC: Normal

PSYCHOSOCIAL: Normal

PHYSICAL EXAM

General: Well-developed, well-nourished

Weight: 59.8 kg

BP: 120/74 P: 100 T: 36.4

Well-hydrated. ill appearing, Alert & appropriate.

Skin: without jaundice. No erythema nodosum.

HEENT: An-icteric sclerae, no conjunctivitis, moist mucous membranes, no ulcers

Neck: without masses, no goiter

Chest: clear to auscultation, breathing unlabored

CV: Regular rate, regular rhythm, no murmurs, no edema

Abdomen: No surgical scars, non-distended, normal bowel sounds. No mass palpable. Lower quadrant tenderness. Liver not palpable. Spleen not palpable.

Anus: refused examination

Lymphadenopathy: none

Ext: No clubbing.

Neuro: Developmentally appropriate.

Psych: unremarkable

Labs:

Date

Test Name	Result/Units	Flag	Ref.
Range			

03/13/XX 10:47			
Hemoglobin	14.0 g/dL	H	11.3 -
13.4			
Hematocrit	42.2 %	H	32.1 -
38.7			
Platelet	134 K cells/uL	L	189 -
342			
C-Reactive Protein	1.70 mg/dL	H	-
<=0.50			
03/17/XX 09:10			
Hemoglobin	12.9 g/dL		11.3 -
13.4			

Hematocrit	39.0 %	H	32.1 -
38.7 Platelet	81 K cells/uL	L	189 -
342 C-Reactive Protein	4.10 mg/dL	H	-
<=0.50 Tacrolimus Level	14.7 ng/mL	H	3.0 -
14.0 03/24/XX 09:06			
WBC	20.25 K cells/uL	H	5.52 -
9.29 Hemoglobin	12.7 g/dL		11.3 -
13.4 Hematocrit	38.2 %		32.1 -
38.7 Platelet	45 K cells/uL	C	189 -
342 C-Reactive Protein	4.30 mg/dL	H	-
<=0.50 03/27/XX 11:28			
WBC	18.39 K cells/uL	H	5.52 -
9.29 Hemoglobin	13.4 g/dL		11.3 -
13.4 Hematocrit	38.5 %		32.1 -
38.7 Platelet	53 K cells/uL	L	189 -
342 Neutrophil/Band	69 %		46 -
76 Lymphocyte	16 %		8 - 39
Monocyte	10 %	H	4 - 7
Eosinophil	2 %		1 - 3
Basophil	0 %		0 - 1
ESR (Erythrocyte Sedimentation Rate)	40 mm/hr	H	0 - 20
C-Reactive Protein	6.80 mg/dL	H	-
<=0.50			

Impression/Plan: This is a 13 yo with UC and ITP now here with a flare. We will admit to GI. With regards to the treatment of this acute flare. We will start Ruby on IV steroid to facilitate resolution, she has been responsive in the past. We will also check stool for infectious studies now. The more difficult question is regarding her long term plan. She will eventually need a colectomy, but will not be able to undergo one on her current steroid dose. We will discuss this more in detail with her Primary GI doctor.

-Sandeep Banerjee, MD
Clinical Fellow in Pediatric GI and Nutrition

History reviewed. Patient examined. 13 year old with UC on tacrolimus and steroids having increasing symptoms admitted for further treatment of her disease. Plan discussed with fellow and family as outlined above.

Alexa Mizrahi, MD
Attending in Gastroenterology

Note Type: Operative Note
 Date: April 2, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: RICCA MD, ADAM on May 10, XX 14:21 EST
 Verified by: RICCA MD, ADAM on July 24, XX 09:22 EDT
 Encounter info: XXXX, St. Sebastian's Hospital, Inpatient, 3/25/XX - 4/5/XX

* Final Report *

DATE OF PROCEDURE: 04/02/XX

PRE-OPERATIVE DIAGNOSIS: Ulcerative colitis

POST-OPERATIVE DIAGNOSIS: Same

PROCEDURES PERFORMED:

1. Rigid proctoscopy.
2. Laparoscopic subtotal colectomy
3. End ileostomy

SURGEON: Adam Ricca, MD

ASSISTANT: Jason Witherspoon, M.D.

HISTORY/INDICATIONS: Ruby Moyo is a 13-year-old female with medically refractory ulcerative colitis. She had ongoing abdominal pain and hematochezia. Due to the fact that she is not responding to medical therapy she was, therefore, deemed an appropriate candidate to be taken to the operating room for the beginning of a three stage laparoscopic colectomy and ileoanal J-pouch pull through. Today's operation is intended to remove the majority of her colon to help abate her symptoms.

FINDINGS: Normal intraabdominal anatomy. There is some injection with inflamed vessels on the surface of the colon.

DESCRIPTION OF PROCEDURE: After informed consent was obtained the patient was taken to the operating room and placed supine on the operating room table. After adequate endotracheal anesthesia had been administered she was placed in a modified lithotomy position. I then performed a rigid proctoscopy to evaluate her mucosa. There was diffuse beefy redness of the mucosa with a couple of small ulcers. It was clear that this patient would not be a safe two-stage colectomy and J-pouch candidate. The proctoscope was removed and the patient was then prepped and draped in the usual sterile fashion. The ileostomy site had been previously marked by Danny Zuko, our enterostomal therapist. I made a circular skin incision the size of a quarter using a Weck 30 degree blade. The Bovie electrocautery was used to dissect down to the level of the fascia and the fascia was incised. The posterior rectus fascia was elevated and incised and the peritoneum was entered safely. A silk suture was placed in the fascia to anchor a port and an Interdyne step dilator sheath was passed easily under direct vision. A 12 mm port was then placed and sutured in position with the silk. The 30 degree 5 mm laparoscope was then introduced into the abdomen to ensure that we were intraperitoneal. The abdomen was then insufflated to a pressure of 12 mm Hg with a carbon dioxide cast. Then 5 mm long ports were placed at the base of the umbilicus,

the suprapubic midline, the left flank and the epigastrium. All ports were placed under direct vision of the laparoscope. Once the ports had been placed I mobilized the rectosigmoid junction using the LigaSure device. A window was made in the rectosigmoid mesentery and the bowel was divided with two loads of a 60 mm long endo-GIA 3.5 mm thick staple load. I then mobilized the colon from its retroperitoneal attachments along the descending and sigmoid colon. The splenic flexure was mobilized and the gastric colic omentum was divided. The right colon was then mobilized up to the hepatic flexure. Once the entire colon was freed from its peritoneal attachments I then used the LigaSure device to divide the colonic mesentery. The colon was then removed directly through an enlarged facial incision at the 12 mm port site. A mesenteric window was made by clamping, dividing and ligating with Vicryl suture. At the ileocecal valve the small bowel was divided using an endo-GIA 2.5 mm thick staple load. The colon was passed off as a specimen. I then reinsufflated the abdomen and observed the ileostomy coming through the abdominal wall. The mesentery was more oriented on the superior aspect of the ileostomy. I took care to attempt to mobilize a longer segment of ileum, as the subcutaneous fat stores in this patient are ample. This made bringing up a well matured ileostomy difficult. Ultimately, however, I think we were successful in obtaining a nicely perfused ileostomy, which sat up fairly well. Then, 4-0 PDS sutures were placed in the fascia and then passed through the serosa of the small bowel to anchor it at the abdominal wall fascia. The fascia of all of the port sites was then closed after removing the ports using PDS suture. The skin edges were reapproximated in layers with Vicryl suture. Telfa and Tegaderm dressings were applied after Steri-Strips were placed. The staple line on the small bowel was then removed using the Bovie electrocautery. The ileostomy was matured in a Brooke fashion using 4-0 Vicryl suture. The first iteration of the four corner stitches of the ileostomy led to dipping of the skin in order to try to get good eversion of the ileostomy. I was concerned that this would make for major challenges in pouching and all of these four sutures were then removed and new corner sutures were placed placing less tension on the skin from the ileostomy. The skin was much flatter and then the quadrant sutures were tied and the quadrants were filled in with interrupted Vicryl sutures.

The patient tolerated the procedure well. The sponge and needle counts were correct at the end of the case. She was extubated in the operating room and taken to the post anesthesia care unit in stable condition. I am the attending surgeon and was present for the entirety of the operation.

Note Type: Pain Treatment Consultation
 Date: April 04, XX 15:27 EST
 Status: Auth (Verified)
 Created by: RIZZO MD, BETTY A on April 04, XX 15:27 EST
 Verified by: RIZZO MD, BETTY A on April 04, XX 15:27 EST
 Encounter info: XXXX, St. Sebastian's Hospital, Inpatient, 3/25/XX - 4/5/XX

*** Final Report ***

Ruby Moyo is being treated with PCA for ABDOMINAL PAIN pain, now POD #2 following Lap assisted subtotal colectomy for ulcerative colitis-dx XXXX. ITP

Patient Weight: 60.0 kg.

Issues overnight included: Pt received toradol x 1. Pt c/o increased back pain and was found to have bleeding at epidural site. Epidural removed, pressure dressing applied. Lumbar MRI done urgently (small amt of epidural blood at catheter insertion site)

right shoulder pain and throat irritation from NGT. NGT currently clamped. MRI results reviewed with team and family.

Current nutritional status: NPO.

Allergies: NO KNOWN ALLERGIES.

On exam today, the patient was alert, oriented, VSS.

Respiratory condition: she had good respiratory rate and depth.

Epidural site condition: Pressure dressing removed. Clean insertion site where epidural catheter had been. Tegaderm dressing with gauze reapplied.

Exam of the lower extremities: shows good voluntary movement of both lower legs.

Our impression for Ruby Moyo: she is having good analgesia with morphine PCA. Had superficial bleeding at site of catheter due to irritation, ITP, ? toradol x 1. Incidental spinal fatty filum.

Our plan today: continue the current PCA morphine 1.5mg dose, 7 min lockout, 25mg 4hr max. Toradol d/c'd after initial dose.

I have personally reviewed the patient's history and laboratory studies, and have examined the patient, and I have supervised the fellows and PNP's in analyzing the clinical data and developing a diagnostic impression, and formulating a treatment plan.

Betty A Rizzo, MD

Comment [AS6]: Adverse event #1 is shown here again.

Comment [AS7]: Adverse event #1 is shown here again.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #7**

Note Type: Discharge Summary
 Date: July 26, XX 17:34 EDT
 Status: Modified
 Subject: Discharge Summary
 Created by: KELTER MD, KATHERINE D on July 26, XX 16:47 EDT
 Verified by: WILLOUGHBY MD, PhD, FRED on July 29, XX 16:32 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***
Document Contains Addenda

ATTENDING PHYSICIAN: Dr. FRED WILLOUGHBY

DATE OF BIRTH: 07/18/XX

THIS IS A REPLACEMENT FOR A CANCELLED DOCUMENT

ADMITTED: 06/11/XX

HOUSE OFFICER:

TEHNAZ PARAKH BOYLE

ADMITTING DIAGNOSIS:

ALLOGENEIC BONE MARROW TRANSPLANT

PRINCIPAL DIAGNOSIS:

ALLOGENEIC BONE MARROW TRANSPLANT

SECONDARY DIAGNOSES:

COMBINED IMMUNODEFICIENCY

HYPER-IGE SYNDROME

S/P MITRAL VALVE REPAIR WITH RESIDUAL STENOSIS

ASTHMA

ADRENAL INSUFFICIENCY

PRINCIPAL PROCEDURE:

MATCHED SIBLING ALLOGENEIC BONE MARROW TRANSPLANT 06/21/XX

COMPLICATIONS:

NONE

SUMMARY OF HOSPITAL COURSE:

Maria is 8y/o F with combined immunodeficiency and hypereosinophilia/hyper IgE, admitted for sibling matched allogeneic bone marrow transplant.

6W BMT Service

Hospital Course (6/11-7/26)

CARDIOVASCULAR: She has a hx mitral valve repair for papillary muscle rupture secondary to endocarditis. Pre-transplant ECHO revealed normal cardiac function. She was initially continued on her home enalapril (converted to IV during transplant). She was pre-medicated with tylenol, benadryl and hydrocortisone, but after engraftment, she began to have daily fevers for which she had serial CXRs to evaluate for a pulmonary source of infection. These were notable for pulmonary edema with development of a small L pleural effusion which progressed over the next week after engraftment and was associated with severe respiratory distress. She was transferred to the ICU and her IVIg infusions stopped. Given her hx mitral valve disease, she underwent a repeat ECHO 7/13 to evaluate whether there was a primary cardiogenic component to her pulmonary edema. This showed mild mitral regurgitation and normal LV systolic function but new findings of increased mitral stenosis (as reflected by increased mitral valve gradient from 7 to 12

DISCHARGE CONDITION:

IMPROVED

DISCHARGE CONDITION:

IMPROVED

DISCHARGE CONDITION:

IMPROVED

UNCHANGED

UNCHANGED

UNCHANGED

UNCHANGED

DATE:

Comment [AS1]: First trigger (#24): Transfer to higher level of care.

Comment [AS2]: Second trigger (#9): Abrupt medication stop.

Comment [AS3]: Adverse event #1: Respiratory failure
 Preventability: Probably not preventable.
 Severity: H

Triggers #9 and #24 both help identify this adverse event. Despite being on premeds, the patient develops a severe IVIg reaction during her hospitalization so is transferred to the ICU (trigger #24). Furthermore, because IVIg infusions caused the patient respiratory distress, the medical staff quickly stopped her infusions (trigger #9). Abrupt medication stops such as this may suggest that a medication(s) caused some type of adverse event.

Comment [AS4]: Key lesson #7: Multiple triggers can point towards one event, i.e., an adverse event may be manifested in multiple ways.

Here, both the transfer to higher level of care and abrupt medication stop point to adverse event #1.

mmHg) and diminished LV relaxation. Cardiology was consulted and felt these findings of increased mitral stenosis and left atrial pressure should be interpreted in the context of increased tachycardia with fever, and should be reevaluated with an ECHO when she is closer to baseline hemodynamics prior to discharge. They recommended diuresis to achieve euvolemia by switching from Enalapril to Lasix BID. She responded well to the Lasix. She underwent repeat echocardiogram on 7/25 which was technically difficult due to poor windows, however, mean mitral inflow gradient of ~ 10 mm Hg (heart rate 109 bpm), mild mitral regurgitation, qualitatively mildly dilated left atrium, qualitatively good left ventricular systolic function and otherwise normal study. As she was doing so well, with likely decreased inflammation and fluid retention, and rising creatinine, we opted to decrease Lasix to once daily dosing and cardiology was in agreement with this plan. Her blood pressure was well controlled on the lasix and enalapril will continue to be held while she remains on the lasix. The lasix will not likely need to continue for very long after discharge; weaning/ discontinuation of lasix and resuming enalapril can be coordinated by cardiology as an outpatient.

Comment [AS5]: Third trigger (#6): Rising creatinine levels paired with nephrotoxic drug use (in this case, cyclosporine and methotrexate use noted below).

RESPIRATORY: She was continued on her home Advair, Singulair, and Albuterol PRN for her hx moderate persistent asthma. She was engrafted on 7/10 (day 18). The week following engraftment, the patient had serial chest x-rays in the setting of fever and evolving respiratory distress (despite broad spectrum antibiotics and antifungal therapy), which showed progressive pulmonary edema and evolution of a L pleural effusion. On subsequent IVIg infusions she was pre-medicated with tylenol, benadryl and hydrocortisone 2mg/kg IV Q6hr x2. Despite her premeds, she developed a severe reaction with a fever to 39.7, rigors, pulmonary edema, and severe respiratory distress so was transferred to the ICU. IVIg Infusion was stopped. Because of shortness of breath, she was placed on BiPAP and treated with aggressive bronchodilator therapy x 3 days, initially with Albuterol Q2H which was spaced progressively to an as needed basis as her respiratory status improved with diuresis on Lasix BID. Echo at the time did not reveal any additional LA enlargement or higher degree of mitral stenosis. While having persistent fevers, she also underwent chest CT which showed new pulmonary (and hepatic) nodules (not visualized on pre-transplant chest CT from outside hospital) which could represent inflammatory nodules, but were concerning for new fungal infection. These were resolved on subsequent CT scan, and then felt to more likely have represented sub-segmental atelectasis. Maria's respiratory status improved slowly and at the time of discharge she was experiencing intermittent, mainly nocturnal, mild tachypnea. There was no evidence of CO2 retention. She was started on azithromycin QMWF for anti-inflammatory effects, which she will continue.

Comment [AS6]: First trigger (#24): Transfer to higher level of care is shown here again.

Comment [AS7]: Second trigger (#9): Abrupt medication stop is shown here again.

Comment [AS8]: Adverse event #1 is shown here again.

Comment [AS9]: Key lesson #5: An H represents measures that needed to be taken to save the patient's life.
-The interventions need to have occurred over a relatively short period of time (e.g., within an hour) to be in this category.

CONDITIONING: She received busulfan and cyclophosphamide for conditioning without incident.

GRAFT: She received a sibling matched allogeneic BMT on 6/22/XX (day 0) with a cell dose of 9.39×10^6 . She received transfusions initially per standard criteria (Hgb <7 and plt <10) but later with increased Plt parameters (plt <30) while having nosebleeds. She did not require PRBC transfusions, and her last platelet transfusion was on 7/2. She received premedication with tylenol/benadryl prior to transfusions. She was started on GCSF on day 0 and continued until her ANC > 2K for 3 consecutive days. She engrafted on 7/10 (day 18).

GVHD PROPHYLAXIS: Maria was treated with cyclosporine (starting day -2 with levels checked at least twice weekly and adjusted as needed) and full-dose

methotrexate on days 1, 3, 6, 11. Last cyclosporine level was 207 on 7/24 and her dose was changed from 75mg PO Q12hr to 50mg PO QAM and 75mg PO QPM.

Comment [AS10]: Third trigger (#6): Use of cyclosporine and methotrexate (nephrotoxins) and rising creatinine levels (noted above) is shown here again.

FEN/GI:

1. Nutrition: Maria received PN as PO intake decreased in midst of transplant, but was weaned off on 7/15 as her PO intake improved.
2. Fluids/Electrolytes: As above, she had evidence of fluid overload with increased weight and pulmonary edema/L pleural effusion, for which she was started on Lasix 0.5 mg/kg IV BID. She had hypokalemia while on standing Lasix, ambisome, and albuterol, which was treated with intermittent IV potassium boluses, increasing potassium in PN, and eventually with standing oral potassium supplementation. As these medications were weaned and oral intake improved, her potassium levels rose and these supplements were discontinued on 7/25. Electrolytes should be checked as an outpatient.
3. GI: She received protonix for GI prophylaxis. She had significant nausea which required a regimen of Zofran ATC (attempted to wean to PRN, but changed back to scheduled 7/24 for increased vomiting), Ativan (to PO 7/21, to Q8 7/22, further weaning to happen on an outpatient basis), Benadryl PRN, marinol (to Q8 7/22, back to Q6hr 7/24 for increased vomiting), and Reglan/Benadryl, which were weaned off prior to discharge.

INFECTIOUS DISEASE:

On admission, she was started empirically on treatment dosing of meropenem IV (6/12-7/20) for sinusitis "cleanout" (given hx pneumococcal infections) and Flagyl (6/12-7/19) for giardia suppression. Repeat Giardia on 7/20 was negative.

Vancomycin (6/23-7/17), Cipro (6/6-7/13), and ambisome 3 mg/kg/day (7/6-7/24) were added sequentially with fever spikes. Persistent fevers began around time of engraftment. Serial blood cultures, bacterial and viral respiratory cultures/DFAs showed no growth. CXR were unrevealing for a new, significant bacterial process. She underwent chest CT which showed new pulmonary nodules (not visualized on pre-transplant chest CT from outside hospital) which could represent inflammatory nodules, but were concerning for new fungal infection. On 7/13, BetaDglucan was mildly elevated at 86 and galactamannin was negative. Repeat BetaDGlucan on 7/21 was decreased to 44, which is interpreted as negative based on the laboratory reference range. Initial chest CT also showed new R hepatic lesion. Abdominal MRI 7/18 showed a lesion possibly concerning for fungal infection though on further review with radiology it was felt that this may have been there previously. Repeat chest CT 7/19 with interval improvement in ???nodules???, raising possibility that these were not true nodules previously visualized but possibly segments of atelectasis.

We then opted to observe her expectantly and serially discontinue her treatment dose antibiotics. She defeveresced and continued to improve clinically, so further work up was not pursued. Through this time, other infectious etiologies were considered as well; she did not demonstrate sinus pain or nasal discharge despite history of recurrent sinusitis; and she had 4 loose teeth with no evidence of dental abscess or other oral infection.

After engraftment, she complained of painful urination, and had serial urinalyses, urine BK and adenovirus (and blood adenovirus) sent which were all negative. Her symptoms were more suggestive of urethritis than cystitis (mild relief with pyridium, better relief with topical normal saline via syringe), although the etiology was unclear.

She also received acyclovir for CMV prophylaxis (given positive pretransplant CMV titers) and fluconazole for fungal prophylaxis when not on ambisome. We followed weekly CMV PCR (when neutropenic) and antigenemia (once engrafted). Last CMV antigenemia on 7/24 was negative. Her acyclovir prophylaxis was continued beyond day 30 due to her history of recurrent mucocutaneous HSV. Her PCP prophylaxis was initially resumed with Bactrim; this was changed to nebulized pentamidine on 7/25 [given a rise in her creatinine]. She was on vancomycin/polymyxin as per protocol for gut decontamination, discontinued once engrafted.

Comment [AS11]: Third trigger (#6): Rising creatinine levels paired with nephrotoxic drug use (in this case, cyclosporine and methotrexate use noted above) is shown here again.

Maria also requires prophylaxis against encapsulated organisms given her asplenia. Her "anti-inflammatory" azithromycin is adequate to achieve this purpose.

ENDOCRINE: She has a hx adrenal insufficiency with prolonged steroid use for hypereosinophilia (home dose hydrocortisone 5 mg PO BID). She was initially converted to IV hydrocortisone 5 mg daily when her PO intake decreased, but was increased to stress-dose steroids in the setting of persistent fever around engraftment. As her fever curve improved, she was weaned to 7.5 mg PO TID on 7/16. Per endocrine, at this dose (~20mg/m²/day) this is neither physiologic nor stress dosing. A physiologic regimen would be approximately 7.5mg QAM and 2.5mg QPM (10mg/m²/day). While it would be acceptable from adrenal standpoint to drop to this dose right away (no risk from an adrenal perspective), a fast wean will likely cause her to feel unwell. We therefore opted to send her home on a taper plan to achieve this dose over the course of approx 3 weeks. If Maria tolerates this dose for a 2-4 weeks, reducing the dose to 5mg QAM and 2.5mg QPM would be appropriate. Once at this dose steady "sub-physiologic" dose for 2-4wks, Maria could undergo a stim test to check adrenal function (which may take months to return to normal). It will be important to remember that she requires stress dose steroids in any future times of stress until adequate function is documented by a "passed" stim test. The endocrine team would be happy to become involved at any point if there are questions or concerns about this regimen.

PAIN: Maria received pain control via a morphine PCA which was eventually transitioned to intermittent morphine on 7/14, and weaned off completely.

RENAL: [Maria's admission creatinine was 0.4 with a creatinine clearance of 173.7mL/min/1.73m². Within the first 48 hours of admission her creatinine rose to 0.8. Her creatinine continued to trend up during the last week or so of her stay, with a discharge value of 1.1]. The family was given supplies to collect a 24 hour urine at home starting Thursday and bring to clinic on Friday. We stopped Bactrim and change to nebulized pentamidine, and decreased her Lasix. We opted to continue her acyclovir at this point but this may need to be readdressed in the future.

Comment [AS12]: Third trigger (#6): Rising creatinine levels paired with nephrotoxic drug use (in this case, cyclosporine and methotrexate use noted above) is shown here again.

Comment [AS13]: Fourth trigger (#5): Serum creatinine doubling.

Comment [AS14]: Adverse event #2: Nephrotoxic drug-induced mild renal injury
Preventability: Probably not preventable
Severity: E

Triggers #5 and #6 help identify this adverse event. The patient needs cyclosporine and methotrexate, however, both of these nephrotoxic drugs may have caused her a mild renal injury, resulting in a rise in her creatinine levels (trigger #6). Trigger #5, doubling of serum creatinine levels, is also present in this chart since the patient's creatinine levels increase from 0.4 to 1.1 during her hospitalization. Consequently, the rises in creatinine levels that both triggers #5 and #6 flag draw attention to the patient's renal injury. However, even with the finding of two different triggers, this still represents a single adverse event.

Comment [AS15]: Key lesson #7: Multiple triggers can point towards one event, i.e., an adverse event may be manifested in multiple ways.

Here, both nephrotoxin use with rising creatinine and serum creatinine doubling point towards adverse event #2.

ACCESS: Left CVL (6/12)

DISCHARGE EXAM:

General: walking around the hall, no distress

HEENT: Alopecia, cushingoid facies, facial edema, no icterus, no congestion/rhinorrhea, MMM

CV: S1 S2 normal, RRR, no murmurs.

Pulm: No evidence of increased WOB. Good aeration throughout without crackles, wheezes. No increased WOB

Abd: soft, +bowel sounds, non-distended, non-tender

Ext: warm, well-perfused

Broviac site on chest without erythema, induration, discharge

Skin: patchy hyperpigmentation.

DISCHARGE DISPOSITION:

ROUTINE DISCHARGE

DIET:

BONE MARROW TRANSPLANT DISCHARGE DIET

LISTED ALLERGIES:

NONE LISTED

MEDICATIONS:

PENTAMIDINE INHALATION POWDER

300MG NEB Q2WK, LAST DOSE 7/25/10

ACYCLOVIR

200MG PO BID

AZITHROMYCIN

250MG PO QMWF

NEORAL

50MG PO QAM AND 75MG PO QPM

DRONABINOL (MARINOL)

5MG PO Q6HR

FLUCONAZOLE

200MG PO DAILY

ADVAIR DISKUS 250MCG-50MCG

1 PUFF MDI BID

HYDROCORTISONE

7.5MG PO TID. SEE INSTRUCTIONS FOR WEAN PLAN.

LORAZEPAM

1MG PO TID

SINGULAIR

5MG PO DAILY

NYSTATIN TOPICAL 100000UNITS/G CREAM

1 APPLICATION TOPICAL TID PRN YEAST RASH

ONDANSETRON ODT

4MG PO Q8HR

OMEPRazole

20MG PO DAILY

ALBUTEROL

2.5MG NEB Q4HR PRN WHEEZING/RESP DISTRESS

DOCUSATE

50MG PO DAILY PRN CONSTIPATION

FUROSEMIDE

20MG PO DAILY

HEPARIN FLUSH 10UNIT/ML

20UNIT IV Q12HR AND PRN

NORMAL SALINE FLUSH

2-3ML IV Q12HR AND PRN

SPECIAL INSTRUCTIONS:

CALL YOUR MD/PNP OR NURSE IMMEDIATELY IF YOUR CHILD HAS A FEVER > 38.0 (100.4F) TWICE IN ONE DAY, OR A FEVER > 38.5C (101.3F) ONE TIME, SHAKING OR CHILLS. 2. CALL IF YOUR CHILD HAS ANY SIGNS OF POTENTIAL INFECTION SUCH AS: REDNESS, SWELLING, OR DRAINAGE FROM ANY SORE AREA OR WOUND, PAC/CVL SITES INCLUDED. 3. CALL IF YOUR CHILD HAS ANY SIGNS OF BLEEDING, SUCH AS: INCREASED BRUISING OR TINY RED SPOTS (PETECHIAE), ANY BLOOD IN URINE OR STOOL, A CUT THAT DOESN'T STOP BLEEDING AFTER 10 MINUTES, A NOSEBLEED THAT DOES NOT STOP AFTER 15 MINUTES. 4. CALL IF YOUR CHILD HAS ANY SIGNS OF ANEMIA SUCH AS: EXTREME TIREDNESS, PALE SKIN, OR SHORTNESS OF BREATH. 5. CALL IF YOUR CHILD HAS ANY SIGNS OF DEHYDRATION SUCH AS: DECREASED OR NO URINATION FOR 6-8 HOURS, FEWER THAN 4-6 WET DIAPERS PER DAY, NOTHING TO EAT OR DRINK

FOR >6 HOURS WHILE AWAKE IF UNDER 1 YEAR OF AGE, OR NOTHING TO EAT OR DRINK FOR >8 HOURS IF YOUR CHILD IS OVER 1 YEAR OF AGE. CALL IF HE OR SHE IS VOMITING. 6. CALL IF YOUR CHILD HAS PROBLEMS WITH CONSTIPATION OR DIARRHEA 7. FOR ANY LIFE THREATENING EMERGENCIES, CALL 911. FOR ANY MEDICAL ISSUES BETWEEN 9AM AND 5PM MON-FRI, CALL THE LAKEVIEW CLINIC. FOR ALL OTHER TIMES CALL 617-632-3352 AND PAGE THE PEDIATRIC BMT FELLOW ON CALL.

STEROID WEAN PLAN: ON FRIDAY 7/28 CHANGE DAILY DOSING TO 7.5MG QAM, 5MG QLUNCH, 7.5MG QPM. ON TUESDAY 8/1 CHANGE DAILY DOSING TO 7.5MG QAM, 2.5MG QLUNCH, 7.5MG QPM. ON FRIDAY 8/4 CHANGE DAILY DOSING TO 7.5MG BID. ON TUESDAY 8/8 CHANGE DAILY DOSING TO 7.5MG QAM AND 5MG QPM. ON FRIDAY 8/11 CHANGE DAILY DOSING TO 7.5MG QAM AND 2.5MG QPM. MAINTAIN AT THIS DOSING REGIMEN UNTIL FURTHER DIRECTED. IF MARIA STARTS TO FEEL UNWELL WHILE WEANING PLEASE CALL DR. PLACE. IF MARIA BECOMES FEBRILE OR OTHERWISE ILL SHE WILL NEED STRESS DOSE STEROIDS.

PLEASE SEE YOUR CARDIOLOGIST IN 1 WEEK. AT THAT TIME YOU SHOULD DISCUSS DISCONTINUING THE LASIX AND WHETHER OR NOT THE ENALAPRIL SHOULD BE RESUMED.

PLEASE COLLECT A 24 HOUR URINE SAMPLE AS DIRECTED AND BRING TO YOUR LAKEVIEW CLINIC APPOINTMENT ON FRIDAY.
PATIENT/FAMILY EDUCATION:

UNSCHEDULED AND EXTERNALLY SCHEDULED APPOINTMENTS:

LAKEVIEW CLINIC DR ANDY PLACE FRIDAY 7/28 AT 10:15

TESTS PENDING AT DISCHARGE:

CHIMERISM

T AND B CELL LYMPHOCYTE SUBSETS

CONSULTATIONS:

CARDIOLOGY

NUTRITION

PHYSICAL THERAPY

PAIN TEAM

PSYCHIATRY

SOCIAL WORK

REFERRING/PRIMARY CARE PHYSICIAN :

DISCHARGING HOUSE OFFICER:

KATHERINE KELTER (BY ELECTRONIC SIGNATURE 07/26/XX)

Addendum by WILLOUGHBY MD, PhD, FRED on August 01, XX 18:05 EDT (Verified)

Correction: GCSF (Filgrastim) was not used after stem cell infusion.

Fred Willoughby, MD, PHD

X4987

Attending in HSCT

Note Type: Stem Cell Transplant Admission MD
 Date: June 11, XX 18:40 EDT
 Status: Auth (Verified)
 Subject: SCT Admission Note
 Created by: Patel MD, Kumar L on June 11, XX 18:42 EDT
 Verified by: Patel MD, Kumar L on June 12, XX 09:33 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 6/26/XX

*** Final Report ***

BMT ADMIT NOTE 6/11/XX

CC: Maria is 8y/o F with combined immunodeficiency and hypereosinophilia/hyper IgE being admitted for sibling matched allogeneic bone marrow transplant.

PMH:

- Combined immune deficiency: Multiple infections since infancy. First one was pneumococcal meningitis and sepsis in 2004. She failed to respond to pneumococcal vaccine after the first infection and was later found to have falling IgG level, falling T cells (particularly) CD4 counts, and high monoclonal IgE. Thereafter she has experienced multiple pneumonias, recurrent otitis, urinary tract infections, recurrent and severe HSV of the skin and persistent Giardia infection. She has been on prophylactic IVIG, bactrim and acyclovir. About a week ago had chest CT, bronchoscopy and sinus puncture. Per pre-transplant notes, no active infection was identified.
- Idiopathic Hypereosinophilia: First noted 2004. Has undergone extensive evaluation including bone marrows 2007 and XX and FIPIL1-PDGFR fusion gene, which was negative. Eosinophilia responded to steroids, but not to hydroxyurea, and imatinib.
- Mitral valve repair: Had chorda tendinae rupture resulting in flail mitral valve for which she underwent mitral valve commissuroplasty at Plainsboro Hospital in October 2004
- Adrenal insufficiency: Thought to be from chronic steroid use. Takes hydrocortisone at baseline and needs stress dose steroids for procedures.

Recent history:

Last infection was UTI in April XX, treated with antibiotics. No fevers since then. Has chronic sinusitis manifested as persistent intermittent cough and post nasal drip. Recent evaluation with bronch, chest ct and sinus tap was negative for active infection. Experiences intermittent chest and muscle pain of unclear etiology and often gets headache with infusion of IVIG. Has intermittent abdominal pain with occasional emesis. Is having formed stools daily. No significant vomiting or diarrhea. Also experiences occasional rash on face and elbows.

Surgeries: Mitral valve repair (2006), myringotomy and tympanostomy tubes in the right (2011), sinus puncture

ALL: Cephalosporins (mild, has tolerated as well)

FH: The family history is negative for early deaths, blood diseases, malignancies, severe atopy, or immunodeficiencies.

SH: She lives in Springfield, Massachusetts, with her parent 2 older siblings (18y/o sister and 5y/o brother) and 2 grandparents. She is the product of a consanguineous marriage, in that her parents are first cousins. They are of Lebanese Arab descent.

Home Medications:

1. Enalapril, 5 mg twice a day.
2. Acyclovir, 200 mg twice a day.
3. Penicillin, 250 mg twice a day.

4. Advair inhaler, 1 puff two times a day.
5. Singulair, 5 mg by mouth once a day.
6. Bactrim, 10 mL daily.
7. Hydrocortisone, 5 mg two times a day.
8. Calcium, 2 Gummy Bears twice a day.
9. Vitamin D, 1000 units once a day.
10. Intravenous immunoglobulin, 20 g intravenously every three weeks.
11. Pepcid, 1 tablet daily.
12. Flagyl 250mg PO TID

Allergies: Documented allergies were reviewed and reconciled with the history provided by the patient.

Allergies: cephalosporins, cow's milk, eggs, nuts (all tree nuts), Peanuts

Physical Exam:

Basic Vital Signs

Vitals Signs since (06/10 18:41)	Most recent (Time)	
Temperature	36.6	(14:45)
Heart Rate	120	(14:45)
BP Systolic	93	(14:45)
Diastolic	54	(14:45)
Respiratory Rate	20	(14:45)
Oxygen Saturation (SPO2)	100%	(14:45)
Weight (kg)	29.3	(14:45)

Physical Exam:

Gen: Well appearing, active, interactive, talkative, no distress
 HEENT: NC/AT head, PERRL, EOM intact, conjunctiva clear, MMM, no oral lesions
 Lungs: Clear to auscultation
 Heart: RRR, no murmur
 Abdomen: Soft, NT, ND, BS present
 Skin: No rash, petechiae or bruising.

Labs (Reported 06/11/XX 03:36 - 06/12/XX 03:36)

Chem 7 (06/11 22:45)

134 L	100	11	/ 127 H (Glu)
3.86	22	0.4	\ Ca 9.7 Mg 1.9 Phos 3.9

LFTs (06/11 22:45)

AST	ALT	Bili T	/ Bili D
17	18	0.2 L	/ 0.1
221	4.0		
ALK	ALB		

CBC (06/11 22:45)

7.32 \	12.5	/	721 K H
/	37.8	\	
MCV 76.2 L			

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
06/12 22:45	10.8	1.01	25.7	346	325	

Pre-transplant work-up:

Dental: Normal by report.

Ophthalmology (6/26/XX): Normal exam.

Audiology (6/9/XX): Normal hearing.

Pulmonary function tests (5/22/XX): FVC 93, FEV1 87, FEV1/FVC 93

Echocardiogram/ECG (5/4/XX): Mild LA dilation, mild MS, moderate MR, LV dilation resolved, Trivial AR, LVFS 44%

Creatinine clearance (5/8/XX): 92ml/min (corrected 173.7 ml/min/m2 per 1.73m2)

Serologies (5/31/XX): CMV 3.39, HSV 19.9, EBV IgG 5.49, EBV PCR negative, VZV 2.76, Hep A IgM negative, Hep B sAg negative, Hep B sAb 212.5, Hep B core negative, HCV negative, HCV PCR negative, Toxo<5, HIV negative, RPRNR, Adenovirus PCR negative

Blood type: O Pos

Donor information:

Donor source: matched sibling

Blood type: O Pos

Serologies: CMV <0.07, HSV less than 0.08, EBV 0.26, Hep A IgM negative, VZV 2.63

Assessment: 8y/o F with combined immunodeficiency hypereosinophilia and hyper IgE being admitted for sibling matched allogeneic bone marrow transplant

Plan:

Conditioning: Busulfan 23 mg IV on days -9,-8,-7, -6 with fosphenytoin prophylaxis beginning day -10 x6 days. Rest on day -5. Cyclophosphamide 1500 mg days -4, -3, -2 and -1. Day 0 = 6/22/10.

GVHD prophylaxis: Cyclosporine starting day 2 and methotrexate on days 1, 3, 6, 11.

Cardiovascular/Respiratory: Hx mitral valve replace and multiple pneumonias. No active issues.

ID: HSV positive, VZV positive and CMV positive/negative. Due to known mitral valve repair will give Ampicillin before line placement and due to known sinusitis will start Meropenem on day -10 as antibiotic prophylaxis. Continue Flagyl for Giardia. Will discontinue penicillin prophylaxis on day -10, but continue Bactrim for PCP prophylaxis until day -1 and give Acyclovir home dose of 200mg PO BID through day -4, then treatment dose at 500 mg/m2 beginning day -5. Fluconazole for fungal prophylaxis. Check IgG level on admission and then every 3 weeks, IVIG for levels<400. CMV screening to initiate on day +21.

Heme: Transfuse for Hgb<7% and platelets<10 or bleeding. Does not need pre-meds prior to blood products.

Endocrine: Adrenal insufficiency. Will give stress dose steroids around central line placement x3 days, then decrease to baseline.

FEN/GI: BMT diet. TF = 1700ml/day. NPO at midnight for procedure tomorrow. Follow PO intake with daily chemistries. Nutrition consult for PN when indicated. Protonix for gut prophylaxis. Standard antiemetics with Zofran, Reglan, Benadryl.

Access: Will have line placement 6/12.

Liane Meloni, MD
pager 4652

Comment [AS16]: Third trigger (#6): Use of cyclosporine and methotrexate (nephrotoxins) and rising creatinine levels (noted above) is shown here again.

Note Type: Operative Note
Date: June 12, XX 00:00 EDT
Status: Auth (Verified)
Subject: Operative Note
Created by: Lee MD, Harold L on June 12, XX 14:27 EDT
Verified by: Lee MD, Harold L on July 03, XX 21:48 EDT
Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***

DATE OF PROCEDURE: 06/12/XX.

PRE-OPERATIVE DIAGNOSIS: Immune deficiency syndrome.

POST-OPERATIVE DIAGNOSIS: Immune deficiency syndrome.

PROCEDURES PERFORMED: Placement of left subclavian double lumen Broviac catheter.

SURGEON: Harold L. Lee, M.D.

ASSISTANTS: Cindy Kim, M.D.

INDICATIONS: Maria is a little girl with a very extensive past medical history who is in need of a central venous line for the initiation of chemotherapy to treat her immunodeficiency syndrome. She presents for operative placement.

DETAILS OF PROCEDURE: After informed consent was obtained from her mother, she was taken to the operating room and placed in supine position where general anesthesia was induced without difficulty. The chest was prepped and draped in the usual sterile fashion.

The 7 French double lumen Broviac catheter kit was utilized. The left subclavian vein was accessed on the first attempt and the guide wire was threaded centrally. Fluoroscopy showed this to be present within the right heart. A counterincision was made and the catheter was tunneled and trimmed to the appropriate length. The obturator and peel away sheath were placed centrally and the catheter was threaded.

Excellent catheter position was verified with the tip of the SVC-RA junction as well as good function. The catheter was flushed with heparinized saline as per protocol and capped. The catheter was secured to three separate locations in the chest wall with 2-0 Ethibond. The little counterincision was closed with a little monocryl. Sterile dressings were applied. The young lady was awakened from anesthesia, extubated and transferred to the recovery room in stable condition.

ESTIMATED BLOOD LOSS: 3 mL.

SPECIMENS: None.

DRAINS: None.

COMPLICATIONS: None.

Note Type: Pediatrics Inpatient MD
 Date: July 10, XX 07:12 EDT
 Status: Modified
 Subject: HSCT Daily Note
 Created by: HARRIS MD, NEILA on May 10, XX 07:12 EDT
 Verified by: HARRIS MD, NEILA on May 10, XX 20:00 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***
Document Contains Addenda

Events

-more congested, viral DFA sent (neg)
 -cough worsening at night
 -CXR yesterday showing +pulmonary edema, L pleural effusion → given Lasix x 1
 -very nauseous this AM
 -continues to be febrile
 -AM labs: low K, engrafted (day 3)

Basic Vital Signs

Vitals Signs since (07/09 07:12)	24 h min	24 h max	Most recent (Time)
Temperature	37.2	38.8	37.7 (05:20)
Heart Rate	89	118	105 *03:37*
BP Systolic	83	105	95 *03:37*
Diastolic	31	57	57 *03:37*
Respiratory Rate	26	36	32 (05:20)
Oxygen Saturation (SPO2)	97%	100%	99% *03:37*
Weight (kg)			31.5 (07/09 14:21)

IO Summary (Daily totals are 0:00-23:59)

I&O	07/09/XX - 07/09/XX	07/10/XX as of 07:12
In: other	7.1	5.7
In: parenteral	2360.28	523.86
In: TOTAL	2367.38	529.56
Out: urine	1890	442
Out: stool	124	30
Out: tubes/drains/other	25	25
Out: TOTAL	2039	497
Balance: TOTAL	328.38	32.56
I&O counts		
Stools (Number)	2	0
Voided Urine (Number)	4	0

Active Medication Orders**Scheduled Medications**

acyclovir 480 mg IV Q8hr *Com Last admin: 480 mg IV (07/10/XX 04:00)
 amphotericin B liposomal (AmBisome) 88 mg IV Q24hr *Com Last admin: 88 mg IV (07/09/XX 22:53)
 ciprofloxacin (ciprofloxacin IV) 400 mg IV Q12hr Last admin: 400 mg IV (07/09/XX 21:37)
 cycloSPORINE 40 mg IV Q12hr *Com Last admin: 40 mg IV (07/10/XX 05:11)
 diphenhydrAMINE 7 mg IV Q6hr *Com Last admin: 7 mg IV (07/10/XX 03:10)

Comment [AS17]: Third trigger (#6): Use of cyclosporine (a nephrotoxin) and rising creatinine levels (noted above) is shown here again.

dronabinol 5 mg PO Q6hr Last admin: 5 mg PO (07/09/XX 18:45)
 enalapril (enalaprilat) 300 mcg IV Q12hr Last admin: 300 mcg IV (07/09/XX 22:51)
 fluticasone-salmeterol (Advair Diskus 250 mcg - 50 mcg inhalation powder) 1 puff MDI BID *Com Last admin:
 1 puff MDI (07/09/XX 21:34)
 hydrocortisone 12.5 mg IV Q6hr Last admin: 12.5 mg IV (07/10/XX 03:10)
 lorazepam 0.7 mg IV Q6hr *Com Last admin: 0.7 mg IV (07/10/XX 06:37)
 meropenem 750 mg IV Q8hr Last admin: 750 mg IV (07/10/XX 02:21)
 metoclopramide 15 mg IV Q6hr *Com Last admin: 15 mg IV (07/10/XX 03:10)
 metronidazole 250 mg IV Q6hr *Com Last admin: 250 mg IV (07/10/XX 02:21)
 montelukast 5 mg PO daily Last admin: 5 mg PO (07/09/XX 21:34)
 ondansetron 4 mg IV Q8hr Last admin: 4 mg IV (07/10/XX 06:37)
 pantoprazole (PANTOprazole) 30 mg IV Q24hr *Com Last admin: 30 mg IV (07/09/XX 22:52)
 vancomycin 440 mg IV Q6hr *Com Last admin: 440 mg IV (07/10/XX 05:11)

PRN Medications

acetaminophen 325 mg PO Q4hr PRN Fever/Pain *Com Last admin: 325 mg PO (07/09/XX 13:30)
 albuterol 2 puff MDI Q4hr PRN Wheezing *Com
 concentrate medications (pharmacy use) concentrate medications
 diphenhydramine 12.5 mg IV Q6hr PRN Agitation Last admin: 12.5 mg IV (07/10/XX 03:59)
 docusate (Colace) 50 mg PO daily PRN Constipation Last admin: 50 mg PO (06/18/XX 12:28)
 immune globulin intravenous 15 g IV Q3wk PRN Other - See Order Comments *Com
 magnesium sulfate (magnesium sulfate dose (CVL/PIV)) 1,465 mg IV daily PRN Other - See Order Comments
 *Com Last admin: 1,465 mg IV (07/03/XX 03:00)
 morphine (morphine IV) 1.5 mg IV Q2hr PRN Pain Last admin: 1.5 mg IV (07/28/XX 12:09)
 nalbuphine 0.6 mg IV Q4hr PRN Itching *Com
 naloxone 30 mcg IV 1time PRN Respiratory depression *Com
 sodium chloride nasal 1 spray Nasal Q2hr PRN Other - See Order Comments *Com
 Total Fluids 1,700 mL
 Vaseline topical 1 appl Nasal BID PRN Other - See Order Comments *Com

Continuous Medications/Fluids

D5W 1/2NS 500 mL IV Last admin: 0 mL IV (07/09/XX 16:59)
 Parenteral Nutrition 1080 mL Last admin: 33 mL IV (07/10/XX 06:59)
 PCA/NCA morphine 30 mg *Com Last admin: 8.3 mL PCA (07/06/XX 06:59)

Suspended/On-Hold Medications

calcium carbonate (Suspended) 750 mg PO BID *Com Last admin: 750 mg PO (06/15/XX 20:21)

Additional Medications Admin within last 24 hours (or since 07/09 07:12)

furosemide Last admin: 15 mg IV (07/09/XX 15:20)
 ursodiol Last admin: 300 mg PO (07/07/XX 19:48)
 vitamin E *Com Last admin: 200 unit PO (07/07/XX 16:40)

*Com: Order comment exists. Consult Order Profile or MAR for details

Physical Exam:

General: Sleeping in bed, tired but arousable, responds to commands, NAD
 Skin: No rashes
 HEENT: Alopecia, cushingoid facies, no icterus, no congestion/rhinorrhea, boggy oral mucosa but no lesions or mucositis, MMM
 CV: S1 S2 normal, RRR, no murmurs. Well healed median sternotomy scar.
 Pulm: intermittent cough, good aeration throughout, scattered crackles in bases, not tachypneic, no wheezes
 Abd: soft, NT/ND, normoactive bowel sounds, no HSM
 Ext: warm, well-perfused, cap refill <2 sec, no edema
 Broviac site on chest without erythema, induration, discharge

Labs (Reported 07/09/XX 19:58 - 07/10/XX 19:58)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
05/10 00:20	137	2.54 C	106	23	14	0.4	145 H

Chem	Ca	Mg	Phos
05/10 00:20	8.8	1.9	2.6 L

LFTs	AST	ALT	Bili T	Bili D	ALK	ALB	LDH
05/10 00:20	13	6	0.3	0.1	168	3.1	283

CBC	WBC	HBG	HCT	PLT
05/10 00:20	3.90 L	7.8 C	23.7 L	166 K L

Assessment/Plan:

8 y/o F with combined immunodeficiency and congenital asplenia, idiopathic hypereosinophilia and hyper IgE, asthma, mitral valve regurgitation s/p repair, and adrenal insufficiency now s/p conditioning and **on day +18** for sibling matched allogeneic BMT.

Cardiovascular: H/o mitral valve repair s/p papillary muscle rupture. Pre-transplant ECHO with normal cardiac function.

-Enalapril IV (home dose is 5 mg PO BID)

Respiratory: H/o multiple pneumonias and moderate persistent asthma. **+Evolving pulm edema.**

-Continue home albuterol, Advair, Singulair

-Consider Lasix PRN.

Conditioning: S/p busulfan and cyclophosphamide

Graft: Day 1 = 6/22/XX.

-Transfuse for Hgb<7% and platelets<30 or bleeding with tylenol/benadryl premedication (Plt threshold increased for frequent nosebleeds)

-S/p amicar q6h x 3 days; may now receive PRN; as well as topical Afrin and saline nasal spray

GVHD prophylaxis:

-Cyclosporine levels qM/Th (last 123 on 7/9, increased by 10%. Recheck 7/11)

-Methotrexate days 1, 3, 6, 11

VOD:

-Vit E/Ursodiol for VOD ppx

FEN/GI: On full PN with poor PO intake. History of chronic giardia.

-Continue full PN today. Increase K in PN.

-Daily chemistries, LFTs.

-Protonix for gut prophylaxis

-Antiemetics with Zofran, Ativan, Reglan, Benadryl (decreased dosing), marinol

ID: Hx recurrent cutaneous HSV infections. Hx UTIs with ESBL organisms. Screening BMT cultures: +Candida albicans from throat, rectum 6/20, throat 6/27. MRSA/VRE negative. Portable CXR 7/6 no acute process. Repeat PA/lateral CXR 7/7 with increased interstitial prominence (possible viral infection, atypical PNA) but no infiltrate. **Repeat CXR 7/9 with pulmonary edema and L pleural effusion.**

Treatment Abx:

-Meropenem IV (6/XX-) for sinusitis "cleanout" (h/o pneumococcal infections)

Comment [AS18]: Third trigger (#6): Use of cyclosporine and methotrexate (nephrotoxins) and rising creatinine levels (noted above) is shown here again.

-**vancomycin IV for fever** (6/23-); continue with qM, Th (last 12.1 on 7/3, no changes made)
-**Flagyl** (6/12-) for giardia suppression
-**Cipro (7/6-) and ambisome (7/6-)** added for GNR double coverage and fungal coverage with fever

Prophylactic Abx:

-**Acyclovir** for CMV prophylaxis
-s/p **Fluconazole** (6/12-7/6) for fungal prophylaxis.
-**Vancomycin-polymixin** for bacterial ppx

-**Monitor for persistent fever.**

-**Follow weekly CMV Ag for +CMV titer pretransplant**

-**BID sitz baths and topical treatment for perirectal sore**

Endocrine: H/o Adrenal insufficiency with prolonged steroid use for hypereosinophilia.

-at baseline, on maintenance hydrocortisone IV 5 mg daily → **increased to stress dose 7/6 (12.5 mg IV q6h) for fever with plan to continue until 24 hours afebrile and well appearing**

Pain: Morphine PCA with continuous 0.3 mg and bolus 0.4 mg.

Access: Broviac (6/12-)

Neila Harris, MD PGY2
Pager 9834

Addendum by WILLOUGHBY MD, PhD, FRED on July 10, XX 21:04 EDT (Verified)

ATTENDING ADDENDUM

I personally examined the patient and reviewed the pertinent portions of the history, vital signs and laboratory. I agree with Dr. Harris's exam findings and I concur with her assessment and plan as described above. Maria is engrafted as of today, continues to have fevers on maximal Abx. Also has edema on CXR, improves with Lasix. ? engraftment related vs infection, will follow, consider CT. I was directly involved in the formulation of the plan outlined above.

Comment [AS19]: Adverse event #1 is shown here again.

Fred Willoughby, MD, PHD
HSCT Attending
X4305

Note Type: Inpatient Nursing
Date: July 11, XX 12:52 EDT
Status: Auth (Verified)
Created by: KEIGHER RN, KRISTEN L on July 11, XX 12:57 EDT
Verified by: KEIGHER RN, KRISTEN L on July 11, XX 18:31 EDT
Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***

Problem: Risk for infection

Outcome: Tmax 38.2 x 1- down on own. Blood cx due if spikes. Increased RR- MDs aware. Pt. continues on PN/IL x24h. Attempting POs at this time. No s/s pain noted. Continues on Morphine PCA + Cl. Emesis x 1. Continues on ATC Ativan, Reglan, benadryl, Marinol, and Zofran.

Plan of Care: Continue to monitor for s/s infection and to draw bld cx as indicated. Continue to monitor respiratory status for any changes. Continue to monitor for s/s pain and nausea and treat accordingly. Plan to report changes in status to HO. No plans for d/c at this time. Continue with plan of care.

Note Type: Pediatrics Inpatient MD
 Date: July 11, XX 07:19 EDT
 Status: Modified
 Subject: HSCT Daily Note
 Created by: HARRIS MD, NEILA on July 11, XX 07:19 EDT
 Verified by: HARRIS MD, NEILA on July 11, XX 20:02 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***
Document Contains Addenda

Events

-increased K in PN for low K → PM recheck still low → given KCL bolus with improvement this AM
 -increased Ativan for nausea
 -CXR showed stable pulmonary edema, given Lasix 15 mg iv x 1 with good diuresis
 -surveillance CMV Ag negative

Basic Vital Signs

Vitals Signs since (07/10 07:19)	24 h min	24 h max	Most recent (Time)
Temperature	37.1	38.6	37.1 (03:24)
Heart Rate	91	142	91 (03:24)
BP Systolic	90	107	105 (03:24)
Diastolic	44	61	61 (03:24)
Respiratory Rate	26	36	32 *06:52*
Oxygen Saturation (SPO2)	97%	99%	98% (03:24)
Weight (kg)			31.1 *05/10 08:03*

IO Summary (Daily totals are 0:00-23:59)

I&O	07/10/XX - 07/10/XX	07/11/XX as of 07:19
In: enteral	330	0
In: other	5.7	5.5
In: parenteral	2251	516.18
In: TOTAL	2586.7	521.68
Out: urine	1742	488
Out: stool	68	0
Out: tubes/drains/other	55	0
Out: TOTAL	1865	488
Balance: TOTAL	721.7	33.68
I&O counts		
Emesis (Number)	0	1
Stools (Number)	1	0

Active Medication Orders**Scheduled Medications**

acyclovir 480 mg IV Q8hr *Com Last admin: 480 mg IV (07/11/XX 04:00)
 amphotericin B liposomal (AmBisome) 88 mg IV Q24hr *Com Last admin: 88 mg IV (07/11/XX 00:40)
 ciprofloxacin (ciprofloxacin IV) 400 mg IV Q12hr Last admin: 400 mg IV (07/10/XX 20:18)
 cycloSPORINE 40 mg IV Q12hr *Com Last admin: 40 mg IV (07/11/XX 05:25)
 diphenhydrAMINE 7 mg IV Q6hr *Com Last admin: 7 mg IV (07/11/XX 03:15)
 dronabinol 5 mg PO Q6hr Last admin: 5 mg PO (07/11/XX 03:14)

Comment [AS20]: Third trigger (#6): Cyclosporine (nephrotoxin) use and rising creatinine levels (noted above) is shown here again.

enalapril (enalaprilat) 300 mcg IV Q12hr Last admin: 300 mcg IV (07/10/XX 23:13)
 fluticasone-salmeterol (Advair Diskus 250 mcg - 50 mcg inhalation powder) 1 puff MDI BID *Com Last admin:
 1 puff MDI (07/10/XX 22:00)
 hydrocortisone 12.5 mg IV Q6hr Last admin: 12.5 mg IV (07/11/XX 03:30)
 lorazepam 1.4 mg IV Q6hr Last admin: 1.4 mg IV (07/11/XX 06:15)
 meropenem 750 mg IV Q8hr Last admin: 750 mg IV (07/11/XX 01:01)
 metoclopramide 15 mg IV Q6hr *Com Last admin: 15 mg IV (07/11/XX 03:15)
 metronidazole 250 mg IV Q6hr *Com Last admin: 250 mg IV (07/11/XX 01:26)
 montelukast 5 mg PO daily Last admin: 5 mg PO (07/10/XX 21:41)
 ondansetron 4 mg IV Q8hr Last admin: 4 mg IV (07/11/XX 06:36)
 pantoprazole (PANTOprazole) 30 mg IV Q24hr *Com Last admin: 30 mg IV (07/10/XX 22:15)
 vancomycin 440 mg IV Q6hr *Com Last admin: 440 mg IV (07/11/XX 05:07)

PRN Medications

acetaminophen 325 mg PO Q4hr PRN Fever/Pain *Com Last admin: 325 mg PO (07/10/XX 18:26)
 albuterol 2 puff MDI Q4hr PRN Wheezing *Com
 concentrate medications (pharmacy use) concentrate medications
 diphenhydramine 12.5 mg IV Q6hr PRN Agitation Last admin: 7 mg IV (07/10/XX 09:58)
 docusate (Colace) 50 mg PO daily PRN Constipation Last admin: 50 mg PO (06/18/XX 12:28)
 immune globulin intravenous 15 g IV Q3wk PRN Other - See Order Comments *Com
 magnesium sulfate (magnesium sulfate dose (CVL/PIV)) 1,465 mg IV daily PRN Other - See Order Comments
 *Com Last admin: 1,465 mg IV (07/03/XX 03:00)
 morphine (morphine IV) 1.5 mg IV Q2hr PRN Pain Last admin: 1.5 mg IV (06/28/XX 12:09)
 nalbuphine 0.6 mg IV Q4hr PRN Itching *Com
 naloxone 30 mcg IV 1time PRN Respiratory depression *Com
 sodium chloride nasal 1 spray Nasal Q2hr PRN Other - See Order Comments *Com
 Total Fluids 1,700 mL
 Vaseline topical 1 appl Nasal BID PRN Other - See Order Comments *Com

Continuous Medications/Fluids

D5W 1/2NS 500 mL IV Last admin: 30 mL IV (07/10/XX 09:59)
 Parenteral Nutrition 1080 mL 1,080 mL Last admin: 18 mL IV (07/11/XX 06:59)
 PCA/NCA morphine 30 mg *Com Last admin: 8.3 mL PCA (07/06/XX 06:59)

Suspended/On-Hold Medications

calcium carbonate (Suspended) 750 mg PO BID *Com Last admin: 750 mg PO (06/15/XX 20:21)

Additional Medications Admin within last 24 hours (or since 07/10 07:19)

furosemide Last admin: 15 mg IV (07/10/XX 18:04)
 lorazepam *Com Last admin: 0.7 mg IV (07/10/XX 06:37)
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) *Com Last admin: 15 mEq IV (07/10/XX 22:35)

*Com: Order comment exists. Consult Order Profile or MAR for details

Physical Exam:

alert, conversant, but c/o nausea, leaning over bucket
 refused exam due to nausea

Labs (Reported 07/10/XX 20:02 - 07/11/XX 20:02)**Chem 7 (07/11 01:45)**

139	108	14	/ 129 H (Glu)
3.01 L	23	0.4	\ Ca 8.7 Mg 2.1 Phos 2.4 L

(07/10 19:45)

140	106	18	/ 112 H (Glu)
2.46 C	23	0.5	\ Ca 8.5 Mg 2.0 Phos 3.2

LFTs (07/11 01:45)

AST	ALT	Bili T	/ Bili D
-----	-----	--------	----------

12	7	0.2 L / 0.1
171	3.0	
ALK	ALB	

CBC (07/11 01:45)

5.90 \ 7.7 C / 228 K MCV 80.2
/ 23.4 L \

Assessment/Plan:

8 y/o F with combined immunodeficiency and congenital asplenia, idiopathic hypereosinophilia and hyper IgE, asthma, mitral valve regurgitation s/p repair, and adrenal insufficiency now s/p conditioning and **on day +19** for sibling matched allogeneic BMT.

Cardiovascular: H/o mitral valve repair s/p papillary muscle rupture. Pre-transplant ECHO with normal cardiac function.

-Enalapril IV (home dose is 5 mg PO BID)

Respiratory: H/o multiple pneumonias and moderate persistent asthma.

-Continue home albuterol, Advair, Singulair

Conditioning: S/p busulfan and cyclophosphamide

Graft: Day 1 = 6/22/XX.

-Transfuse for Hgb<7% and platelets<30 or bleeding with tylenol/benadryl premedication (Plt threshold increased for frequent nosebleeds)

-S/p amicar q6h x 3 days; may now receive PRN; as well as topical Afrin and saline nasal spray

GVHD prophylaxis:

-Cyclosporine levels qM/Th (last 123 on 7/9, increased by 10%. Recheck 7/11)

-Methotrexate days 1, 3, 6, 11

Comment [AS21]: Third trigger (#6): Use of cyclosporine and methotrexate (nephrotoxins) and rising creatinine levels (noted above) is shown here again.

VOD:

-Vit E/Ursodiol for VOD ppx

FEN/GI: On full PN with poor PO intake. History of chronic giardia.

-Continue full PN today, increase K concentration 7/11.

-Daily chemistries, LFTs. **Monitor low K while on Lasix PRN. Consider starting Ksupps.**

-Protonix for gut prophylaxis

-Antiemetics with Zofran, Ativan (increased 7/10), Reglan, Benadryl (decreased dosing), marinol. Check with Pharmacy re:scopolamine patch.

ID: Hx recurrent cutaneous HSV infections. Hx UTIs with ESBL organisms. Screening BMT cultures: +Candida albicans from throat, rectum 6/20, throat 6/27. MRSA/VRE negative. Portable CXR 7/6 no acute process. Repeat PA/lat CXR 7/7 with increased interstitial prominence (possible viral infection, atypical PNA) but no infiltrate. **Repeat CXR 7/9 with pulmonary edema and L pleural effusion. Stable on repeat CXR 7/10.**

Treatment Abx:

-Meropenem IV (6/12-) for sinusitis "cleanout" (h/o pneumococcal infections)

-vancomycin IV for fever (6/23-); continue with qM, Th (last 12.1 on 7/3, no changes made)

-Flagyl (6/12-) for giardia suppression

-Cipro (7/6-) and ambisome (7/6-) added for GNR double coverage and fungal coverage with fever

Prophylactic Abx:

-Acyclovir for CMV prophylaxis

-s/p Fluconazole (6/12-7/6) for fungal prophylaxis.

-Monitor for persistent fever. If still afebrile 7/12, will obtain pan-CT to evaluate for fungal infection.
-Follow weekly CMV Ag for +CMV titer pretransplant (last CMV Ag negative 7/10)
-BID sitz baths and topical treatment for perirectal sore

Endocrine: H/o Adrenal insufficiency with prolonged steroid use for hypereosinophilia.
-at baseline, on maintenance hydrocortisone IV 5 mg daily → **increased to stress dose 7/6 (12.5 mg IV q6h) for fever with plan to continue until 24 hours afebrile and well appearing**

Pain: Morphine PCA with continuous 0.2 mg and bolus 0.4 mg. **Wean continuous to 0.1 mg/h on 7/11.**

Access: Broviac (6/12-)

Neila Harris, MD PGY2
Pager 6741

Addendum by WILLOUGHBY MD, PhD, FRED on July 11, XX 21:53 EDT (Verified)

ATTENDING ADDENDUM

I personally examined the patient and reviewed the pertinent portions of the history, vital signs and laboratory. I agree with Dr. Harris's exam findings and I concur with her assessment and plan as described above. Maria's fever curve is improving on maximal antibiotics and now engrafted. Engraftment inflammation vs infection. If fevers persist will scan, continue to follow clinically. Doing well in all other respects with POs increasing. I was directly involved in the formulation of the plan outlined above.

Fred Willoughby, MD, PHD
HSCT Attending
X4305

Note Type: Cardiology Consultation
 Date: July 14, XX 11:54 EDT
 Status: Modified
 Created by: THOMAS MD, EDDIE D on July 14, XX 12:31 EDT
 Verified by: THOMAS MD, EDDIE D on July 14, XX 19:03 EDT
 Encounter info: XXXX, Plainsboro Hospital, Inpatient, 6/11/XX - 7/26/XX

*** Final Report ***
Document Contains Addenda

Requesting physician/service:
 Willoughby/6W BMT

Reason for consultation:
 Tachypnea, concern for CHF

History of Present Illness:

Asked to see this 8 yo girl with history of severe combined immunodeficiency and congenital asplenia, idiopathic hypereosinophilia and hyper IgE, asthma, and mitral regurgitation s/p mitral valvuloplasty. She is presently day +21 following matched sib BMT. Her cardiac history is significant for a history of presumed endocarditis at 8 months of age, with presentation at that time with severe MR and a flail anterior mitral leaflet, presumably due to ruptured chordal attachments. She was followed medically for some time but developed progressive LV and mitral annular dilatation. On 10/13/2008, she underwent mitral valve repair. Intraoperative findings were significant for an unsupported central portion of the anterior leaflet, with a defect reminiscent of a cleft. This region was tightened up with sutures, and an annuloplasty was performed. She tolerated the procedure well and has been followed by Dr Morris at Southshore, with mild residual MR and moderate MS.

Over the past few days, she has had high persistent fevers, tachypnea, facial edema, foot swelling and difficulty sleeping. She had been receiving significant IVF for PN and meds making her net fluid positive but yesterday her PN was concentrated, IV fluids restricted and she was given prn Lasix, ending up 1.6L negative. Her mother notes that her tachypnea and leg and facial swelling have improved. She has been less tachypneic and more comfortable.

Review of Systems: see HPI

Past Medical History: as above.

Active Medication Orders

Scheduled Medications

acyclovir 480 mg IV Q8hr *Com Last admin: 480 mg IV (07/14/XX 11:23)
 albuterol 1 mL NEB Q4hr *Com Last admin: 5 mg NEB (07/14/XX 10:23)
 amphotericin B liposomal (AmBisome) 88 mg IV Q24hr *Com Last admin: 88 mg IV (07/13/XX 22:21)
 cycloSPORINE 40 mg IV Q12hr *Com Last admin: 40 mg IV (07/14/XX 04:54)
 diphenhydrAMINE 7 mg IV Q6hr *Com Last admin: 7 mg IV (07/14/XX 09:34)
 dronabinol 5 mg PO Q6hr Last admin: 5 mg PO (07/14/XX 09:34)
 enalapril (enalaprilat) 300 mcg IV Q12hr Last admin: 300 mcg IV (07/14/XX 11:24)
 fluticasone-salmeterol (Advair Diskus 250 mcg - 50 mcg inhalation powder) 1 puff MDI BID *Com Last admin: 1 puff MDI (07/14/XX 09:34)
 furosemide 15 mg IV 1time Stop: 07/14/XX 11:13
 hydrocortisone 12.5 mg IV Q6hr Last admin: 12.5 mg IV (07/14/XX 09:34)
 lorazepam 1.4 mg IV Q6hr Last admin: 1.4 mg IV (07/14/XX 11:24)
 meropenem 750 mg IV Q8hr Last admin: 750 mg IV (07/14/XX 10:05)
 metoclopramide 15 mg IV Q6hr *Com Last admin: 15 mg IV (07/14/XX 09:34)

Comment [AS22]: Third trigger (#6): Cyclosporine (nephrotoxin) use and rising creatinine levels (noted above) is shown here again.

metronidazole 250 mg IV Q6hr *Com Last admin: 250 mg IV (07/14/XX 08:30)
 montelukast 5 mg PO daily Last admin: 5 mg PO (07/13/XX 19:40)
 morphine (morphine IV) 0.5 mg IV Q4hr Last admin: 1.5 mg IV (06/28/XX 12:09)
 ondansetron 4 mg IV Q8hr Last admin: 4 mg IV (07/14/XX 06:00)
 pantoprazole (PANToprazole) 30 mg IV Q24hr *Com Last admin: 30 mg IV (07/13/XX 21:21)
 phenazopyridine 100 mg PO 6 dose TID Stop: 05/15/10 08:00 Last admin: 100 mg PO (07/14/XX 09:34)
 vancomycin 440 mg IV Q6hr *Com Last admin: 440 mg IV (07/14/XX 10:24)

PRN Medications

acetaminophen 325 mg PO Q4hr PRN Fever/Pain *Com Last admin: 325 mg PO (07/13/XX 21:44)
 albuterol 2 puff MDI Q4hr PRN Wheezing *Com
 concentrate medications (pharmacy use) concentrate medications
 diphenhydramine 12.5 mg IV Q6hr PRN Agitation Last admin: 12.5 mg IV (07/13/XX 01:00)
 docusate (Colace) 50 mg PO daily PRN Constipation Last admin: 50 mg PO (06/18/XX 12:28)
 immune globulin intravenous 15 g IV Q3wk PRN Other - See Order Comments *Com
 lorazepam 2 mg IV 1time PRN Other - See Order Comments *Com
 magnesium sulfate (magnesium sulfate dose (CVL/PIV)) 1,465 mg IV daily PRN Other - See Order Comments *Com Last admin: 1,465 mg IV (07/12/XX 03:00)
 morphine (morphine IV) 0.25 mg IV Q2hr PRN Pain
 nalbuphine 0.6 mg IV Q4hr PRN Itching *Com
 naloxone 30 mcg IV 1time PRN Respiratory depression *Com
 potassium CHLORIDE (potassium CHLORIDE dose (CVL) in NS) 15 mEq IV daily PRN Other - See Order Comments *Com Last admin: 15 mEq IV (07/12/XX 06:00)
 sodium chloride nasal 1 spray Nasal Q2hr PRN Other - See Order Comments *Com
 Total Fluids 1,700 mL
 Vaseline topical 1 appl Nasal BID PRN Other - See Order Comments *Com

Continuous Medications/Fluids

D5W 1/2NS 500 mL IV Last admin: 0 mL IV (07/14/XX 06:59)
 Parenteral Nutrition 540 mL 540 mL Last admin: 13 mL IV (07/14/XX 08:59)

Suspended/On-Hold Medications

calcium carbonate (Suspended) 750 mg PO BID *Com Last admin: 750 mg PO (06/15/XX 20:21)
 sulfamethoxazole-trimethoprim (Bactrim) (Suspended) 160 mg PO MWF *Com Last admin: 160 mg PO (07/14/XX 09:34)

Additional Medications Admin within last 24 hours (or since 07/13 11:54)

albuterol *Com Last admin: 5 mg NEB (07/13/XX 22:07)
 furosemide *Com Last admin: 30 mg IV (07/13/XX 17:19)
 PCA/NCA morphine 30 mg *Com Last admin: 8.3 mL PCA (07/06/XX 06:59)

*Com: Order comment exists. Consult Order Profile or MAR for details

Allergies: cow's milk, eggs, nuts (all tree nuts), Peanuts

Physical Exam:**Basic Vital Signs**

Vitals Signs since (07/13 12:15)	24 h min	24 h max	Most recent (Time)
Temperature	37	38.2	38.2 (11:37)
Heart Rate	117	147	131 (11:37)
BP Systolic	86	103	103 (11:37)
Diastolic	38	66	58 (11:37)
Respiratory Rate	30	46	30 (11:37)
Oxygen Saturation (SPO2)	97%	100%	97% (11:37)
Weight (kg)			32.3 *08:29*

8 yo girl sleeping in mother's arms with mild comfortable tachypnea but no significant distress. Cushingoid, ? mild facial edema. No obvious JVD. Chest wall with CVL without erythema. Occl crackle in bases but good air entry with comfortable tachypnea. Tachycardic while febrile with regular rhythm, nl S1, phys split S2, no systolic murmur, soft diastolic rumble. Abdomen soft but uncooperative with abdomina exam so unable to appreciate liver size. No pitting edema at shins. Good distal pulses, good cap refill.

Input/Output (Daily totals are 0:00-23:59)

In/Out/Bal: Yesterday 2346.74/3688/-1341.26; Today (as of 11:54) 955.39/784/171.39

Labs (Reported 07/13/XX 11:54 – 07/14/XX 11:54)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
07/14 09:00	142	3.42	109	25	21 H	0.5	101 H
07/14 02:00	143	2.65 C	107	26	17	0.5	119 H

Chem	Ca	Mg	Phos
07/14 09:00	8.6	2.2	3.3
07/14 02:00	8.2	2.0	2.9 L

LFTs	AST	ALT	Bili T	Bili D	ALK	ALB	LDH
07/14 02:00	12	6	0.3	0.1	196	3.1	314 H

CBC	WBC	HBG	HCT	PLT
07/14 02:00	13.90 H	7.7 C	24.0 L	410 K H

Diagnostic Imaging:

Echo 7/13/XX: Moderate mitral stenosis (mean gradient ~12 mm Hg with heart rate 140). Mild MR. Round systolic ventricular septal position suggests that the right ventricular pressure is not significantly elevated. Low septal early diastolic tissue doppler velocity suggests impaired relaxation. Central line seen in the left innominate vein. No aortic regurgitation. Normal left ventricular systolic function (EF 60%). Qualitatively good right ventricular systolic function.

CXR: normal heart size. Small L pleural effusion. Mild pulmonary edema.

Assessment & Recommendation):

No evidence of ventricular dysfunction by exam or echocardiography. Given her cardiac history, mitral stenosis and increased LAP may contribute to her respiratory symptoms but do not seem to have rapidly progressed. While her mitral valve gradient is higher on the recent echo, this is in the setting of significant tachycardia (previous study showed a mean gradient ~7 mm Hg with a heart rate of 112 bpm. The valve has a similar 2D appearance. We feel her fever and other issues are likely playing a larger role in her tachypnea, but her symptoms seem to be improved from yesterday after diuretics and negative fluid balance. We would recommend trying to keep her euvolemic and would D/C enalapril in favor of diuretic (switch prn Lasix to 15 mg IV daily). Could consider bid Lasix if response is insufficient. Will follow and consider repeat echo when she is closer to baseline or with clinical change.

History, laboratory data and diagnostic imaging reviewed, patient examined and plan discussed with Dr. Penn.

Eddie D Thomas, MD
Clinical Fellow, Cardiology

Addendum by PENN MB, BS, CHRISTOPHER on July 16, XX 09:43 EDT (Verified)

Reviewed history and examined patient, agree with assessment and plan above

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #8**

Note Type: Discharge Summary
 Date: February 11, XX 11:51 EST
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: JANOTA MD, MANUEL M on February 4, XX 10:06 EST
 Verified by: HINGHAM MD, WILLIAM E on February 14, XX 08:29 EST
 Encounter info: XXXX, Springfield General Hospital, Inpatient, 01/16/XX - 01/24/XX

*** Final Report ***

Dr. ANN PERKINS
 4321 WISTERIA LANE
 SUITE 321
 NEIGHBORVILLE, USA XXXXX

Encounter Number XXXX
 Date of Birth August 29, XX
 Age 4 years old
 Gender Female

Your patient, Natsumi Hirata, was admitted to Springfield General Hospital on 01/16/XX to the Nephrology Service. The principal admission diagnosis was "RENAL TRANSPLANT". Procedures performed during the hospitalization include "SURGICAL REMOVAL OF HEMODIALYSIS CATHETER" performed on 01/20/XX, "SURGICAL PLACEMENT OF NEW QUENTIN HD CATHETER" performed on 01/22/XX, and "RENAL TRANSPLANT" on 02/05/XX.

Natsumi was discharged on 02/11/XX. The principal discharge diagnosis was "RENAL TRANSPLANT" which was noted to be unchanged. Other discharge diagnoses included "ESRD" which was noted to be unchanged.

There were no recent laboratory results before discharge. There are no tests pending at discharge.

Discharge medications:

- * FOLIC ACID: 1 MG LIQUID DAILY
- * GLYCERIN SUPPOSITORY: 1 SUPPOSITORY PER RECTUM AS NEEDED FOR CONSTIPATION
- * LANSOPRAZOLE: 15 MG LIQUID DAILY
- * KEPPRA: 250 MG LIQUID BID
- * METHYLPREDNISOLONE: 2 MG EVERY OTHER DAY
- * REGLAN: 1 MG EVERY 8 HOURS
- * POLY VI SOL: 1 ML LIQUID DAILY
- * OXYCARBAZEPINE: 240 MG LIQUID BID
- * KAYEXALATIE: 5.625 G PER EVERY 24 HOURS FORMULA
- * SOMATOTROPIN: 1.2 MG SC EVERY 24 HOURS
- * COUMADIN: 4 MG DAILY

Discharge diet:

FORMULA SIMILAC PM 60/40, 20 KCAL/OZ, 35 CC/HR CONTINUOUS G-TUBE FEEDS

We gave the following instructions to Natsumi and her family:

CALL DOCTOR FOR FEVER, ABDOMINAL PAIN, VOMITING, DIFFICULTY BREATHING, CHANGE IN BEHAVIOR, OR ANY OTHER CONCERNS
 The discharging provider wrote the following lines regarding this hospitalization:

CC: Infected hemodialysis catheter

HPI: Natsumi is a 4 y.o. female with ESRD on HD, admitted in preparation for a renal transplant. History of perinatal asphyxia secondary to placental abruption. She is s/p deceased donor renal transplant in Feb 'XX, complicated by acute humoral rejection 10 days after transplant, leading to loss of allograft. She has been maintained on HD since May 'XX.

PMH: Perinatal asphyxia -> neurologic impairment and ESRD, CP
 -ESRD: Initially on PD starting at 3 weeks of age; converted to HD in Jan 'XX due to recurrent peritonitis; s/p deceased donor renal transplant in Feb 'XX, complicated by acute humoral rejection, with loss of allograft; now on HD
 -Peritransplant course marked by thrombosis of IVC, right femoral, and right external iliac veins - now on coumadin
 -Complications of ESRD: hyperPTH, hyperPhos, hyperKal, anemia
 -Seizure d/o
 -s/p G-tube
 -Dev delay

Meds:

Prevacid 15mg every day
 Reglan 1mg PO/GT Q8H
 Trileptal 240mg PO/GT BID
 Keppra 250mg PO/GT BID
 Medrol 2mg PO/GT every other day
 Coumadin 1.5mg PO/GT once daily (goal INR 2-3)
 Nutropin 1.2mg SC once daily
 Folic Acid 1mg PO/GT once daily
 Poly-Vi-Sol 1ml PO/GT once daily
 Kayexalate 1 1/2 tsp per 24 hours of formula (decanting formula)
 Epogen 2,700 units 3x/wk (given with dialysis)
 Glycerin Suppository; one prn bid
 L-Carnitine 500 mg IV with HD 4x/wk (given with dialysis)
 Zemplar 10 mcg IV with HD 4x/wk (given with dialysis)
 Zyrtec 2.5 mg GT daily

Diet: Similac PM 60/40 35 cc/hr continuous G-tube feeds

Allergies: Inderal - tachycardia

IMM: UTD

Physical Exam:

Afeb, 105, 26, 87/59, 100% RA
 Lying in bed, NAD
 MMM
 Neck supple, no LAD
 Good air entry, coarse transmitted upper airway sounds
 RRR, S1S2, no m/r/g
 Soft, NT, ND, +BS, G-tube c/d/i
 No rash
 Site of cath removal c/d/i, no hematoma

Assessment: 4 y.o. girl with ESRD on HD, now with infection of HD catheter, refractory to Abx treatment. Presents for surgical removal of line.

Hospital course as follows by system:

1. Renal:

- Infected left subclavian HD cath removed four days after admission, without complication
- US of neck vessels on 01/21 showed patent vessels
- Returned to OR on 01/22 for placement of new Quentin HD catheter
- Underwent hemodialysis next day

Comment [AS1]: First trigger (#15): Healthcare-associated infections: positive blood culture (only after 48 hours from admission).

2. CVS/Resp: Remained hemodynamically stable, comfortable on room air

3. FEN/GI: Continued home GT feeds.

4. ID: Developed fever 48 hours after admission. Left subclavian HD cath grew out *E. faecalis* on 01/20/XX after having low-grade fevers. She was treated with vanco, but cultures persistently positive.

Comment [AS2]: First trigger (#15): Healthcare-associated infections: positive blood culture (only after 48 hours from admission) is shown here again.

-Continued Vancomycin with dialysis, and will continue to be treated upon discharge

-Blood cultures from 01/21 and 01/22 were NGTD

5. Heme: Coumadin held peri-procedurally; restarted at 4 mg daily prior to discharge; will have INR checked with dialysis, and will adjust coumadin dose accordingly

-INR 1.11 on 01/21

Thank you for allowing us to participate in the care of your patient, and for continuing to refer your patients to Springfield General Hospital.

Attending Physician: William Hingham, Phone (XXX) XXX-XXXX

Discharging Provider: Manuel Janota, Pager (XXX) XXX-XXXX

Note Type: Operative Note
 Date: January 20, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: BUBULKA MD, NOLAN W on January 20, XX 19:19 EST
 Verified by: BUBULKA MD, NOLAN W on January 22, XX 21:11 EST
 Encounter info: XXXX, Springfield General Hospital, Documents, X/X/XXXX - X/X/XXXX

* Final Report *

DATE OF PROCEDURE: 01/20/XX

PRE-OPERATIVE DIAGNOSIS: 1. Chronic renal failure. 2. Hemodialysis infection.

POST-OPERATIVE DIAGNOSIS: Same

PROCEDURES PERFORMED: Tunneled hemodialysis catheter removal.

SURGEON: Nolan Bubulka, M.D.

ASSISTANTS: Phillip Eid, M.D.

PATIENT AGE: 4 years, 19 kilograms

ANESTHESIA: General endotracheal anesthesia by Dr. Marco Acosta.

INDICATIONS: This young girl has a complex medical history including bilateral Wilms' tumors and a failed kidney transplant. She was admitted 1/16, several days prior to her scheduled renal transplant, and placed on hemodialysis the same day. Unfortunately this catheter became infected while she was in the hospital awaiting transplant so Dr. Trisha Doerfler has requested that it be removed.

FINDINGS: The patient underwent uncomplicated removal of the hemodialysis catheter. It was removed intact. The tip was sent for culture.

DETAILS OF PROCEDURE: After induction of general anesthesia, she was already on antibiotics, she was very carefully positioned and hard points carefully padded. Her left chest and neck were meticulously and thoroughly sterilely prepped and draped.

CATHETER REMOVAL: We cut sutures holding it in position, dissected the cuff off from the surrounding tissues until we could slide the catheter out. The catheter was slowly slid out. It was removed intact. There was egress of dark blood out of the wound. We held pressure over the wound until the bleeding stopped after about a minute or two. We then used Steri-Strips to occlude the wound and apply sterile dressing. We did locally infiltrate Marcaine for postop pain control.

COMPLICATIONS: None

ESTIMATED BLOOD LOSS: Less than 3 ML

PATHOLOGY: Catheter

Comment [AS3]: First trigger (#15): Healthcare-associated infections: positive blood culture (only after 48 hours from admission) is shown here again.

Comment [AS4]: Adverse event #1: Hospital-acquired infection in central line/catheter
 Preventability: Probably preventable
 Severity: F

Trigger #15 helps identify this adverse event. This patient came to the hospital for a kidney transplant. However, while waiting for the transplant, her hemodialysis catheter became infected. While catheter infections are common, having a catheter infected within four days of inserting a catheter is an unintended consequence of medical care that was probably preventable.

Comment [AS5]: Key lesson #10: Usually, cases of hospital-acquired infections are preventable.

MICROBIOLOGY: Catheter tip being sent for cultures.

I am the attending surgeon present for the entire procedure. The patient tolerated the procedure well and at the end of the operation, is being awakened for transport to the recovery room in good condition.

Surgical End Time: 10:56	Pt. Out of O.R.: 11:24
Pt. Transferred to: PACU	Transferred Via: BED W/ O2
Pt. In PACU: 11:10	Pt. Out of PACU: 13:25
Pt. In Other:	Pt. Out of Other:

Comments: TO DIALYSIS AND THEN TO FLOOR 6A

Signature: CHEN RN

Signature: ELIZABETH

Implant	QTY	Size
Lot No	Serial No	

Note Type: Operative Note
 Date: January 21, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: MAJORS MD, STACEY L on February 03, XX 05:47 EST
 Verified by: MAJORS MD, STACEY L on February 20, XX 18:21 EST
 Encounter info: XXXX, Springfield General Hospital, Inpatient, 01/16/XX - 01/24/XX

*** Final Report ***

DATE OF PROCEDURE: 01/21/XX

PRE-OPERATIVE DIAGNOSIS: Chronic renal failure.

POST-OPERATIVE DIAGNOSIS: Chronic renal failure.

PROCEDURES PERFORMED: Placement of left femoral 11-French Mahurkar hemodialysis catheter.

SURGEON: Stacey L. Majors, MD

CO-SURGEON: David Lindiwe, MD (Interventional Radiology)

FIRST ASSISTANT: Dan Thuy Nguyen, MD

INDICATIONS FOR PROCEDURE: Natsumi is a four-year-old little girl with chronic renal failure as well as a multitude of medical problems. She has failed transplantation and has been known to have exceedingly difficult vascular access. Because of this, an upper extremity ultrasound was done that showed the jugular system to be patent bilaterally. She presents for temporary hemodialysis catheter replacement as her recent line required removal because of infection. She has a history of exceedingly difficult vascular access. Her former line was in the left subclavian.

Comment [AS6]: Adverse event #1 is shown here again.

DESCRIPTION OF PROCEDURE: After informed consent was obtained from her parents, the patient was taken to the operating suite and placed in the supine position where general anesthesia was induced without difficulty. The chest and bilateral neck was prepped and draped in the usual sterile fashion. She received antibiotics.

We turned our attention to the left subclavian vein. Dr. Nguyen and I tried for over 20 min to access this vein without any success or a flash despite multiple repositioning maneuvers. Fluoroscopy showed that there was no pneumothorax.

We then went to the right neck where we tried for another 20 min or so to access the right subclavian. Again we were never even able to obtain a flash in order to even attempt to thread a guidewire. Another fluoroscopic shot showed no pneumothorax.

We then arranged to have the SonoSite ultrasound machine brought into the room. She had no visible veins in her neck and multiple scars. We turned our attention first to the right neck and were not really able to identify any significant internal jugular system. At that point, I called Dr. David Lindiwe who is our interventional radiologist on-call for intraoperative

assistance. He was gracious to come help for what turned out to be the next 4 hrs.

Dr. Lindiwe ultrasounded the right neck with us disagreeing with the previous read on the ultrasound in that he did not see an internal jugular vein on the right. Rather we saw a small external jugular. We were able to access this with the use of the SonoSite and thread a small guidewire. However, this kept meeting resistance at the brachiocephalic. It took multiple catheter changes and maneuvers, which he will dictate in his consultation note to maintain access of the vein over a guidewire. We then were finally able to thread a small catheter into this system and perform a venogram under fluoroscopic guidance. This venogram showed complete occlusion of the brachiocephalic system with filling through collaterals into the right chest into the azygos system. These were very circuitous appearing much like a medusa and finally went centrally. However, there was certainly no direct pathway or any stenotic area that we could dilate to utilize the right neck. We then reultrasounded and confirmed that we did not see an internal jugular on that side. We therefore then abandoned this approach.

We could see a reasonable IJ in the left neck with ultrasound. Dr. Lindiwe punctured this with the use of the SonoSite and we threaded the guidewire centrally. We performed dilations with the Cook vascular catheter over the vein and then ultimately were able to thread a small catheter to do a venogram as we were not able to get the guidewire to thread centrally as it kept meeting resistance at the brachiocephalic system. Unfortunately the venogram appeared fairly similar to the one on the right neck filling multiple small thready collaterals ultimately going centrally but certainly not through any major venous system. These appeared to fill the hemiazygos system and then collaterals into the heart. Therefore, it appeared that we had bilateral brachiocephalic occlusion and Dr. Lindiwe and I agreed that there was no utility in continuing this approach. It had now been approximately three to four hours attempting to gain access.

We then broke down the surgical drapes and prepped and draped the lower extremities. I had a discussion with Dr. Hingham who is her attending nephrologist. She had had her previous transplant in the right iliac fossa and they were trying to save the left side for her transplant, which would be our last choice for vascular access. Nonetheless she is obvious in need of dialysis.

We then went to the right groin where ultrasound showed no femoral system that was patent. There was a very superficial thready vein that we were able to cannulate under ultrasound guidance. The regular wire was not able to be threaded at all meeting resistance at the inguinal ligament. We were able to pass a very small glidewire and dilated this up with several catheter and glidewire changes in order to get a small catheter into this thready tributary, which is the only patent vessel in her right groin. A venogram showed complete occlusion of the iliac system on the right with collateralization into the retroperitoneum and lumbar system, but certainly no filling of the cava. Obviously, this would not be suitable for central access as there was a complete occlusion here and there was nothing to even dilate.

Therefore as our last choice we went to the left groin and found a small collateral vein. A guidewire would not initially thread centrally and we had to again do several catheter changes and manipulations in order to put a small catheter in to perform a venogram. This venogram showed filling of the

Comment [AS7]: Second trigger (#3): Change in procedure.

The surgery was supposed to be for placement of a L-femoral hemodialysis catheter however the patient ended up getting a catheter in her small collateral vein.

Comment [AS8]: Key lesson #6: Not all triggers lead to an adverse event. They only provide clues that an adverse event may have occurred.

Here, although trigger #3 – change in procedure – exists, the trigger does not identify an adverse event. The patient has been maintained on a HD catheter, which has led to poor venous access so the change in procedure is due to the underlying chronic disease process.

iliac but then a very stenotic area up in the cava with preferential filling of the collaterals. At least this was something that we could then possibly dilate. Dr. Lindiwe manipulated a very small glidewire ultimately up the iliac. With multiple long manipulations we were able to get this glidewire through the area of the caval stenosis. We then were able to serially dilate up the cava in order to accept the 11-French Mahurkar catheter, which was finally placed centrally. The tip was up above her native renals and excellent function was verified. We flushed the catheter with heparinized saline and secured this in multiple locations to the skin.

Clearly, this is a tour de force of both the pediatric surgical service as well as interventional radiology and took approximately 5.5 hr to obtain this access. However, it was exceedingly useful information as she is going to be very difficult for additional access in consideration of transplantation. In fact, Dr. Lindiwe suggested that we not attempt any central access in the traditional fashion but rather on her next line go straight to transhepatic cannulation. I will share this with Dr. John Watson, her transplant surgeon, as this is a very challenging situation for Natsumi.

ESTIMATED BLOOD LOSS: 20 mL.

SPECIMENS: None.

DRAINS: None.

COMPLICATIONS: None.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #9**

Note Type: Discharge Summary
 Date: May 09, XX 01:30 EST
 Status: Auth (Verified)
 Subject: Discharge Summary
 Created by: LORINSKI MD, PETER A on July 08, 2010 16:15 EDT
 Verified by: ROSENBERG MD, ADAM D on July 20, 2010 11:23 EDT
 Encounter info: XXXX, Wyndham Hospital, Inpatient, 2/5/2010 - 2/9/2010
 Contributor system: ORADOC

*** Final Report ***

ADMISSION DIAGNOSIS: Biliary Atresia

SECONDARY DIAGNOSIS: History of bronchiolitis

DISCHARGE DIAGNOSIS: Pulmonary hypertension, multisystem organ failure, arterial bleeding post liver transplant

OPERATIVE PROCEDURES:

1. Liver transplant with reduced graft, right trisegmentectomy, and choledochocholedochostomy on 5/6/XX.
2. Emergency laparotomy, right femoral arterial line placement, and direct inferior vena cava catheter placement performed on 5/9/XX.

CONSULTATIONS: Infectious Disease, Nutrition, Pharmacy, Social Work, Liver Hepatology

HISTORY OF PRESENT ILLNESS: Alex was a 3-month-old male who had presented preoperative for a liver transplant. The patient had been seen previously when he was transferred from Shoreline Medical Clinic for a liver transplant evaluation. The patient has biliary atresia. He was admitted to Shoreline Medical Clinic on April 17 with fever and tachypnea with confirmed bronchiolitis and was transferred to Wyndham Hospital on April 20 for pre-transplant evaluation.

PAST MEDICAL HISTORY: 25 weeks gestation with a significant Neonatal Intensive Care Unit course. Was on CPAP but was not on any oxygen after his initial neonatal course. The patient was on Similac 60/40 during the day and 12 hours overnight PC N-G tube running for 30 hours at night. The patient had an extensive evaluation by the Liver Transplant Team pre-surgery as well. The patient was up to date with his immunizations.

FAMILY HISTORY: Non-contributory

MEDICATIONS:

1. Protonix
2. Bactrim 3 times a week for prophylaxis
3. Tylenol as needed
4. Zofran as needed

PHYSICAL EXAMINATION UPON ARRIVAL TO THE HOSPITAL PRE-TRANSPLANT: Jaundiced, poorly-nourished-appearing male Mother at bedside. Patient afebrile, vital signs were stable. Good breath sounds, regular rhythm, abdomen soft, large

palpable liver with full margins. The patient was then brought to the operating room for a liver transplant.

HOSPITAL COURSE: On 5/5/XX, the patient went to the operating room where he had an uncomplicated orthotopic liver transplant with reduced graft, including segments 1, 4-8 performed by Dr. Adam Rosenberg, Dr. Pablo Hermoso, and Dr. Maziar Rassi. Postoperatively, the patient was brought to the Intensive Care Unit for recovery. Patient did well. Postoperative ultrasound showed all transplant vessel anastomoses were widely patent with no perihepatic chelation or other acute complications. Patient was managed on a heparin drip, aspirin, dextran, basiliximab, methylprednisolone, nystatin, pantoprazole, tacrolimus was started on postoperative day #1. The patient was extubated and was doing well otherwise.

On postoperative day #2, the patient was transferred to the floor, doing well. He was started on a diet of clear liquids on 5/8/XX.

The patient was transferred to the Intensive Care Unit late in the evening on postoperative day #3 into 4 for just 2 days. He developed acute onset of refractory hypotension which required emergent transfer back to the Intensive Care Unit. He was fluid-resuscitated and intubated for decreased mental status and hypotension. Consideration was made for ECMO but while the circuit was being set up, he improved with fluid-resuscitation and pressors. Following this, his abdomen became acutely distended with blood coming from his J-P drains and it was then decided to take him emergently to the operating room for exploration. Bleeding was identified from the hepatic artery. With repair of the artery, the bleeding stopped and the patient gradually stabilized. He was transferred back to the ICU following the procedure.

Comment [AS1]: First trigger (#24): Transfer to higher level care.

Comment [AS2]: Second trigger (#23): Return to surgery.

Comment [AS3]: Key lesson #7: Multiple triggers can point towards one event, i.e., an adverse event may be manifested in multiple ways.

Here, two triggers – transfer to higher level of care and return to surgery – point towards adverse event #1.

Comment [AS4]: Adverse event #1: Post-operative bleeding
Preventability: Probably preventable
Severity: H

Triggers #23, and #24 both help identify this adverse event. The sequence of events – patient's transfer to the intensive care unit (trigger #24) and the patient's return to surgery (trigger #23) – both point to the difficulty of this hospitalization. Post-operative bleeding is often considered a preventable event.

Note Type: Operative Note
 Date: May 05, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: ROSENBERG MD, ADAM D on May 08, XX 14:29 EST
 Verified by: ROSENBERG MD, ADAM D on May 16, XX 14:49 EST
 Encounter info: XXXX, Wyndham Hospital, Inpatient, 5/5/XX - 5/9/XX

*** Final Report ***

DATE OF START OF PROCEDURE: 05/05/XX.
 DATE OF COMPLETION OF PROCEDURE: 05/06/XX.

AGE OF PATIENT: 3 months.

PRE-OPERATIVE DIAGNOSIS: Biliary Atresia

POST-OPERATIVE DIAGNOSIS: Biliary Atresia

PROCEDURES PERFORMED: 1. Orthotopic liver transplant with reduced liver graft (segments 1, 4-8).
 2. Insertion of central venous line.

SURGEON: Rosenberg, Adam Daniel, MD.

ASSISTANTS: Rassi, Maziar, MD.
 Hermoso, Pablo B, MD, Ph.D.

ANESTHESIA: General endotracheal.

COMPLICATIONS: None.

INDICATIONS FOR SURGERY: This young boy was born prematurely and, therefore, spent the first three months of his life in the hospital. He was recently diagnosed with biliary atresia.

FINDINGS AT SURGERY: We performed orthotopic liver transplant using a graft from an 8 kilogram weight donor. The graft was reduced in situ and consisted of segments 1, 4-8. The graft was implanted in standard piggyback fashion with an end-to-end anastomosis from the donor suprahepatic vena cava to the recipient confluence of the left and middle hepatic veins, end-to-end portal vein anastomosis, and end-to-end hepatic artery anastomosis from a branch patch of the recipient confluence of the left and right hepatic arteries to the donor branch patch of the celiac and splenic arteries.

Operative times were as follows:
 Donor cross-clamp time was on 05/05/XX at 2220 hours.
 The hepatic artery was ligated on 05/06/XX at 0115 hours.
 The portal vein was clamped at 0243 hours.
 The liver came off ice at 0547 hours.
 The portal vein was opened at 0312 hours.
 The artery was re-perfused at 0359 hours.

The estimated blood loss was 200 mL.

Transfusions consisted of:
 Packed red blood cells 270 mL.
 Albumin 120 mL.
 Fresh frozen plasma 60 mL.
 Platelets 60 mL.
 Cryoprecipitate 120 mL.
 Crystalloid 60 mL.

A team surgery approach was necessary to complete this very complex operation in this child weighing only 5.5 kilograms with biliary atresia. Dr. Rosenberg was responsible for placement of the central venous line and the entire operation, including hepatectomy and implantation of the graft. Dr. Rassi was responsible for back table preparation of the graft, as well as the entire operation, including hepatectomy and implantation. Dr. Hermoso was responsible for back table preparation of the graft.

DESCRIPTION OF PROCEDURE: The patient was brought to the operating room and placed in the supine position. After general endotracheal anesthesia was achieved, we began with central venous line placement. A #4.8 French, 8 centimeter, double-lumen Arrow catheter was in the right subclavian vein without complication under fluoroscopic guidance. The site was sterilely dressed.

We then prepared and draped the abdomen in the usual sterile fashion. A large bilateral subcostal incision was made. The Thompson retractor was used for exposure. We then mobilized the liver from its ligamentous attachments. We began by dissecting out the porta hepatis. The hepatic artery was ligated beyond its bifurcation and divided. Bleeding ensued, but with some difficulty, we were able to suture the artery. The portal vein was skeletonized. We then mobilized the liver from the retrohepatic cava and ligated multiple direct branches. The right hepatic vein was encircled. This was suture ligated and divided. The caudate lobe was completely mobilized, and the liver was left on a pedicle of the portal vein for inflow and left and middle hepatic veins for outflow.

While this was going on, the graft was being prepared on the back table. The graft was taken from an 8 kilogram donor and was reduced in situ. It consisted of segments 1, 4-8, with good perfusion of segment 4. There was a single common bile duct. The hepatectomy was completed by cross-clamping the left and middle hepatic veins and clamping the portal vein, and the liver was removed. The confluence of the left and middle hepatic veins was then opened into a single orifice, which appeared to be a good size match for the donor suprahepatic cava. There was adequate hemostasis.

The liver was brought to the table and anastomosed in the following fashion. The donor suprahepatic vena cava was anastomosed end-to-end to the confluence of the left and middle hepatic vein with running 5-0 Prolene suture. The portal vein was then anastomosed end-to-end from main portal vein to main portal vein with running 6-0 Prolene suture. This was tied with a small amount of growth factor to allow for anastomotic expansion. Portal flow was restored to the liver graft, and a small blood flush was performed, with evacuation via the infrahepatic vena cava. Once we had adequate blood flush, the infrahepatic vena cava was ligated, and the hepatic vein clamp was removed.

The patient was stable throughout the procedure. The liver perfused evenly, although it still appeared somewhat dark at this point, without arterial

Comment [AS5]: Key lesson #8: During procedure, bleeding developed due to difficulty placing a suture, addressed intra-operatively. This bleeding is unintended and is part of adverse event #1.

Comment [AS6]: When reviewing charts, pay attention to any hints or suggestions that an operation or treatment plan had difficulty since these situations may lead to adverse events. Here, the operative note states that the artery was sutured with difficulty. It may be that adverse event #1 was caused by the rupture of this section of the artery.

flow. After taking a few moments to achieve hemostasis, we turned our attention to the hepatic artery anastomosis. The recipient hepatic artery bifurcation was dissected free, and the main hepatic artery was clamped with a bulldog clamp. The confluence of the left and right hepatic arteries was opened into a single branch patch, which appeared to have excellent inflow. The donor common hepatic artery was opened as it came off the celiac into a branch patch of the celiac and the splenic artery. These appeared to be a good size match for the recipient artery branch patch. We then performed the anastomosis with interrupted 7-0 Prolene sutures. The artery was fed via the side branch of the gastroduodenal artery, and flow was restored. The liver pinked up immediately and evenly and began making bile almost immediately. There was excellent Doppler flow in both the hepatic artery and portal vein at this point. Three Jackson-Pratt drains were placed, the right one behind the right lobe of the liver, the middle one behind the bile duct anastomosis, and the left one near the cut edge of the liver. The wound was closed with two layers of running PDS to the fascia, followed by subcutaneous and subcuticular Vicryl. Sterile dressings were applied.

The patient tolerated the procedure well and was extubated in the operating room and taken to the recovery room in stable condition.

Note Type: Liver Intestine Transplant Inpatient MD
 Date: May 08, XX 17:58 EST
 Status: Auth (Verified)
 Subject: Liver Transplant POD#2
 Created by: GIANDECHI MD, SACHI L on May 08, XX 18:02 EST
 Verified by: GIANDECHI MD, SACHI L on May 09, XX 11:48 EST
 Encounter info: XXXX, Wyndham Hospital, Inpatient, 5/5/XX - 5/9/XX

*** Final Report ***

Interval History: Tm 38.4, PRBC today for low HCT, transferred to 6A

Basic Vital Signs

Vitals Signs since (05/07 17:58)	24 h min	24 h max	Most recent (Time)
Temperature			37.1 (14:42)
Heart Rate	133	170	133 *16:58*
BP Systolic			116 (14:55)
Diastolic			104 (14:55)
Respiratory Rate	26	37	37 *16:58*
Oxygen Saturation (SPO2)	96%	99%	99% *16:58*
Weight (kg)			5.35 (15:16)

IO Summary (Daily totals are 0:00-23:59)

I&O	05/07/XX - 05/07/XX	05/08/XX as of 17:58
In: parenteral	30.84	15.19
In: TOTAL	30.84	15.19
Out: urine	0	84
Out: tubes/drains/other	0	18
Out: TOTAL	0	102
Balance: TOTAL	30.84	-86.81

Active Medication Orders

Scheduled Medications

aspirin 20.25 mg PO daily *Com
 basiliximab 10 mg IV 1time Stop: 05/10/XX 13:16 *Com
 cytomegalovirus immune globulin 840 mg IV 1time Stop: 05/08/XX 17:00 *Com
 filgrastim 28 mcg IV Q24hr Last admin: 28 mcg IV (05/08/XX 11:00)
 ganciclovir 28 mg IV Q12hr *Com
 methylPREDNISolone 16.68 mg IV 2 dose Q12hr Stop: 05/08/XX 21:00 *Com Last admin: 16.68 mg IV (05/08/XX 09:00)
 methylPREDNISolone 22 mg IV 2 dose daily Stop: 05/09/XX 10:00 *Com
 methylPREDNISolone 11 mg IV 1 dose daily Stop: 05/10/XX 09:00 *Com
 nystatin 1 mL PO QID Last admin: 1 mL PO (05/08/XX 16:00)
 pantoprazole (PANTOprazole) 5.5 mg IV Q24hr *Com Last admin: 5.5 mg IV (05/08/XX 08:00)
 prednisolONE 6 mg PO 1 dose daily Stop: 05/11/XX 09:00 *Com
 prednisolONE 3 mg PO daily *Com

tacrolimus (TACROLIMUS) 1.5 mg PO Q12hr *Com Last admin: 1 mg NG (05/08/XX 09:00)

PRN Medications

diphenhydramine (Benadryl) 6 mg IV Q4hr PRN Itching *Com Last admin: 6 mg IV (05/08/XX 09:38)

lidocaine topical (LMX 4 with Tegaderm) 1 g TOP 5x/Day PRN Procedure(s) *Com

morphine (morphine IV) 0.278 mg IV Q2hr PRN Pain Last admin: 0.278 mg IV (05/08/XX 17:01)

sucrose (Sucrose 24% oral solution) 2 mL PO Q2hr PRN Pain *Com Last admin: 2 mL PO (05/08/XX 14:52)

Continuous Medications/Fluids

D5W NS 500 mL + potassium CHLORIDE, IVF 10 mEq IV *Com

heparin [33.00 unit/kg/hr] + NS *Com Last rate: 33 unit/kg/hr

Suspended/On-Hold Medications

acetaminophen (Suspended) 60 mg PR Q4hr PRN Fever/Pain Last admin: 60 mg PR (05/06/XX 12:36)

Additional Medications Admin within last 24 hours (or since 05/07 17:58)

ampicillin-sulbactam (Unasyn) *Com Last admin: 264.5 mg IV (05/08/XX 06:00)

furosemide *Com Last admin: 6 mg IV (05/08/XX 10:00)

heparin [27.00 unit/kg/hr] + D10W *Com Last rate: 18 unit/kg/hr

methylPREDNISolone *Com Last admin: 22.24 mg IV (05/07/XX 21:00)

morphine *Com Last admin: 1 mg ICU-IV (05/08/XX 11:30)

*Com: Order comment exists. Consult Order Profile or MAR for details

Allergies: No known allergies

Physical Examination:

GEN: alert, crying, appears hungry, mother at bedside and attentive

HEENT: sclera clear, MMM, NGT R nare

CHEST: port accessed, RRR, no murmur, LS CTAB, easy WOB

ABD: soft, NTND, transverse dsg c/d/i, JP x3 with sanguinous drainage in dsg and in drain, foley catheter with pale yellow urine

EXT: WWP, no edema, PIV

Labs (Reported 05/07/XX 17:58 - 05/08/XX 17:58)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
05/08 16:15	140	3.51	104	24	9	0.3	108 H
05/08 08:56	138	4.26	108	21 L	8	0.3	107 H
05/08 04:46	134 L	4.07	102	21 L	7	0.2	105 H
05/07 22:10	129 L	3.67	98 L	24	6	0.2	124 H

Chem	Ca	Mg	Phos
05/08 16:15	9.3	1.6	2.4 L
05/08 08:56	8.7	1.5	2.7 L
05/08 04:46	8.9	1.6	2.6 L
05/07 22:10	8.7	1.5	2.6 L

LFTs	AST	ALT	Bili T	Bili D	ALK	ALB	LDH
05/08 16:15	234 H	111 H	0.7	0.2	160	3.5	472 H
05/08 08:56	229 H	105 H			116	2.9 L	321
05/08 04:46	235 H	110 H	0.5	0.2	113	2.8 L	
05/07 22:10	246 H	118 H	0.6	0.3	95 L	2.6 L	

CBC	WBC	HBG	HCT	PLT
05/08 16:15	34.57 H	11.8	34.3	180 K L
05/08 04:46	2.73 L	7.5 C	21.8 L	159 K L
05/07 14:10	3.94 L	7.8 C	22.7 L	163 K L
05/06 15:52		11.0	33	
05/06 04:15		10.6 L	32	
05/06 03:15		12.9 H	39 H	
05/06 02:35		12.1	36	
05/06 01:30		11.3	34	
05/06 00:55		9.1 L	27 L	
05/05 23:30		9.2 L	27 L	

Comment [AS7]: Third trigger (#21): Drop of Hgb or Hct of >25% in less than 24 hours.

This trigger points to adverse event #1. The patient's rapid loss of hematocrit between 05/06 and 05/07 is associated with the patient's post-operative bleeding.

Comment [AS8]: Key lesson #7: Multiple triggers can point towards one event, i.e., an adverse event may be manifested in multiple ways.

At this point in the chart review, three triggers — transfer to higher level of care, return to surgery, and drop of Hgb or Hct of >25% in less than 24 hours — point to adverse event #1.

COAG	PT	INR	PTT	FIB	FIB Est	D-Dimer
05/08 16:15	11.8	1.13	50.5 C		278	
05/08 07:10	10.9	1.03	40.2 H	283	301	
05/08 04:46	10.5	0.99	41.0 H		333	
05/07 22:10	10.3	0.97	44.9 H		356	

Diagnostic studies: 5/8/XX ABD US doppler: There is a small amount of free pelvic fluid.

Grayscale examination of the liver is unremarkable, without evidence of focal lesions or biliary radicles dilatation. The two main hepatic veins demonstrate normal triphasic waveform. The main hepatic artery demonstrates normal arterial waveform, with a resistive index of 0.53. Intrahepatic portal vein demonstrate normal monophasic hepatopedal flow. Native IVC is identified and demonstrate normal waveform. Evaluation of the aorta is limited but demonstrates high resistance arterial waveform.

Views of the pancreas are limited by overlying bandages. However, the previously visualized loculated collection, just to the left of the left hepatic margin is again identified, and appears slightly smaller. The right kidney measures approximately 4.7 cm. The left kidney measures approximately 5.7 cm. There is no evidence of hydronephrosis. The spleen measures 5.3 cm.

Micro Results: Updates since 05/07 17:58. Collection date displayed.

Blood Culture Routine, Aerobic: (Blood, Venous) 05/06. **Preliminary Report:** No growth to date Culture is continuously monitored and will be updated if positive

Blood Culture Routine, Aerobic: (Blood, CVL) 05/06. **Preliminary Report:** No growth to date Culture is continuously monitored and will be updated if positive

Blood Culture Routine, Aerobic: (Blood, Portacath) 05/06. **Preliminary Report:** No growth to date Culture is continuously monitored and will be updated if positive

EBV PCR, Quantitative: (Blood) 05/06. **Final Report:** No EBV DNA detected by PCR. The lower limit of this test is 10,000 EBV genomes per mL of blood. A reference range for this test has not been established. Results should be interpreted in the context of other clinical and laboratory information. Values obtained in this test can be compared to those obtained at University of Pittsburgh (where the test was previously sent) using these approximate values: 10,000 in this test equals 8 at Pittsburgh; 25,000 in this test equals 40 at Pittsburgh; 150,000 in this test equals 200 at Pittsburgh; 500,000 in this test equals 500 at Pittsburgh. This test is performed on whole blood, while the test at University of Pittsburgh is performed on purified lymphocytes. This test should not be used to diagnose latent or previous EBV infection. People with latent or previous EBV infection may not have detectable EBV DNA in their blood by this test. The variability of this test should be considered when interpreting results. Changes of approximately

three fold in the quantity of EBV DNA detected may be due to variation in the test rather than actual changes in the level of EBV DNA in the sample. Note: This test was developed and its performance characteristics determined by the Infectious Diseases Diagnostic Division of Wyndham Hospital. It has not been cleared or approved by the U.S. Food and Drug Administration. The FDA has determined that such clearance or approval is not necessary.

MRSA Culture: (Nares) 05/06. **Final Report:** No methicillin resistant *Staphylococcus aureus* isolated

Urine Culture: (Urine, straight catheterized) 05/06. **Preliminary Report:** No growth or fewer than 1,000 organisms/mL

VRE Culture, Rectal: (Rectum) 05/06. **Final Report:** No vancomycin resistant Enterococci isolated

Impression and Plan: 3 mo male now POD#2 right reduced lobe liver transplant for biliary atresia in stable condition.

1. Methylprednisolone 3 mg/kg IV q12hrs today, 4 mg IV x1 in am 5/9, 2 mg/kg IV 5/XX, prednisolone 1 mg/kg po 5/11, prednisolone 0.5 mg/kg po 5/12 per protocol
2. nystatin 1 ml QID
3. ganciclovir 5 mg/kg/dose q12hrs and cytogam 150 mg/kg IV x1 as donor CMV+
4. Labs q6hrs today, q12hrs tomorrow
5. Heparin drip with goal PTT 60
6. Antithrombin III goal 50-70 - only treat if less than 50
7. ABD US doppler 5/9 per protocol
8. Start aspirin when heparin drip DC approx POD#5
9. Remove NGT now, start pedialyte po only 10 mL per feed
10. Foley to gravity
11. Prograf 1.5 mg po q12hrs
12. Synagis due 5/26/XX
13. Basiliximab POD#4 per protocol
14. IVF at maintenance
15. WBC elevated to 34 this pm - send blood cultures now from port. May be elevated in setting of GCSF x1 this am but pt febrile this am.

Jillien Lochridge, CPNP

Attending Note: I have reviewed the available patient data and assisted with the coordination of care with input from members of the multidisciplinary team.

Patient seen and examined. laboratory evaluation reviewed. PE lungs with good air entry bilaterally, abdomen soft, surgical site covered in gauze, passed flatulence during exam. Assessment as above. Plan discussed with team and mom. I participated in a multidisciplinary discussion of this child's status, course and plan of care. The multidisciplinary group included the transplant surgeon, nurse coordinator, dietitian, transplant pharmacist, social worker, and staff nurses from the transplant unit.

Sachi Giandechi, MD
Attending in Hepatology

Note Type: Inpatient Nursing
 Date: May 08, XX 20:00 EST
 Status: Auth (Verified)
 Created by: MORAN RN, PATRICIA R on May 08, XX 20:17 EST
 Verified by: MORAN RN, PATRICIA R on May 08, XX 23:15 EST
 Encounter info: XXXX, Wyndham Hospital, Inpatient, 5/5/XX - 5/9/XX

*** Final Report ***

Progress Note - Nursing

Problem: Alteration in fluid balance / ICU transfer

Outcome: Pt admitted this afternoon. By report he had received a blood transfusion prior to transfer. VSS. BP 's 116/84, afebrile. Patient was alert and fussy. He received Sweet-ease for comfort and it seemed to soothe him for short intervals. Mom at side was able to soothe Alex and he finally fell asleep. Labs were drawn at 1600, and of note his WBC's had risen to 34.35. Cultures were ordered and obtained from his Port. his pre CMVIG VS showed an elevation in his BP's (130's over 80's) and his heart rate was also elevated to the 130's. Surgery was paged and informed as well as asked if CMVIG should be started. It was decided to continue. Patient continued with increasing BP's and surgery was again informed and checked in on his status. At 2045 he woke abruptly and was diaphoretic, his BP's were still elevated, his temp was 36.6, he had a desat to 86 which initially improved with BB O2. Surgery was paged and at the time she first saw him he appeared stable with a BP of 116/70, without respiratory distress. Within 2 minutes he was limp, pale and had desated to 83. He was switched to 1L O2 by NC and an ICU STAT was called. His BP continued to drop to 46/30, a 100cc NS bolus was given before he was transferred.

Alex did not receive his tacrolimus Team and ICU RN aware. His CMVIG was stopped abruptly with 5mL remaining of an 840mg/ 16.8 mL dose

Comment [AS9]: Fourth trigger (#9): Abrupt medication stop.

Problem: Potential Alteration in Coping:

Outcome: Mom is very attentive and caring. She watches over Alex as he slept and was able to hold him for about 30 minutes this afternoon. During the ICU Stat she remained calm and understood the need to transfer Alex to the ICU.

Comment [AS10]: First trigger (#24): Transfer to higher level of care is shown here again.

Comment [AS11]: Both triggers #9 and #24 are associated with adverse event #1.

Note Type: Operative Note
 Date: May 08, XX 00:00 EST
 Status: Auth (Verified)
 Subject: Operative Note
 Created by: ROSENBERG MD, ADAM D on May 09, XX 08:39 EST
 Verified by: ROSENBERG MD, ADAM D on May 16, XX 14:49 EST
 Encounter info: XXXX, Wyndham Hospital, Documents, 1/1/1869 - 1/1/2100

*** Final Report ***

DATE OF PROCEDURE: 05/8/XX

PRE-OPERATIVE DIAGNOSIS:

1. Biliary Atresia
2. Status post orthotopic liver transplant
3. Hypotension

POST-OPERATIVE DIAGNOSIS: Same with 4; hemoperitoneum,

PROCEDURES PERFORMED:

1. Exploratory laparotomy
2. Pericardial window

SURGEON: Adam D Rosenberg, MD

ASSISTANTS: Maziar Rassi, MD. Biren P Modi, MD

ANESTHESIA: General endotracheal tube anesthesia

INDICATIONS FOR PROCEDURE: This young boy was just two days status post an orthotopic liver transplant and was doing quite well. He had just been transferred from the intensive care unit to the transplant floor. He developed a relatively acute onset of refractory hypotension, which required emergent transfer back to the intensive care unit. He was fluid resuscitated and intubated for decreased mental status and hypotension. Consideration was made to put him on ECMO but while the circuit was being set up he improved with fluid resuscitation and pressors. Following this however, his abdomen became acutely distended and blood starting coming from his JP drains. It was then decided to take him emergently to the operating room for exploration. Ongoing fluid resuscitation occurred during transfer emergently to the operating room. The patient's mother was present during the ICU resuscitation and I discussed the need to return to the OR with Alex's mother. She was crying and confused but seemed to understand the gravity of the situation and the need for emergent operation.

FINDINGS: the patient had a large hemoperitoneum upon opening the prior liver transplant incision, hepatic arterial bleeding identified and repaired. Hemodynamics improved following the repair.

DESCRIPTION OF PROCEDURE: The patient was brought emergently with ongoing fluid and pressor resuscitation after already being intubated. Upon arrival in the operating room the patient's abdomen was distended but he was maintaining a blood pressure. We decided to emergently open his abdomen after prepping and draping. Upon opening the peritoneal cavity a large amount of blood was evacuated which appeared quite fresh and the wound was

Comment [AS12]: First trigger (#24): Transfer to higher level care is shown here again.

Comment [AS13]: Second trigger (#23): Return to surgery is shown here again.

Comment [AS14]: Adverse event #1 is shown here again.

Comment [AS15]: Second trigger (#23): Return to surgery is shown here again.

packed temporarily. The liver appeared distended and dark, consistent with impaired venous outflow but there was no evidence of hepatic vein thrombosis and the anastomosis appeared soft and intact. Despite aggressive ongoing fluid and blood resuscitation, the patient continued to have hypotension. We identified the source of bleeding to stem from the hepatic artery and repaired it. Upon repair the child's hemodynamics improved, fluid resuscitation stabilized and vasopressor need decreased in the operating room. Following observation to ensure stabilization the patient's abdomen was closed and the patient was transferred to the intensive care unit.

**GLOBAL ASSESSMENT OF PEDIATRIC
PATIENT SAFETY TRIGGER TOOL
TRAINING RECORD #10**

Note Type: Discharge Summary
Date: September 22, XX 14:11 EDT
Status: Auth (Verified)
Subject: Discharge Summary
Created by: KUTNER MD, MPH, LAWRENCE on September 22, XX 14:18 EDT
Verified by: TAUB MD, PhD, CHRISTOPHER on September 24, XX 12:59 EDT
Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

*** Final Report ***

CHILDREN'S HOSPITAL
4321 WISTERIA LANE
CITY, USA XXXXX

Encounter Number XXXX
Date of Birth Feb 22, XX
Age 2 years old
Gender Male

Your patient, Brian Hadley, was admitted to Princeton-Plainsboro on 08/27/XX to the Pulmonary Service. The principal admission diagnosis was "MULTIFOCAL PNEUMONIA". Consultations during the hospitalization included Pain Team, Hematology, and Plastic Surgery.

Brian was discharged on 09/22/XX. The principal discharge diagnosis was "MULTIFOCAL PNEUMONIA" which was noted to be improved. Other discharge diagnoses included "ASPIRATION OF THIN AND NECTAR THICK LIQUIDS" which was noted to be unchanged, and "CRANIOSYNOSTOSIS S/P FOA" which was noted to be unchanged.

There were no recent laboratory results before discharge. There are no tests pending at discharge.

There were no complications during the hospitalization.

Discharge medications:

- * ALBUTEROL 0.5% INH SOLUTION: 0.25ML Q4H NEB PRN RESP DISTRESS, WHEEZE
- * ENOXAPARIN: 14 MG SUBCUTANEOUS INJECTION BID
- * CLONIDINE: 25 MCG NG BID FOR ONE WEEK, FOLLOWED BY 12.5 MCG NG BID FOR ONE WEEK, FOLLOWED BY 5 MCG NG BID FOR ONE WEEK
- * MIRALAX: 8.5 G NG DAILY
- * BECLOMETHASONE 40 MCG/INH: MDI 1 PUFF BID
- * PANTOPRAZOLE: 8 MG NG DAILY

Discharge diet:

THICKEN LIQUID FEEDS TO HONEY CONSISTENCY PER FEEDING TEAM INSTRUCTIONS.
PEDIASURE WITH FIBER AT 35 CC/HR OVERNIGHT FOR 10-12 HOURS

We gave the following instructions to Brian and his family:

PLEASE FOLLOW UP WITH YOUR PEDIATRICIAN WITHIN 48 HOURS OF DISCHARGE
PLEASE SEEK MEDICAL ATTENTION IF BRIAN HAS FEVER, ALTERED MENTAL STATUS, RAPID BREATHING, VOMITTING, DIARRHEA, COUGHING/GAGGING WITH FEEDS, SEIZURE ACTIVITY OR OTHER CONCERNING SYMPTOMS

Scheduled appointments include:

09/30/XX at 11:20 AM in HEMATOLOGY/MAIN PROGRAM with ALLISON CAMERON

The discharging provider wrote the following lines regarding this hospitalization:

HPI: 2yo M w/ a h/ of craniosynostosis, also w/ h/o kyphosis w/ RLD and sleep apnea here with likely PNA after recent frontal orbital advancement surgery (8/20/XX) at PPH. Patient was noted to have a URI pre-operatively, but underwent successful procedure. Required re-intubation after operation and was extubated approximately one day after. Remained stable on floor and discharged although some tachycardia was noted prior to discharge with stable H&H. Per mom, child was coughing with a fever at the time of discharge (records show that for the two days prior to d/c Tmax was 38.6C). Per mom, fever and non-productive cough progressed. No clear aspiration event. Tmax 102 on 8/25 (day of discharge). AM of admission child appearing more ill, in pain and crying inconsolably, and having irregular breathing. Brought to ED where initially afebrile but developed temp to 38.3 C. CXR showed b/l infiltrates concerning for PNA and patient started on CTX + Vanco. Given 10cc and then 20cc/kg NS bolus for tachycardia. Patient noted to have increasing tachypnea and then respiratory distress with retractions. Placed on non-rebreather and given xopenex with no effect. VBG was 7.29/69/32. Patient placed on BiPap of 18/6 and admitted to ICU for further care. Of note, patient had had no BMs x 4d prior to admission.

PMH: Craniosynostosis, Kyphosis/RLD, Sleep/Central apnea (doesn't tolerate CPAP at home). Baseline is 0.5-3L O2 prn. Surgery (8/20/XX)

1. Frontal orbital advancement.
2. Particulate bone cranioplasty.
3. Left supraorbital cranial bone graft for supraorbital rim contouring

Meds: Omeprazole 7mg daily, Pulmicort bid, albuterol prn
All: NKDA
Imm: UTD

PICU/ICU Course (8/27-9/16)

CV: Initially required pressors in the PICU, but has been HD stable off dopamine since 9/1/XX.

Resp: Admitted with b/l PNA and increased WOB. Baseline home O2 0.5-3L while asleep or drinking. Airway: DL Grade I view, previously intubated with wisc 1 and 3.0 ETT. Initially maintained on CTX + Vanco, but repeat CXR on HD#2 showed concern for worsening infiltrates b/l. Therefore given aspiration risk, patient transitioned to Unasyn. His respiratory status was noted to be tenuous on BiPap; he was observed and it was decided to intubate the patient on 8/29/XX. He remained intubated on the ventilator until 9/07 when he was extubated to NC O2. The following day he was placed on HFNC for increased WOB, which helped stabilize the patient. He completed his 2 week course of Unasyn on 9/10/XX. His home budesonide was changed to inh beclamethasone and he was started on standing albuterol q4h to treat his RAD component.

After transfer to the ICP Brian was weaned from HFNC at 8L 40% FiO2 as tolerated. He transiently needed increased respiratory support over the night of 9/12/XX after his NJ tube was pulled out and his sedation medications were switched to IV. Subsequent CXR showed no evidence of aspiration, and starting 9/13/XX he was weaned successfully to 2L regular NC. His albuterol was weaned to PRN and he was continued on beclamethasone. He continues to have intermittent tachypnea to the 60s, as well as moderate amounts of thin white secretions that require suctioning and chest PT. He has had occasional desats

Comment [AS1]: First trigger (#25): Failed endotracheal extubation (reintubation within 24 hours of planned extubation).

Comment [AS2]: Second trigger (#18): Hospital readmission within 30 days.

This discharge summary shows that the patient was hospitalized on 8/20/XX during a prior admission and then readmitted for the current hospitalization on 8/27/XX.

Comment [AS3]: Adverse event #1: PNA/respiratory distress
Preventability: Probably preventable
Severity: F

Triggers #18 and #25 help identify this adverse event. The patient was prematurely discharged in his previous medical encounter, as evidenced by requiring reintubation (trigger #18) close to discharge date and possibly having a fever. The patient's readmission to the hospital (trigger #25) is a consequence of the previous error in discharging the patient too early.

Comment [AS4]: Key lesson #7: Multiple triggers can point towards one event, i.e., an adverse event may be manifested in multiple ways.

Here, both failed endotracheal extubation and hospital readmission within 30 days point to adverse event #1.

Comment [AS5]: Key lesson #9: For a randomly selected medical encounter that has a discharge date within the quarter of interest, if you identify an adverse event that occurred in a previous encounter and/or previous quarter, year, etc., still count the adverse event in the quarter for which you are collecting data. This will prevent charts early in a quarter from having fewer adverse events than the later charts in the same quarter.

associated with plugging that resolved with suctioning, the last one being on the morning of 9/15/XX.

FEN/GI: Initially kept NPO on IVF and IV PPI. NG was placed to suction to decompress stomach while on BiPap. After respiratory status improved, patient started again on home feeds, slowly advancing to goal feeds of Pediasure with fiber 30 kcal/oz 32 mL/h via NJT. On 9/12/XX his NJT was accidentally pulled and was replaced on 9/13/XX. On 9/16/XX his NJT was pulled back to NG as he no longer required HFNC. Placement was confirmed with x-ray. He was initiated on PPI for GI prophylaxis which was switched to enteral. Because of the concern for an aspiration event that led to his hospitalization, as well as his history of needing O2 with feeds, Brian was scheduled for modified barium swallow study.

ID: Brian was initially started on vancomycin and ceftriaxone, then treated with a 14 day course of unasyn for a presumed aspiration pneumonia completed on 9/10/XX. He had fevers on 9/6/XX and 9/8/XX, and received vancomycin from 9/8/XX through 9/10/XX for a 48 hour rule out. All blood cultures (8/27/XX, 9/6/XX, 9/8/XX) and urine cultures (9/6/XX, 9/8/XX) were negative. On arrival to the ICP a viral DFA and respiratory culture were sent due to his secretions and were negative. He was afebrile throughout his course in the ICP.

Heme: The patient received pRBCs x 1 for anemia while in the ICU.

Plastics: The plastics team continues to follow.

Neuro: While intubated, Brian was maintained on morphine + midazolam gtt. He required frequent bolusing and uptitration to properly sedate his. After extubation, an appropriate wean of his sedation was started. He was transitioned to intermittent methadone and lorazepam, and was started on a clonidine patch for agitation. On arrival to the ICP, pain service was consulted and recommended an aggressive wean of his methadone and lorazepam due to his relatively short sedation course. Methadone and ativan were weaned by 20% daily from 1mg to 0.2mg as of 9/15/XX. On 9/16/XX his dosing was spaced from Q4hr to Q6hr. WAT scores were followed and were never greater than 1. Per pain team the plan is to space the medications daily to Q12hr, then go down to 0.1mg Q12hr, then to Q24hr, and then observe for at least 24 hours off medication.

Social: Parents upset about readmission and initially threatening to file against hospital. Parents were offered reassurance and kept well informed.

Comment [AS6]: Second trigger (#18): Hospital readmission within 30 days is shown here again.

=====
Pulmonary Service Hospital Course (9/16-9/22)
=====

Pulm: Remained on supplemental O2 at 0.5 L (home requirement has been 0.5 to 3L). No active issues during the patient's course on the pulmonary service.

FEN/GI:
-Brian tolerated NG feeds after NJ tube was pulled back.
-Modified barium swallow study was performed on 9/18. Brian showed a decline in swallow function from previous MBS evidenced by silent aspiration of both thin and nectar thick liquids. Previously, Brian had demonstrated adequate airway protection from above with the nectar consistency. Brian should

receive all liquids thickened to the honey consistency. He may continue to have purees and dissolvable solids as tolerated.

-Brian demonstrated good PO intake of solid foods. He had difficulty taking honey-consistency liquids through the nipple so NG feeds were provided overnight at a rate of 35 cc per hour.

Heme: Brian continued enoxaparin injections twice daily. Levels were measured weekly and remained in the therapeutic range. He will need a low molecular weight heparin level one week after discharge for which the hematology service will arrange and follow.

Neuro: Ativan and Methadone wean was continued. Ultimately weaned off completed on the morning of 9/22. Pain team plan for clonidine wean was communicated by the pain team and is listed in the medication section of this document.

Social: Attending phone calls were made daily at 11:00 am to keep the parents informed of the plan.

Discharge exam:

Gen: NAD

HEENT: MMM

CV: RRR, normal S1, S2

Lungs: mild coarse breath sounds bilaterally. No tachypnea

Abd: soft, nontender, non-distended

Ext: warm, well-perfused

Thank you for allowing us to participate in the care of your patient, and for continuing to refer your patients to Princeton-Plainsboro.

Attending Physician: Christopher Taub , Phone XXX-XXX-XXXX

Discharging Provider: Lawrence Kutner , Pager (XXX) XXX-XXXX

Note Type: PICU Admission MD
 Date: August 27, XX 20:32 EDT
 Status: Auth (Verified)
 Subject: PICU Provider Admission Note
 Created by: HOUSE MD, GREGORY on September 01, XX 09:47 EDT
 Verified by: HOUSE MD, GREGORY on September 01, XX 09:47 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

PICU Provider Admission Note Entered On: 08/30/XX 20:33 EDT
Performed On: 08/30/XX 20:32 EDT by HOUSE MD, GREGORY

Admission

The patient was admitted to the ICU for: Respiratory distress, Risk of respiratory insufficiency
Presenting History: 2 y.o. male w/ craniosynostosis, also w/ h/o kyphosis w/ RLD and sleep apnea here with likely PNA after recent frontal orbital advancement surgery (8/20/XX) at Princeton-Plainsboro. Patient was noted to have a URI pre-operatively, but underwent successful procedure. Required reintubation after operation and was extubated approximately one day after. Remained stable on floor and discharged although some tachycardia was noted prior to discharge with stable H&H. Per mom, child was coughing with a fever at the time of discharge (records show that for the two days prior to d/c Tmax was 37.6C). Per mom, fever and non-productive cough progressed. No clear aspiration event. Tmax 102 on 8/25 (day of discharge). AM of admission child appearing more ill, in pain and crying inconsolably, and having irregular breathing. Brought to ED where initially afebrile but developed temp to 38.3 C. CXR showed b/l infiltrates concerning for PNA and patient started on CTX + Vanco. Given 10cc and then 20cc/kg NS bolus for tachycardia. Over the ensuing several hours, patient noted to have increasing tachypnea and then respiratory distress with retractions. Placed on non-rebreather and given xopenex with no effect. VBG was 7.29/69/32. Patient placed on BiPap of 18/6 and admitted to ICU for further care. Of note, patient had had no BMs x 4d prior to admission.

Comment [AS7]: First trigger (#25): Failed endotracheal extubation (reintubation within 24 hours of planned extubation) is shown here again.

Comment [AS8]: Second trigger (#18): Hospital readmission within 30 days is shown here again.

Comment [AS9]: Adverse event #1 is shown here again.

PMH: Craniosynostosis, Kyphosis/RLD, Sleep/Central apnea (doesn't tolerate CPAP at home). Baseline is 0.5-3L O2 prn.

Surgery (8/20/XX)

1. Frontal orbital advancement.
2. Particulate bone cranioplasty.
3. Left supraorbital cranial bone graft for supraorbital rim contouring

Airway: DL Grade I view, intubated with wisc 1 and 3.0 ETT

Meds: Omeprazole 7mg daily, Pulmicort bid, albuterol prn

All: NKDA

Imm: UTD

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Primary Diagnosis : The patient has a primary diagnosis of Pneumonia

HOUSE MD, GREGORY - 08/27/XX 20:32 EDT

Past Medical History : The patient has a past medical history that is significant for Craniosynostosis s/p FOA on 8/20, Kyphosis/RLD, Sleep/Central apnea

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Physical Exam

Current Vital Signs : Reviewed in EMR. Currently afebrile with RR in 30s-40s

General Appearance : BiPap in place, lying comfortably in bed but with tachypnea and mild-mod increased WOB

HEENT: BiPap in place. PERRL 2-1.5mm. Neck without swelling or masses
Respiratory/Chest: Increased WOB with mild subcostal retractions and intermittent grunting. Coarse BS throughout with moderate air entry. Rhonchi b/l R > L.
Cardiovascular: RRR, no M/R/G noted
Gastrointestinal: Mildly distended belly, but soft and no HSM noted. + BS
Genitourinary: Deferred
Musculoskeletal: MAE equally with symmetric extremities, WWP with 2+ distal pulses and cap refill < 2s
Skin: Dry without significant bruising
Neuro: Sleeping but arousable. MAE, no focal deficits
Access: PIV x 2 (left arm and left leg)

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Lab and Diagnostic Studies

.: I have reviewed the available laboratory data and diagnostic imaging studies

Significant results include: VBG: 7.29/69/32

Radiology studies today show: CXR (8/27): IMPRESSION: Extensive bilateral pulmonary consolidation in keeping with pneumonia. In addition, there is volume loss in the right lower lobe with mild elevation of the right hemidiaphragm.

CXR (6/30) #2: IMPRESSION: No significant change in the appearance of the chest compared to the preceding study.

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Impression/Plan

Overall Assessment: A/P: 2yo M w/ a h/o craniosynostosis, also w/ h/o kyphosis w/ RLD and sleep apnea here with likely PNA after recent FOA surgery (8/20/XX) at PPH. Concern is for hospital acquired PNA and treating with broad spectrum abx. Currently on BiPap.

CV: HD stable, tachycardia in setting of fevers, continue to monitor

Resp: Here with PNA and increased WOB

- Continue BiPap
- Repeat VBG, if improved, consider sprinting to HFNC
- Continue CTX/Vanc for concern for hosp acquired PNA
- Continue home pulmicort, alb prn

FEN/GI:

- NPO for now, NG to suction while on BiPap
- IV PPI for now - return to PO when tolerating feeds
- D5NS @ maintenance, repeat chem in AM
- Has pooped here, continue to monitor

ID:

- F/U blood cultures
- Continue CTX, Vanc; monitor vanc troughs
- If worsens, resend cx and consider anaerobic coverage

S/P FOA:

- Plastics aware and will follow
- Oxycodone if in pain

Social: Parents upset about readmission and initially threatening to file against hospital.

- Offer reassurance and keep well informed.

HOUSE MD, GREGORY - 08/29/XX 00:28 EDT

Note Type: PICU Admission Attending MD
 Date: August 27, XX 21:38 EDT
 Status: Auth (Verified)
 Subject: PICU Attending Admission Note
 Created by: CUDDY MD, PhD, LISA on August 27, XX 21:38 EDT
 Verified by: CUDDY MD, PhD, LISA on August 27, XX 21:38 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

PICU Attending Admission Note Entered On: 08/27/XX 21:38 EDT
Performed On: 08/27/XX 21:38 EDT by CUDDY MD, PhD, LISA

Addendum

. : Brian is admitted to the PICU for NIV at risk of respiratory failure in setting of bilateral PNA. PMH sig for recent craniostomy surgery. Several day h/o URI/worsening RD. CXR bilateral atelectasis/PNA. In ED in severe distress. VBG 7.29/69/32. Transitioned to BIPAP in the ED with some improvement.

On exam here he is febrile, HR 140s, BP 85/50, 95% saturated on BIPAP/60% FiO2. RR 40-60s. G/F/R. Chest is coarse bilaterally. Abd is soft. He is sleepy but arousable. WWP throughout.
 Lytes 132/4.4/97/32/9/02
 VBG 7.32/55/HCO3 28
 CBC 5>27<375

As the patient's attending physician in the intensive care unit, I have personally reviewed the medical record on admission, including available consultant's notes, laboratory reports and imaging data. I have directed decision-making and the development of the current treatment plan.

By my assessment, Brian remains in critical condition and ongoing treatment in the intensive care unit is necessary today. His ongoing critical illness acutely impairs one or more organ systems and therefore a high probability of clinically significant or life-threatening deterioration remains. The prevention of further deterioration is necessary and the abrupt withdrawal of our present treatment regimen would potentially result in a clinically significant or life-threatening deterioration.

The essential physiologic derangements today remain need for NIV and risk for respiratory failure and need for mechanical ventilation. Our management priorities at this time are to monitor and support oxygenation and ventilation; assure adequate tissue perfusion; monitor for changes in the neurologic examination; provide surveillance for infection; BSABX; monitor and correct significant metabolic and hematologic abnormalities; and assure adequate symptom relief.
 Lisa Cuddy

I the critical care attending physician in the intensive care unit have provided direct patient care-not inclusive of teaching-to this critically ill patient have been immediately available to provide full attention to the patient at the bedside.

CUDDY MD, PhD, LISA - 08/27/XX 21:38 EDT

Note Type: ICU Admission Nursing
Date: August 29, XX 03:35 EDT
Status: Auth (Verified)
Subject: ICU Admission Nursing Note
Created by: WILSON RN, JAMES on August 29, XX 05:26 EDT
Verified by: WILSON RN, JAMES on August 29, XX 05:26 EDT
Encounter info: 6109996021, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

*** Final Report ***

**ICU Admission Nursing Note Entered On: 08/29/XX 04:26 EDT
Performed On: 08/29/XX 03:35 EDT by WILSON RN, JAMES**

ICU Admission Nursing Note

Past Medical History: Brian is a former 34 week preemie, reflux, kyphosis, coronal craniosynostosis and obstructive sleep apnea with restrictive lung disease. Swallow study done on past admission under fluroscopy showing aspiration of thin liquids, purees but nectar thick liquids ok. To OR 8/20 for fronto-orbital advancement. Remained in ICU intubated for several days post-op due to lung disease. Transfer to PICU on 8/23. Readmit through ER 8/27/XX.

Recent Events: ED visit following vomiting & increased irritability & irregular breathing at home

WILSON RN, JAMES - 09/01/XX 03:35 EDT

Review of System: Pt arrived to PICU from ED on BIPAP for resp distress.

ROS:

Resp: Ls sl coarse throughout, NP suction x2 with minimal secretions. + cough, non productive. Bipap settings 12/6, 60% FIO2. RR 40-70's. Pt desaturated into the 50's, requiring bagging when taken off of BIPAP for skincare. FIO2 titrated to accommodate for O2 requirement. VBg sent overnight, PCO2 down. will recheck in am.

Neuro: Pt waking appropriately. Crying with cares, requiring morphine x1. Unable to open Pt's R eye d/t swelling. L eye 3/2 & brisk. Tylenol given x1 for agitation.

CV: WWP, 2+ pulses to all extremities. 3 second cap refill. PIV's intact, flushing easily. Afebrile. IVF continue to infuse. Afebrile overnight, continues on abx. Vanco lvl due to be drawn this am. HR 110-160. BP stable with MAPs in the 50-60's.

GI/GU: Sump to LWCS, green bilious drainage. Abd soft & round, min BS. No BM, per aunt had large one in ED. Voiding QS amts of CYU to diaper. NPO & continues on IVF.

Social: Mom & father at bedside last night. All family members understandably upset. Angry for sending them home "too early". Will cont to update and support.

WILSON RN, JAMES - 09/01/XX 04:21 EDT

Note Type: PICU Progress Attending MD
 Date: August 29, XX 12:45 EDT
 Status: Auth (Verified)
 Subject: PICU Attending Progress Note
 Created by: FOREMAN MBBS, ERIC on August 29, XX 12:45 EDT
 Verified by: FOREMAN MBBS, ERIC on August 29, XX 12:45 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

PICU Attending Progress Note Entered On: 08/29/XX 12:59 EDT
Performed On: 08/29/XX 12:45 EDT by FOREMAN MBBS, ERIC

Addendum

. : Attending Progress note

Brian is a 2yo boy who was admitted to PICU yesterday evening with incipient respiratory failure necessitating close supervision and monitoring. Three weeks ago he underwent a cranial vault remodeling procedure under general anesthesia.

Overnight:

Brian had progressive worsening with hypercapnia (pH 7.29, PCO2 69 mm Hg, HCO3 32 mmol/L) and required nasal/face-mask CPAP. This morning there was no improvement in gas exchange with BiPAP settings of 12/6 cm H2O and FiO2 0.8 (pH 7.29, PCO2 63 mm Hg, HCO3 30 mmol/L). Of note, he desaturates down to 50% whenever the mask is removed. The chest x-ray shows worsening diffuse changes.

Supervision of care:

As the patient's attending physician in the intensive care unit, I have personally reviewed the medical record over the past 24 hours, procedural note, available consultants' notes, laboratory reports and imaging data. I supervised admission, reviewed the physical examination and interpretation of all relevant data, and directed decision-making and the development of the current treatment plan.

Condition: Serious

Assessment:

Brian requires continued care on PICU. He has acute or chronic respiratory failure and, in view of his progressive deterioration, we have elected to intubate and mechanically ventilate him. I was present during this procedure. As a precaution I spoke with the Neurosurgery service about his recent operation and the stability of his craniocervical junction. I note the foramen magnum stenosis on recent MRI.

We will continue with prudent mech ventilatory support, sedation and analgesia as required, and follow vital signs and resolution of the current pneumonic changes. Of concern, however, is the history of obstructive sleep apnea, home oxygen dependence, and raised bicarbonate. This will require further investigation in regard to drive to breathing, and respiratory control, and the possibility of GER.

Eric Foreman MD

I, the critical care attending physician in the ICU have been immediately available to provide full attention to the patient at the bedside and have spent a minimum of 75 min providing direct care-not inclusive of teaching-to this critically ill patient.

FOREMAN MBBS, ERIC - 08/29/XX 12:45 EDT

Comment [AS10]: Second trigger (#18):
 Hospital readmission within 30 days is shown here again.

Note Type: Hematology Consultation
 Date: August 30, XX 14:28 EDT
 Status: Auth (Verified)
 Subject: Hematology Initial Consult note
 Created by: CAMERON MD, ALLISON on August 30, XX 15:00 EDT
 Verified by: CAMERON MD, ALLISON on August 31, XX 06:31 EDT
 Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

* Final Report *

Requesting physician/service: Foreman/PICU

Reason for consultation: Line-associated DVT

History of Present Illness: Brian is a 2 yo ex-34 wk M w/ kyphosis, restrictive lung disease requiring home O2, and now POD#9 from craniostomy repair (cranial vault advancement) who was readmitted 2 days ago for fever and found to have multifocal PNA. Worsened yesterday and was thus intubated and R. femoral CVL placed. Ultrasound showed clot along the end of the CVL and extending into the common and superficial femoral vein. The ICU's plan is to remove the CVL after PICC is placed, as Brian is getting PRBCs and IV antibiotics.

Review of Systems: low-grade fever yesterday, intubated, no oozing, bleeding, or bruising noted. Has been urinating well.

Past Medical/Surgical History:

1. 34-week ex-premature.
2. kyphosis
3. restrictive lung disease
4. L. coronal synostosis s/p repair
5. spinal stenosis

Family History: No family history of easy bruising, bleeding, heavy periods, unexpectedly needing transfusions during surgery. Also no family history of clots, including DVTs, PEs, CVAs, or MIs. No cancers, no persons requiring splenectomy or cholecystectomy.

Social History: Brian and his sister and brother live with their parents in Stevensville.

Active Medication Orders

Scheduled Medications

ampicillin-sulbactam (Unasyn) 400 mg IV Q6hr *Com Last admin: 400 mg IV (08/30/XX 12:17)
 beclomethasone (beclomethasone 40 mcg/inh inhalation aerosol with adapter) 1 puff MDI BID *Com Last admin: 1 puff MDI (08/30/XX 11:26)
 budesonide (Budesonide Respule (neb)) 1 mg NEB BID *Com Last admin: 1 mg NEB (08/30/XX 11:30)
 metoclopramide 0.8095 mg IV 1time Stop: 08/30/XX 11:00 *Com
 pantoprazole (PANToprazole) 8 mg IV Q24hr *Com Last admin: 8 mg IV (09/01/XX 19:07)
 vancomycin 160 mg IV Q6hr *Com Last admin: 160 mg IV (08/30/XX 13:53)

PRN Medications

acetaminophen 100 mg PR Q4hr PRN Fever/Pain Last admin: 100 mg PR (08/30/XX 21:28)
 acetaminophen 100 mg PO Q4hr PRN Fever/Pain
 albuterol (albuterol 0.5% inhalation solution) 0.25 mL NEB Q2hr PRN Respiratory Distress *Com Last admin: 0.25 mL NEB (09/01/XX 06:42)
 fentanyl (fentanyl IV) 16 mcg IV Q1hr PRN Pain
 heparin flush (heparin Flush 10 unit/mL) 20 unit IV Q8hr PRN Line Maintenance
 midazolam 0.4 mg ICU-IV Q1hr PRN Agitation *Com Last admin: 0.4 mg ICU-IV (08/30/XX 13:18)
 morphine (morphine IV) 0.4 mg ICU-IV Q1hr PRN Pain Last admin: 0.4 mg ICU-IV (08/30/XX 13:19)

Comment [AS11]: Third trigger (#13): Documented evidence of a deep vein thrombosis (DVT) or a pulmonary embolism (PE).

Comment [AS12]: Adverse event #2: Blood clot at the end of CVL
 Preventability: Probably not preventable
 Severity: E

Trigger #13 helps identify this adverse event. This clot is due to hospital care, specifically the central line. It is challenging to know if this event represented any deviations in the standard of care so without evidence of deviations, we consider the event probably not preventable.

ocular lubricant (ocular lubricant drops) 1 drop OPTH Q2hr PRN Dry eyes *Com Last admin: 1 drop OPTH (09/01/XX 20:59)

Continuous Medications/Fluids

D5W NS 1,000 mL + potassium CHLORIDE, IVF 20 mEq IV *Com Last admin: 32 mL IV (08/30/XX 13:59)
 midazolam infusion [0.07 mg/kg/hr] + syringe contains *Com Last rate: 1 mg
 morphine infusion [0.07 mg/kg/hr] + D5W *Com Last rate: 1 mg
 NS 50 mL + heparin, continuous flush 50 unit IV *Com

Allergies: No known allergies

Examination:

Basic Vital Signs

Vitals Signs since (09/01 14:28)	24 h min	24 h max	Most recent (Time)
Temperature	36.1	38.1	36.5 (12:45)
Heart Rate	116	163	130 *13:22*
BP Systolic	73	100	91 *13:22*
Diastolic	32	75	75 *13:22*
Respiratory Rate	23	36	28 *13:22*
Oxygen Saturation (SPO2)	60%	100%	99% *13:22*
Percent FiO2	0.5	0.6	0.5 (13:45)

Input/Output (Daily totals are 0:00-23:59)

In/Out/Bal: Yesterday 891.05/399/492.05; Today (as of 14:28) 784.9/660/124.9

Physical Exam:

Gen: intubated, sedated, pale
 HEENT: intubated, blonde hair
 Neck: no LAD
 Chest: coarse ventilator breaths bilaterally, riding the ventilator
 CV: RRR, nl S1 & S2, no murmurs
 Abd: +Bs, soft, NT, ND, no masses or HSM palpable
 Groin: Right femoral line in place
 left thigh and leg WWP, TP 2/4, Cr< 2 sec
 Skin: no oozing, petechiae, bruising

Labs (Reported 08/30/XX 12:28 - 08/27/XX 12:28)

Chem 7	Na	K	Cl	CO2	BUN	Cr	Glu
08/27 06:30	143	3.55	110	26	2 L	0.2	97
08/27 02:30	142	2.50 C	108	26	2 L	0.2	104 H
08/27 01:50	140	2.70 C	107	26	2 L	0.2	103 H

Chem	Ca	Mg	Phos
08/27 06:30	8.7	2.1	3.5
08/27 02:30	8.2	2.1	2.9 L
08/27 01:50	7.7 L	2.0	2.8 L

CBC	WBC	HBG	HCT	PLT
08/27 06:30	8.86	6.9 C	21.8 L	466 K
08/27 02:30	8.21	7.1 C	21.7 L	469 K

Pre-operative coags on 8/14: PT 10.8, PTT: 25.3, fibrinogen: 203. last set on 8/20 were intraoperative. None since then.

No recent U/As or stool Guaiacs

Diagnostic Imaging: prelim report of right leg dopplers: FINDINGS: The venous catheter is noted in the right iliac vein and common femoral vein. Common iliac vein is patent. There is reduced flow in the external iliac vein. There is no or very minimal flow in the common femoral vein, superficial femoral vein, and popliteal veins. Clot is not well visualized. However, the superficial and popliteal veins are not compressible. The corresponding arteries have normal high resistance arterial flow. IMPRESSION: Findings as described above suggestive of right lower extremity deep venous thrombosis as described.

Assessment/Recommendations: Brian is a 2 yo, ex-34 wk M w/ kyphosis, restrictive lung disease requiring home O2, POD#9 from craniostomy repair (cranial vault advancement), with multifocal PNA and respiratory failure requiring mechanical ventilation, and now with new line-associated DVT. No FH concerning for underlying bleeding disorder or hypercoagulable state, and patient's exam not consistent with DIC. Drop in his hemoglobin probably related to hydration; however could be possibly from bleeding that is not yet clinically detected.

Comment [AS13]: Third trigger (#13): Documented evidence of a deep vein thrombosis (DVT) or a pulmonary embolism (PE) is shown here again.

Would send off coags from non-heparin contaminated line/peripheral stick. Assuming these are normal and post-PRBC transfusion hemoglobin shows expected bump, we would recommend anticoagulating with Enoxaparin at 1 mg/kg (or 8mg) q12hr and checking a LMWH level 4-6 hours after his 2nd dose, with a goal range of 0.5-1. See below table for titration based on levels. However, should he develop bleeding or his hemoglobin be dropping further, please contact us to discuss any dose adjustments to his LMWH goal range to the high-risk of bleeding of 0.4-0.6.

We agree with removing the femoral line as soon as able.

We anticipate that Brian will need anticoagulation for at least 6 weeks, at which point we would likely re-image the area.

Thank you for this interesting consult. We will continue to follow. Please feel free to contact us with any questions.

Allison Cameron, MD
Pediatric Hematology/Oncology Fellow
Pager XXXX

ATTENDING ADDENDUM

Data and history reviewed. Patient Examined by me. This appears to be a provoked DVT related to femoral line. The family history doesn't suggest an obvious thrombophilia. Most thrombophilic evaluation in this setting should be deferred until the patient is stable and clot free. The anticoagulation service will pick up monitoring of lovenox as of September 2, and can help with discharge planning. We suspect that lovenox via insufflon will be the easiest way to do entire course of anticoagulation. Sunday AM, right lower extremity is pink but cooler than left with moderate swelling and delayed cap refill, all related to increased tissue fluid, not decreased arterial flow. The risk in large DVTs of this type is of pulmonary embolism which is rare in young children, but would be poorly tolerated with his present pneumonia. Hence, full dose anticoagulation as outlined above by Dr. Cameron is indicated. The bleeding risk in children without known bleeding problems is small but not negligible, so ongoing monitoring of hemoglobin status is also important. We'll continue to follow with you and we are available to answer questions from the family as needed. Thanks for asking us to see him.

Comment [AS14]: Third trigger (#13): Documented evidence of a deep vein thrombosis (DVT) or a pulmonary embolism (PE) is shown here again.

Robert Chase MD, PhD
Associate Chief, Hematology
pXXXX

Enoxaparin Dosage Titration

Antifactor Xa Level (units/mL)	Hold Next Dose	Dose Change?	Repeat Antifactor Xa Level
*SR = Standard Risk,			
Deviations from 6th ACCP Consensus Conference on Antithrombotic Therapy <i>Italicized</i>			
<0.35 - *SR	No	Increase dose by 25%	4 h after next AM dose (or at clinician discretion)
0.35-0.49 - *SR	No	Increase dose by 10%	4 h after next AM dose (or at clinician discretion)
0.5-1 - *SR	No	No	<i>Repeat weekly while inpatient</i> <i>Repeat monthly when outpatient</i>
1.01-1.5 - *SR	No	Decrease dose by 20%	4 h after next AM dose Trough before next dose, and post 4 h after next dose may be considered if clinically indicated i.e. severe renal insufficiency and/or any signs of bleeding.
1.51-2 - *SR	3 h	Decrease dose by 30%	4 h after next AM dose Trough before next dose, and post 4 h after next dose may be considered if clinically indicated i.e. severe renal insufficiency and/or any signs of bleeding
>2 - *SR	Until Anti-factor Xa <0.5 units/mL	Decrease dose by 40%	Trough before next dose if not <0.5 units/mL, repeat q12h

Note Type: Hematology Consultation
Date: September 17, XX 12:02 EDT
Status: Auth (Verified)
Subject: Anticoagulation Service - Div. of Hematology Sign Off Note
Created by: CAMERON MD, ALLISON on September 17, XX 12:04 EDT
Verified by: CAMERON MD, ALLISON on September 17, XX 15:18 EDT
Encounter info: XXXX, Princeton-Plainsboro Hospital, Inpatient, 8/27/XX - 9/22/XX

*** Final Report ***

Anticoagulation Service - Sign off Note

Brian is a 2 yo, ex-34 wk M w/ kyphosis, restrictive lung disease requiring home O2, who is status post a craniostomy repair and PNA with respiratory failure requiring mechanical ventilation. He developed a line provoked deep vein thrombosis and is now requiring a 6 week course of enoxaparin therapy. His goal range LMWH level is 0.5-1. Last LMWH level was 0.5 on 9/11.

Focused Exam:

Lower extremities symmetrical in size, no erythema, no swelling and WWP.

Recommendations:

- 1) Continue to check LMWH levels weekly while inpt, drawn 4-6 hours after his enoxaparin dose and with a goal level of 0.5-1.
- 2) He will need a level one week after discharge for which our service will arrange and follow.
- 3) Follow up hematology appt will be with me on September 20th at 11:20 am on 7R. Follow up doppler US is scheduled for 2:30 on that same day.
- 4) Kai Park RN met with mother this afternoon and reviewed anticoag precautions/ed/ and sc admin
- 5) If you need assistance with discharge enoxaparin scripts, please do not hesitate to contact our service.

Edward Vogler RN, CPNP #XXXX

Thrombosis Program & Anticoagulation Service
Div. of Hematology/Oncology

Attending Addendum

Pt seen with NP Ms. Warner, recommendations as above

Robert Chase MD, PhD

Associate Chief, Hematology
pXXXX

Appendix M. Answers to GAPPS Training Records

In the second training video, the triggers, adverse events, and key lessons found in each medical record are discussed. Below, the key points from each of these training records are outlined. This Appendix can be used concurrent with the second training session and/or as a post-training review of the GAPPS methodology. Note that all names, hospitals, and medical cases in these training records are fictional.

Training Record #1

The patient is a 15-year-old male transferred to the hospital with severe respiratory distress. During the transfer, the patient was intubated but had a bradycardic arrest during intubation, which resulted in the medical service team performing several minutes of chest compressions and administering epinephrine until the patient's spontaneous circulation returned.

The trigger found in this record is:

- Trigger #19: Any code, arrest, or rapid response team activation.

The adverse events in this record are:

- The bradycardic arrest following intubation. The arrest was probably not preventable because the patient was in respiratory failure and the need for intubation was emergent. Bradycardia is an occasional consequence of intubation, especially in a patient who is already hypotensive. The severity of the arrest is ranked H because the medical team had to do CPR since the patient's condition was life-threatening.
- The behavioral side effects of Keppra. The condition is definitely not preventable because doctors did not have an alternative, satisfactory medication for his seizures. The severity is ranked E because the patient required additional monitoring but the adverse event did not contribute to an increased length of stay.

The key lessons from this record are:

- An H severity classification indicates that measures needed to be taken to save the patient's life. The interventions need to have occurred over a relatively short period of time (e.g., within an hour) to be classified in this category.
- Not all adverse events will have a clear trigger. You should still record events you find without the help of a trigger.
- Triggers and adverse events can often be mentioned in multiple notes for a given hospitalization.

Training Record #2

The patient is a 7-year-old male admitted to the hospital due to slow leakage of cerebrospinal fluid from a spinal cord detethering procedure that occurred three weeks before.

The trigger found in this record is:

- Trigger #18: Hospital readmission within 30 days.

The adverse event in this record is:

- The leakage of clear fluid from the patient's surgical site. The patient had his cord recently detethered and had to return to the hospital due to the disruption of his surgical wound. This event is probably not preventable because it is a currently unavoidable complication that sometimes occurs with cord detethering surgery. The severity of this event is F because it leads to hospitalization.

The key lessons from this record are:

- All complications of surgery are adverse events. Post-operative complications should not be excluded because they are “known” to occur in a certain percentage of cases or because the patient was advised of the risk before surgery. Surgical complications do not necessarily indicate or imply that an error has occurred.
- Adverse events present when the patient arrives at your hospital are counted, regardless of who caused it or where the adverse event initiated. These events are recorded but not attributed to the hospital where they occurred.

Training Record #3

The patient is a 14-year-old female admitted to the hospital for a left neck abscess.

The trigger found in this record is:

- Trigger #23: Return to surgery.

The adverse events in this record are:

- The prolongation of the patient’s illness. Once the patient was admitted, the incision and drainage procedure should have been performed on the abscess immediately instead of the initial needle drainage procedure. Consequently, this adverse event is probably preventable because the procedure the patient needed was not done until the second procedure. The event’s severity is F because she had prolongation of her hospital stay but only had temporary harm. Note that this is a good example of a medical record where primary reviewers may find it helpful to consult with a specialist in order to determine what procedure(s) should have been done on this patient.
- The patient’s prolonged nausea. This event is probably preventable because the patient was not treated for nausea in the beginning of her hospitalization, causing her to continue having nausea for several days. The event’s severity is E because it causes temporary harm to the patient.

The key lessons from this record are:

- All complications of surgery are adverse events. Post-operative complications should not be excluded because they are “known” to occur in a certain percentage of cases or because the patient was advised of the risk before surgery. Surgical complications do not necessarily indicate or imply that an error has occurred.
- Symptoms such as nausea or itching are not always adverse events. They are only considered adverse events when they are longer episodes. This is a judgment call.
- Not all adverse events will have a clear trigger. You should still record events you find without the use of a trigger.

Training Record #4

The patient is an 11-day-old male admitted to the hospital for RSV bronchiolitis

The triggers found in this record are:

- Trigger #11: Naloxone administration.
- Trigger #24: Transfer to a higher level of care.
- Trigger #26: Racemic epinephrine administration (on a patient mechanically ventilated within the last 24 hours).

The adverse events in this record are:

- Shock following intubation (this occurred during the patient's transfer). This event was probably preventable because the patient seems to have experienced shock due to aggressive drug dosing. Since the patient would have had an arrest without intervention, this event has a severity classification of H.
- Oversedation upon extubation. This event was probably preventable because it seems the patient was extubated while still under the strong influence of narcotics. The appropriate course of action would have been to wait a little longer before extubating the patient. The event's severity classification is H because the patient's low oxygen and low respiratory rates required immediate intervention in order to sustain the patient's life.

The key lessons from this record are:

- Not all triggers lead to an adverse event. They only provide clues that an adverse event may have occurred.
- An H severity classification indicates that measures needed to be taken to save the patient's life. The interventions need to have occurred over a relatively short period of time (e.g., within an hour) to be classified in this category.

Training Record #5

The patient is a 4-year-old female admitted to the hospital due to suspicion of leukemia. During her hospital stay, she has a bone marrow biopsy and is diagnosed with acute lymphoblastic leukemia.

There are no triggers in this record.

The adverse event in this record is:

- The skin rash. Because the patient needed a PICC for her chemotherapy medications, this event was probably not preventable. The severity of this event is classified as E because the event was relatively mild and did not extend the patient's stay in the hospital.

The key lesson from this record is that not all adverse events will have an associated trigger. You should still record events you find without the help of a trigger.

Training Record #6

The patient is a 13-year-old female admitted to the hospital for chronic ulcerative colitis. During her hospital stay, she has an abdominal colectomy

The trigger found in this record is:

- Trigger #18: Hospital readmission within 30 days.

The adverse event in this record is:

- The small hematoma in the posterior epidural space at the level of catheter insertion. This event was probably preventable because this was a technique-dependent complication. The severity of the event can be classified as E because the harm was temporary and did not prolong the patient's stay in the hospital.

The key lessons from this record are:

- All complications of surgery are adverse events. Post-operative complications should not be excluded because they are "known" to occur in a certain percentage of cases or because the patient was advised of the risk before surgery. Surgical complications do not necessarily indicate or imply that an error has occurred.
- Not all adverse events will have a clear trigger. You should still record events you find

- without the use of a trigger.
- Not all triggers lead to an adverse event. They only provide clues that an adverse event may have occurred.

Training Record #7

The patient is an 8-year-old female admitted to the hospital for an allogeneic bone marrow transplant.

The triggers found in this record are:

- Trigger #5: Serum creatinine doubling.
- Trigger #6: Nephrotoxic drug use and rising creatinine levels.
- Trigger #9: Abrupt medication stop.
- Trigger #24: Transfer to higher level of care.

The adverse events in this record are:

- Respiratory failure while the patient was on premedications. This event was probably not preventable because the team took the necessary steps in caring for the patient but could not have predicted that the patient would have a IVIG reaction. The severity of the event can be classified as H because the patient immediately needed bypass to sustain life.
- Nephrotoxic drug-induced mild renal injury. This event was probably not preventable because the patient needed cyclosporine and methotrexate. The event's severity is categorized as E because the drugs caused a relatively mild bump in creatinine levels without permanent renal damage to the patient.

The key lessons from this record are:

- Multiple triggers can point towards one event, i.e., an adverse event may be manifested in multiple ways.
- An H severity classification indicates that measures needed to be taken to save the patient's life. The interventions need to have occurred over a relatively short period of time (e.g., within an hour) to be classified in this category.

Training Record #8

The patient is a 4-year-old female with chronic renal failure admitted to the hospital for a renal transplant. During her stay, the patient's hemodialysis catheter becomes infected and must be removed.

The trigger found in this record is:

- Trigger #3: Change in procedure.
- Trigger #15: Healthcare-associated infections: positive blood culture (only after 48 hours from admission).

The adverse event in this record is:

- The patient's catheter infection. This event was probably preventable because hospital-acquired infections are usually preventable. The event's severity classification is F because the patient's hospital stay was extended due to the infection but there was no death or permanent injury that resulted from this harm.

The key lessons from this record are:

- Cases of hospital-acquired infections are usually preventable.
- Not all triggers lead to an adverse event. They only provide clues that an adverse event may have occurred.

Training Record #9

The patient is a 3-month-old male (who is a former 25-week gestational age premature infant) admitted to the hospital for biliary atresia. Ultimately, this patient is diagnosed with pulmonary hypertension and multisystem organ failure post-liver transplantation.

The triggers found in this record are:

- Trigger #9: Abrupt medication stop.
- Trigger #21: Drop of Hgb or Hct of >25% in less than 24 hours.
- Trigger #23: Return to surgery.
- Trigger #24: Transfer to higher level care.

The adverse event in this record is:

- The patient's post-operative internal bleeding. This event was probably preventable because intra-abdominal bleeding is usually preventable. The event's severity is classified as H because surgeons had to conduct an emergency operation to sustain the patient's life.

The key lessons from this record are:

- Multiple triggers can point towards one event, i.e., an adverse event may be manifested in multiple ways.
- During the procedure, bleeding developed due to difficulty placing a suture, addressed intra-operatively. This bleeding is unintended and is part of adverse event #1.

Training Record #10

The patient is a 2-year-old male re-admitted to the hospital for respiratory distress. He had a frontal orbital advancement surgery the prior week. The patient was discharged two days prior to this readmission despite having some tachycardia and a possible fever.

The triggers found in this record are:

- Trigger #25: Failed endotracheal extubation (reintubation within 24 hours of planned extubation).
- Trigger #18: Hospital readmission within 30 days.
- Trigger #13: Documented evidence of a deep vein thrombosis (DVT) or a pulmonary embolism (PE).

The adverse events in this record are:

- The patient's respiratory distress following his surgery. This event was probably preventable because the surgery should have been delayed because of the patient's hospital-acquired pneumonia and weakness. The event's severity is classified as F because the patient has respiratory failure.
- The patient's blood clot at the end of central venous line. The event was probably not preventable because it is known that a certain proportion of lines develop clots. The severity of the event is E because the event did not prolong hospitalization.

The key lessons from this record are:

- Multiple triggers can point towards one event, i.e., an adverse event may be manifested in multiple ways.
- For a randomly selected medical encounter that has a discharge date within the quarter of interest, if you identify an adverse event that occurred in a previous encounter and/or previous quarter, year, etc., still count the adverse event in the quarter for which you are

collecting data. This will prevent records early in a quarter from having fewer adverse events than the later records in the same quarter.

Appendix N. SAS Programs for the Automated Triggers

EXAMPLE PROGRAMING FOR AUTOMATING GAPPS TRIGGERS

Programmer: Kimberly Chin

Boston Children's Hospital
Clinical Research Program

Date: February 23, 2016

CRITERIA:

Start date: January 1, 2007

End date: December 31, 2012

Inpatient / Observation admissions > 24 hours

Age at admission < 18 years

List all the MRNs that meet the search criteria.

```
%let startdate = '01JAN07'd;
```

```
%let enddate = '31DEC12'd;
```

```
*/-----\*
```

IDENTIFYING CLINICS

```
*\-----/*
```

```
;
```

```
** Clinics - for sql code;
```

```
%let acute_code =
```

```
'201700','201701','201702','201703','201704','201705','201706','201707','201708','201712','201713','201716','201730','201802','201803','201804','201805','201810','201812','201813';
```

```
%let transitional_code = '201808';
```

```
%let icu_code = '201709','201710','201711','201800','201801','201809';
```

```
** Clinics - for data step code;
```

```
%let acute_code2 = '201700' '201701' '201702' '201703' '201704' '201705' '201706' '201707' '201708' '201712' '201713' '201716' '201730' '201802' '201803' '201804' '201805' '201810' '201812' '201813';
```

```
%let transitional_code2 = '201808';
```

```

%let icu_code2 = '201709' '201710' '201711' '201800' '201801' '201809';

PROC SQL;
create table clinics as
select distinct clinic_description
      from nzprod1.cons_encounter_fact
      where clinic_code in (&acute_code, &transitional_code, &icu_code)
      order by clinic_description;

create table clinic_acute as
select distinct clinic_description
      from nzprod1.cons_encounter_fact
      where clinic_code in (&acute_code)
      order by clinic_description;

create table clinic_transitional as
select distinct clinic_description
      from nzprod1.cons_encounter_fact
      where clinic_code in (&transitional_code)
      order by clinic_description;

create table clinic_icu as
select distinct clinic_description
      from nzprod1.cons_encounter_fact
      where clinic_code in (&icu_code)
      order by clinic_description;

quit;
data clinics2;
      length clinic $255;
      set clinics;
      clinic=cats("",clinic_description,"");
      keep clinic;

run;
data clinic_acute2;
      length clinic $255;
      set clinic_acute;
      clinic=cats("",clinic_description,"");
      keep clinic;

run;
data clinic_transitional2;
      length clinic $255;
      set clinic_transitional;
      clinic=cats("",clinic_description,"");
      keep clinic;

run;
data clinic_icu2;
      length clinic $255;
      set clinic_icu;
      clinic=cats("",clinic_description,"");
      keep clinic;

```

```

run;

proc sql noprint;
select clinic
      into :cliniclist separated by ', '
      from clinics2;

select clinic
      into :acutelist separated by ' '
      from clinic_acute2;

select clinic
      into :translist separated by ' '
      from clinic_transitional2;

select clinic
      into :iculist separated by ' '
      from clinic_icu2;

quit;
%put &=cliniclist;
%put &=acutelist;
%put &=translist;
%put &=iculist;

```

```
*/-----\*
```

IDENTIFYING HOSPITALIZATIONS

```
*\-----/*
```

```

;
proc sql;

  ** Find hospitalizations that meet inclusion criteria ;
create table har as
select distinct
      pt.mrn
      ,pt.date_of_birth
      ,(datepart(e.admit_date)-pt.date_of_birth)/365.25   as age_yrs   "age_yrs"
format=8.2
      ,e.hospital_account_record_num                      as
HAR      "HAR"
      ,e.admit_date
                                format=datetime.
      ,e.discharge_date
                                format=datetime.
      ,(e.discharge_date-e.admit_date)/3600                as admit_hrs
"admit_hrs" format=8.2
      ,year(datepart(e.discharge_date))
      "year"
                                as year

```



```

from nzprod1.cons_encounter_fact e
    inner join nzprod1.cons_patient_fact pt on e.patient_key=pt.patient_key
where e.primary_csn_ind='Y'
    and e.care_class in ('Inpatient','Observation')
    and e.discharge_date ge &startdate
    and e.discharge_date le &enddate
    and calculated_age_yrs < 18
    and calculated_admit_hrs > 24
order by har;

** Find hospitalizations that meet exclusion criteria;
create table psych as
select distinct e.hospital_account_record_num as HAR "HAR"
    from nzprod1.cons_encounter_fact e
    where e.clinic_code in ('201714')
        and e.discharge_date ge &startdate
        and e.discharge_date le &enddate
    order by har;
quit;

data har2;
    merge har (in=a) psych (in=b);
    by har;
    if a=1 and b=0;
run;

proc freq data=har2; tables year / nocum nopercnt; run;

*/-----\*

TRIGGERS

*\-----/*
;

*****
TRIGGER 6 - Serum creatinine doubling
*****
,

proc sql;
create table sc0 as
select distinct
    p.MRN
    ,p.date_of_birth
    ,a.EVENT_CODE_DESCRIPTION
    ,e.hospital_account_record_num    as HAR                                "HAR"

```

```

        ,b.event_end_dt_tm                                as event_end_dtm
"event_end_dtm"    format=datetime.
        ,input(b.RESULT_VAL,best12.) as result
        ,c.RESULT_UNIT_DISPLAY
FROM          nzprod1.CONΣ_RESULT_EVENT_CODE_DIM
a
        inner join    nzprod1.CONΣ_RESULT_COMPLETE_EVENT_FACT    b
on a.EVENT_CODE_KEY=b.event_cd_key
        left join     nzprod1.CONΣ_RESULT_UNIT_DIM
c
        on b.RESULT_UNIT_KEY=c.result_unit_key
        inner join    nzprod1.CONΣ_ENCOUNTER_FACT
e
        on b.ENCOUNTER_KEY=e.encounter_key
        left join nzprod1.CONΣ_CURRENT_PATIENT_DIM                p
on e.patient_key = p.patient_key
WHERE event_code_key in (95079/*,103798*/)
        and datepart(b.EVENT_END_DT_TM) ge &startdate
        and datepart(b.EVENT_END_DT_TM) le &enddate
        and HAR ne -1
        and b.RESULT_UNIT_KEY=1568;

create table sc1 as
select distinct
        sc.MRN
        ,sc.date_of_birth
        ,(datepart(h.admit_date)-sc.date_of_birth)/365.25 as age_yrs
"age_yrs"    format=8.2
        ,sc.har
        ,h.care_class
        ,h.admit_date
        ,h.discharge_date
        ,(h.discharge_date-h.admit_date)/3600                as admit_hrs
"admit_hrs"    format=8.2
        ,sc.EVENT_CODE_DESCRIPTION
        ,sc.event_end_dtm
        ,sc.result
        ,sc.RESULT_UNIT_DISPLAY
FROM          work.sc0
        left join nzprod1.CONΣ_ENCOUNTER_FACT    h    on    sc
sc.har=h.hospital_account_record_num
WHERE calculated age_yrs < 18
        and h.PRIMARY_CSN_IND='Y'
        and h.care_class in ('Inpatient','Observation')
        and calculated admit_hrs > 24
        and result > 0
ORDER BY HAR, event_end_dtm;

quit;

```

**Create wide dataset;
 data sc2;

```

        set sc1;
        by har;
        count+1;
        if first.har then count=1;
run;
proc transpose data=sc2 out=sc2_wide1 prefix=result;
    by har;
    id count;
    var result;
run;
proc transpose data=sc2 out=sc2_wide2 prefix=dtm;
    by har;
    id count;
    var event_end_dtm;
run;
data sc2_wide;
    merge sc2_wide1 (drop=_name_)
          sc2_wide2 (drop=_name_ _label_);
    by har;
    if result2=. then delete;
run;

**Create macro variable for max count of results;
proc sort data=sc2 out=sc2_sortharcount (keep=count); by descending count; run;
proc sql noprint;
select count
    into :harcount
    from sc2_sortharcount;
quit;
%put &=harcount;

**Find HARs when a result at time x2 is double the result at time x1 & result at time x2 must be
>= 0.5 mg/dl;
data sc3 sc3_fail;
    set sc2_wide;
    array result {&harcount} ;
    array dtm {&harcount};
    flag=0;
    do i=1 to &harcount;
    do j=1 to &harcount;
        if flag=0 and result{i} ne . and result{j} ne . and dtm{i}>dtm{j} then do;
            if result{i}>=(2*result{j}) and result{i} ge 0.5 then flag=1;
        end;
    end; end;
    drop i j flag;
    if flag=1 then output sc3;
    else if flag=0 then output sc3_fail;
run;

**To display in wide format;
proc sql;

```

```

create table sc4 as
select distinct
    all.mrn
    ,all.age_yrs
    ,all.admit_date
    ,all.discharge_date
    ,all.event_code_description
    ,final.*
    from sc3 as final, sc1 as all
    where final.har=all.har
    order by all.mrn, final.har;

```

```

quit;
%DROPMISS(sc4, T06, NODROP=)

```

```

data data.T06; set T06; run;

```

```

*****

```

TRIGGER 7 - Nephrotoxin Use

```

*****

```

```

proc sql;
create table sc_med_sc as
select distinct
    s1.mrn
    ,s1.age_yrs
    ,s1.admit_date
    ,s1.discharge_date
    ,s1.har
    as har
    ,s1.event_end_dtm
    as sc_dtm1
    ,m.drug_admin_dt_tm
    as med_dtm
    ,s2.event_end_dtm
    as sc_dtm2
    ,(m.drug_admin_dt_tm-s1.event_end_dtm)/3600
    as sc1_med_diff_hr
    "sc1_med_diff_hr" format=8.2
    ,(s2.event_end_dtm-m.drug_admin_dt_tm)/3600
    as med_sc2_diff_hr
    "med_sc2_diff_hr" format=8.2
    ,s1.result
    as sc_mgdl1
    "sc_result1"
    ,s2.result
    as sc_mgdl2
    "sc_result2"
    ,(s2.result-s1.result)
    as sc_mgdl_diff
    "sc_mgdl_diff"
    from
        nzprod1.cons_admin_meds_fact m
        inner join
        nzprod1.CONC_ENCOUNTER_FACT e
        on
        m.ENCOUNTER_KEY=e.encounter_key
        inner join
        work.sc1 s1
        on
        e.hospital_account_record_num=s1.har

```

```

inner join      work.sc1
e.hospital_account_record_num=s2.har
where m.ADMIN_DRUG_NAME in
('acyclovir', 'acyclovir NS hydration', /*'acyclovir topical',*/ 'amikacin',
'amikacin inhalation',
'amphotericin B', 'amphotericin B inhalation', 'amphotericin B liposomal',
/*'bacitracin/HC/neomycin/polymyxin B ophth',
'bacitracin/neomycin/polymyxin B ophth',*/
/*'bacitracin/neomycin/polymyxin B topical',*/ 'benazepril', 'candesartan',
'captopril',
'celecoxib', 'ciprofloxacin', /*'ciprofloxacin ophthalmic',*/ 'ciprofloxacin-
dexamethasone otic',
'ciprofloxacin-hydrocortisone otic', 'CISplatin', 'CISplatin liposomal',
'cycloSPORINE',
/*'cycloSPORINE ophthalmic', 'dexamethasone/neomycin/poly B ophth',
'dexamethasone-tobramycin ophthalmic',*/
'diclofenac', /*'diclofenac topical',*/ 'enalapril', 'etodolac', /*'flurbiprofen
ophthalmic',*/
'foscarnet', 'fosinopril', 'gentamicin', /*'gentamicin ophthalmic', 'gentamicin
topical',*/
/*'gramicidin/neomycin/polymyxin B ophth', 'hydrocortisone/neomycin/poly
B ophth', */
'hydrocortisone/neomycin/polymyxin B otic', 'ibuprofen', 'indomethacin',
'irbesartan',
'ketorolac', /*'ketorolac ophthalmic',*/ 'levofloxacin', 'lisinopril', 'losartan',
'meloxicam',
'methotrexate', 'mitoMYcin', 'nabumetone', 'naproxen', 'ofloxacin',
/*'ofloxacin ophthalmic',*/
'ofloxacin otic', 'olmesartan', 'pentamidine', 'piroxicam', /*'polymyxin B-
trimethoprim ophthalmic',*/
'quinapril', 'ramipril', 'rifampin', 'SAME', 'streptomycin', 'sulfamethoxazole-
trimethoprim',
'sulindac', 'tacrolimus', /*'tacrolimus topical',*/ 'tetracycline', 'tobramycin',
'tobramycin (PRESERVATIVE FREE)', 'tobramycin inhalation',
'tobramycin intrathecal',
/*'tobramycin ophthalmic',*/ 'tobramycin PF nasal irrigation', 'trimethoprim',
'valACYclovir', 'valsartan', 'zoledronic acid')
and datepart(s2.event_end_dtm) ge &startdate
and datepart(s2.event_end_dtm) le &enddate
and s1.event_end_dtm < m.drug_admin_dt_tm
and s2.event_end_dtm > m.drug_admin_dt_tm
and calculated sc1_med_diff_hr le 168 /*168 hours = 7 days*/
and calculated med_sc2_diff_hr le 48
and calculated sc_mgdl_diff > 0.3
order by s1.har, s2.result desc, sc1_med_diff_hr;
quit;
data t07;
set sc_med_sc;
by har;
if first.har;
drop har;

```

```
run;
proc sort data=t07; by mrn; run;
data data.T07; set T07; run;
```

```
*****
```

TRIGGER 14 - Hepatotoxic medications & elevated AST ALT

```
*****
,
```

```
proc sql;
create table liver as
select distinct
    p.MRN
    ,p.date_of_birth
    ,a.EVENT_CODE_DESCRIPTION
    ,b.ENCOUNTER_KEY
    ,e.hospital_account_record_num    as HAR
    ,b.event_end_dt_tm                as event_end_dtm
    "event_end_dtm" format=datetime.
    ,input(b.RESULT_VAL,best12.) as result
    ,c.RESULT_UNIT_DISPLAY
FROM      nzprod1.CONΣ_RESULT_EVENT_CODE_DIM
a
    inner join      nzprod1.CONΣ_RESULT_COMPLETE_EVENT_FACT    b
on a.EVENT_CODE_KEY=b.event_cd_key
    inner join      nzprod1.CONΣ_ENCOUNTER_FACT
e
    on b.ENCOUNTER_KEY=e.encounter_key
    inner join      nzprod1.CONΣ_CURRENT_PATIENT_DIM
p
    on e.patient_key = p.patient_key
    left join      nzprod1.CONΣ_RESULT_UNIT_DIM
c
    on b.RESULT_UNIT_KEY=c.result_unit_key
WHERE event_code_key in (87356,136513,136509,88737,136493,136487)
    and datepart(b.EVENT_END_DT_TM) ge &startdate
    and datepart(b.EVENT_END_DT_TM) le &enddate
    and HAR ne -1;
```

```
create table liver150 as
select distinct
    l.*
from liver l
where result ge 150;
```

```
create table med_liver as
select distinct
    a.MRN
    ,a.date_of_birth
    ,a.ENCOUNTER_KEY
    ,a.HAR
    ,m.admin_drug_name
    ,m.drug_admin_dt_tm                format=datetime.
```

```

,m.route
,a.EVENT_CODE_DESCRIPTION
,a.event_end_dtm
,((a.event_end_dtm-m.drug_admin_dt_tm)/2629800) as month_diff
label="month_diff" format=8.2
,a.result
,a.RESULT_UNIT_DISPLAY
from work.liver150 a
inner join nzprod1.cons_admin_meds_fact m on
a.encounter_key=m.encounter_key
where ADMIN_DRUG_NAME in
/*Per ST, only */
('acarbose', 'acetaminophen', 'acetaminophen-codeine', 'acetaminophen-
HYDROcodone',
'acetaminophen-oxyCODONE', 'allopurinol', 'amiodarone', 'amoxicillin',
'amoxicillin-clavulanate', 'atorvastatin', 'baclofen', 'baclofen pump
continuous',
'celecoxib', 'diclofenac', /*'diclofenac topical',*/ 'divalproex sodium',
'erythromycin',
/*'erythromycin ophthalmic', 'erythromycin topical',*/ 'etodolac',
/*'flurbiprofen ophthalmic',*/
'glimepiride', 'glipiZIDE', 'hydrALAZINE', 'ibuprofen', 'indomethacin',
'isoniazid',
'ketorolac', /*'ketorolac ophthalmic',*/ 'labetalol', 'lisinopril', 'losartan',
'lovastatin',
'meloxicam', 'methotrexate', 'methyldopa', 'minocycline', 'nabumetone',
'naproxen',
'nitrofurantoin', 'penicillin', 'penicillin G benzathine', 'penicillin G
potassium',
'penicillin V potassium', 'piroxicam ', /*'polymyxin B-trimethoprim
ophthalmic',*/ 'pravastatin',
'procainamide ', 'rifampin', 'rosuvastatin ', 'simvastatin ',
'sulfamethoxazole-trimethoprim',
'sulfiSOXAZOLE', 'sulindac ', 'tetracycline ', 'trimethoprim ', 'valproic acid ',
'vitamin A'
/*,'vitamin A + D topical'*/)
and m.drug_admin_dt_tm<a.event_end_dtm
and calculated month_diff le 6.0;

create table med_liver2 as
select distinct
ml.mrn
,ml.date_of_birth
,(datepart(h.admit_date)-ml.date_of_birth)/365.25 as age_yrs
"age_yrs" format=8.2
,ml.har
,h.care_class
,h.admit_date
,h.discharge_date
,(h.discharge_date-h.admit_date)/3600 as admit_hrs
"admit_hrs" format=8.2

```

```

        ,ml.admin_drug_name
        ,ml.drug_admin_dt_tm
        ,ml.route
        ,ml.EVENT_CODE_DESCRIPTION
        ,ml.event_end_dtm
        ,ml.month_diff
        ,ml.result
        ,ml.RESULT_UNIT_DISPLAY

    from med_liver ml
        inner join nzprod1.cons_encounter_fact h on
ml.HAR=h.hospital_account_record_num
    WHERE calculated_age_yrs < 18
        and h.PRIMARY_CSN_IND='Y'
        and h.care_class in ('Inpatient','Observation')
        and calculated_admit_hrs > 24
    order by ml.har ,ml.month_diff;

quit;
data T14;
    set med_liver2;
    by har;
    if first.har;
        keep MRN /*DATE_OF_BIRTH*/ age_yrs /*HAR CARE_CLASS*/ ADMIT_DATE
DISCHARGE_DATE /*admit_hrs*/
        ADMIN_DRUG_NAME DRUG_ADMIN_DT_TM ROUTE
EVENT_CODE_DESCRIPTION event_end_dtm month_diff result RESULT_UNIT_DISPLAY;
run;
proc sort data=T14; by mrn; run;
data data.T14; set T14; run;

```

```

*****
TRIGGER 15 - HYPERKALMEMIA & SODIUM POLYSTYRENE ADMINISTRATION
*****
,

```

```

/*create view gapps_potassium_start07 as*/
/*SELECT distinct*/
/*    e.MRN*/
/*    ,e.DATE_OF_BIRTH*/
/*    ,b.ENCOUNTER_KEY*/
/*    ,d.HOSPITAL_ACCOUNT_RECORD_NUM*/
/*    ,a.EVENT_CODE_DESCRIPTION*/
/*    ,b.EVENT_END_DT_TM*/
/*    ,b.RESULT_VAL*/
/*    ,c.RESULT_UNIT_DISPLAY*/
/* FROM CHBPROD.CHB_DW.CONS_RESULT_EVENT_CODE_DIM a*/
/*    inner join CHBPROD.CHB_DW.CONS_RESULT_COMPLETE_EVENT_FACT b on
a.EVENT_CODE_KEY=b.event_cd_key*/
/* left join CHBPROD.CHB_DW.CONS_RESULT_UNIT_DIM c on
b.RESULT_UNIT_KEY=c.result_unit_key*/

```



```

/*      inner join CHBPROD..CONS_ENCOUNTER_FACT d on
b.ENCOUNTER_KEY=d.encounter_key*/
/*      inner join CHBPROD..CONS_PATIENT_FACT e on
d.PATIENT_KEY=e.PATIENT_KEY*/
/**/
/* where a.EVENT_CODE_KEY in
(85543,88031,89202,91023,96536,96978,101278,103378,106997,107433,115167,122512)*/
/* and c.RESULT_UNIT_DISPLAY in ('mmol/L','mEq/L')*/
/* and b.EVENT_END_DT_TM >='2007-01-01'*/

```

```
proc sql;
```

```

** Find all sodium polystyrene administrations ;
create table na_poly as
select distinct
        p.mrn
        ,p.date_of_birth
        ,h.hospital_account_record_num as har "har"
        ,m.admin_drug_name
        ,m.drug_admin_dt_tm          format=datetime.
from          devcrit.CONNS_ADMIN_MEDS_FACT          m
        inner join          nzprod1.cons_encounter_fact          h on
m.encounter_key=h.encounter_key
        inner join          nzprod1.cons_patient_fact          p on
h.patient_key=p.patient_key
        where m.admin_drug_name = 'sodium polystyrene sulfonate'
        and datepart(m.DRUG_ADMIN_DT_TM) ge &startdate
        and datepart(m.DRUG_ADMIN_DT_TM) le &enddate
        and h.care_class in ('Inpatient','Observation');

```

```

create table na_poly2 as
select distinct
        np.mrn
        ,(datepart(h.admit_date)-np.date_of_birth)/365.25 as age_yrs "age_yrs"
format=8.2
        ,np.har
        ,h.admit_date          format=datetime.
        ,h.discharge_date          format=datetime.
        ,(h.discharge_date-h.admit_date)/3600          as admit_hrs  "admit_hrs"
format=8.2
        ,np.admin_drug_name
        ,np.drug_admin_dt_tm
from          work.na_poly          np
        inner join          nzprod1.cons_encounter_fact h          on
np.har=h.hospital_account_record_num
        where h.primary_csn_ind='Y'
        and calculated admit_hrs > 24
        and calculated age_yrs < 18;

```

```

create table k_na as
select distinct

```

```

        np.mrn
        ,np.age_yrs
        ,np.har
        ,np.admit_date
        ,np.discharge_date
        ,k.event_code_description
        ,k.event_end_dt_tm                                as potassium_dtm "potassium_dtm"
format=datetime.
        ,input(k.result_val,best12.)    as potassium_result "potassium_result"
        ,k.result_unit_display          as result_unit "result_unit"
        ,np.admin_drug_name
        ,np.drug_admin_dt_tm
        ,(np.drug_admin_dt_tm-k.event_end_dt_tm)/3600 as diff_hrs "diff_hrs"
format=8.2

FROM          work.na_poly2                                np
              inner join    devcrit.gapps_potassium_start07      k on
np.har=k.hospital_account_record_num
              where k.RESULT_UNIT_DISPLAY in ('mmol/L','mEq/L')
                  and calculated potassium_result>6
                  and calculated diff_hrs>0
                  and calculated diff_hrs<24
              order by np.har, potassium_dtm, np.drug_admin_dt_tm;

quit;

data k_na2;
    set k_na;
    by har;
    if first.har;

run;
proc sort data=k_na2; by mrn admit_date; run;
data data.T15 T15;
    set k_na2;
    drop har;

run;

*****
TRIGGER 16 - GLUCOSE
*****
proc sql;
create table glucose as
select distinct
        p.MRN
        ,p.date_of_birth
        ,e.hospital_account_record_num as HAR "HAR"
        ,a.EVENT_CODE_KEY
        ,a.EVENT_CODE_DESCRIPTION
        ,datepart(b.event_end_dt_tm) as event_end_dt format=mmddyy10.
        ,input(b.RESULT_VAL,best12.) as result

```

```

        ,b.RESULT_UNIT_KEY
        ,c.RESULT_UNIT_DISPLAY
FROM      nzprod1.CONΣ_RESULT_EVENT_CODE_DIM
a
        inner join      nzprod1.CONΣ_RESULT_COMPLETE_EVENT_FACT      b
on a.EVENT_CODE_KEY=b.event_cd_key
        left join      nzprod1.CONΣ_RESULT_UNIT_DIM
c
        on b.RESULT_UNIT_KEY=c.result_unit_key
        left join nzprod1.CONΣ_ENCOUNTER_FACT      e
on b.ENCOUNTER_KEY=e.encounter_key
        left join nzprod1.CONΣ_CURRENT_PATIENT_DIM      p
on e.patient_key = p.patient_key
WHERE event_code_key in
/*      116942 = 5% Glucose Water Oral*/

(84885,86515,86916,87363,87806,88531,89171,89222,91012,91482,91930,92116,9234
5,92392,93019,93781,

93945,94528,95178,96070,98785,99704,99781,100084,100619,101110,102445,102912
,103227,

103770,104901,106087,107896,107913,108551,109282,109387,110051,110279,11076
7,110857,111177,111229,

111658,112499,112541,112790,112995,113179,113523,114425,114668,114926,11517
9,115386,115623,115745,

116774,117265,117526,117674,118485,119049,119299,119529,120782,121755,12230
7,122482,123180,

123636,124047,124390,124952,125299,125434,125457,125576,126320,126489,13429
0,136461,136557)
and datepart(b.EVENT_END_DT_TM) ge &startdate
and datepart(b.EVENT_END_DT_TM) le &enddate
and b.RESULT_UNIT_KEY in (1275,1568)
and p.MRN is not null;

create table glucose2 as
select distinct
        g.mrn
        ,(datepart(h.admit_date)-g.date_of_birth)/365.25 as age_yrs
"age_yrs"      format=8.2
        ,g.har
        ,h.care_class
        ,h.admit_date
        ,h.discharge_date
        ,(h.discharge_date-h.admit_date)/3600      as admit_hrs
"admit_hrs"      format=8.2
        ,g.EVENT_CODE_DESCRIPTION
        ,g.event_end_dt
        ,g.result

```

```

        ,g.RESULT_UNIT_DISPLAY
    from          work.glucose          g
        inner join nzprod1.CONNS_ENCOUNTER_FACT  h      on
g.HAR=h.hospital_account_record_num
    WHERE result ne .
        and ((RESULT<40 and RESULT_UNIT_KEY=1568) or (RESULT<2 and
RESULT_UNIT_KEY=1275))
        and calculated age_yrs < 18
        and h.PRIMARY_CSN_IND='Y'
        and h.care_class in ('Inpatient','Observation')
        and calculated admit_hrs > 24
    ORDER BY g.har, g.EVENT_END_DT
;
quit;
data t16;
    set glucose2;
    by har;
    if first.har;
        keep MRN age_yrs /*HAR CARE_CLASS*/ ADMIT_DATE DISCHARGE_DATE
/*admit_hrs*/ EVENT_CODE_DESCRIPTION event_end_dt result RESULT_UNIT_DISPLAY;
run;
proc sort data=t16; by mrn event_end_dt; run;
data data.T16; set T16; run;

```

```

*****
TRIGGER 17 - GLUCAGON ADMINISTRATION TO A PATIENT ON INSULIN
*****
,

```

```

proc sql;

    ** Find glucagon administrations ;
create table glucagon as
select distinct
    pt.mrn
    ,pt.date_of_birth
    ,med.ENCOUNTER_KEY
    ,enc.hospital_account_record_num
    ,med.DRUG_ADMIN_DT_TM
    ,med.ADMIN_DRUG_NAME
    from          devcrit.cons_admin_meds_fact      med
        inner join      nzprod1.cons_encounter_fact      enc on
med.encounter_key=enc.encounter_key
        inner join      nzprod1.cons_patient_fact      pt      on
med.patient_key=pt.patient_key
    where med.ADMIN_DRUG_NAME in ('glucagon')
        and datepart(med.DRUG_ADMIN_DT_TM) ge &startdate
        and datepart(med.DRUG_ADMIN_DT_TM) le &enddate;

    ** Find insulin administrations ;
create table insulin as

```

```

select distinct
    pt.mrn
    ,pt.date_of_birth
    ,med.ENCOUNTER_KEY
    ,enc.hospital_account_record_num
    ,med.DRUG_ADMIN_DT_TM
    ,med.ADMIN_DRUG_NAME
from
    devcrit.cons_admin_meds_fact      med
    inner join      nzprod1.cons_encounter_fact      enc on
med.encounter_key=enc.encounter_key
    inner join      nzprod1.cons_patient_fact      pt      on
med.patient_key=pt.patient_key

where med.ADMIN_DRUG_NAME in
    ('insulin aspart','insulin aspart-insulin aspart protamine','insulin
detemir','insulin glargine',
    'insulin glulisine','insulin isophane (NPH)','insulin isophane (NPH)-insulin
regular','insulin lispro',
    'insulin lispro-insulin lispro protamine','insulin regular')
and datepart(med.DRUG_ADMIN_DT_TM) ge &startdate
and datepart(med.DRUG_ADMIN_DT_TM) le &enddate;

```

** Find glucagon administrations to patients on insulin ;
create table insulin_glucagon as

```

select distinct
    coalesce(i.mrn,g.mrn)
as mrn      "mrn"
    ,coalesce(i.date_of_birth,g.date_of_birth)      as dob
"dob"      format=date9.
    ,(datepart(e.admit_date)-g.date_of_birth)/365.25      as age_yrs
"age_yrs"      format=8.2
    ,coalesce(i.hospital_account_record_num,g.hospital_account_record_num)
as har      "har"
    ,e.care_class
    ,e.admit_date      format=datetime.
    ,e.discharge_date      format=datetime.
    ,(e.discharge_date-e.admit_date)/3600      as admit_hrs
"admit_hrs"      format=8.2
    ,i.DRUG_ADMIN_DT_TM
as ins_dtm      "ins_dtm"      format=datetime.
    ,i.ADMIN_DRUG_NAME
as ins_name      "ins_name"
    ,g.DRUG_ADMIN_DT_TM
as glucagon_dtm      "glucagon_dtm"      format=datetime.
    ,g.ADMIN_DRUG_NAME
as glucagon_name      "glucagon_name"
    ,((g.DRUG_ADMIN_DT_TM)-(i.DRUG_ADMIN_DT_TM))/3600      as hours
"hours"      format=8.2
from
    work.insulin      i
    inner join      work.glucagon      g on
i.hospital_account_record_num=g.hospital_account_record_num

```

```

            inner join      nzprod1.cons_encounter_fact      e on
i.hospital_account_record_num=e.hospital_account_record_num

        and g.hospital_account_record_num=e.hospital_account_record_num
        where 0 < calculated_hours le 24
            and e.care_class in ('Inpatient','Observation')
            and calculated_age_yrs < 18
            and calculated_admit_hrs > 24
            and e.PRIMARY_CSN_IND='Y'
        order by har, hours;

quit;

data T17;
    set insulin_glucagon;
    by har;
    if first.har;
        keep mrn /*dob*/ age_yrs /*har care_class*/ admit_date discharge_date /*admit_hrs*/
ins_dtm ins_name glucagon_dtm glucagon_name hours;
run;
proc sort data=T17; by mrn; run;
/*data data.T17; set T17; run;*/

```

```

*****
TRIGGER 18 - DEXTROSE BOLUS ADMINISTRATION TO A PATIENT ON INSULIN
*****
,

```

```

proc sql;

    ** Find dextrose administrations ;
create table dextrose as
select distinct
    pt.mrn
    ,pt.date_of_birth
    ,med.ENCOUNTER_KEY
    ,enc.hospital_account_record_num
    ,med.DRUG_ADMIN_DT_TM
    ,med.ADMIN_DRUG_NAME
from
    devcrit.cons_admin_meds_fact      med
    inner join      nzprod1.cons_encounter_fact      enc on
med.encounter_key=enc.encounter_key
    inner join      nzprod1.cons_patient_fact      pt      on
med.patient_key=pt.patient_key
    where med.ADMIN_DRUG_NAME in
        ('Dextrose 10% in Water','Dextrose 10% with 0.2% NaCl','Dextrose 10%
with 0.9% NaCl','Dextrose 12.5% in Water',
        'Dextrose 15% in Water','Dextrose 17.5% in Water','Dextrose 20% in
Water','Dextrose 22.5% in Water',

```

'Dextrose 25% in Water','Dextrose 30% in Water','Dextrose 40% in Water','Dextrose 50% in Water')

and datepart(med.DRUG_ADMIN_DT_TM) ge &startdate
and datepart(med.DRUG_ADMIN_DT_TM) le &enddate;

** Found insulin administrations in Trigger 17 ;

** Find dextrose administrations to patients on insulin ;

create table insulin_dextrose as

select distinct

```

        coalesce(i.mrn,d.mrn)
    as mrn          "mrn"
        ,coalesce(i.date_of_birth,d.date_of_birth)          as dob          "dob"
    format=date9.
        ,(datepart(e.admit_date)-d.date_of_birth)/365.25    as age_yrs
    "age_yrs"      format=8.2
        ,coalesce(i.hospital_account_record_num,d.hospital_account_record_num)
    as har          "har"
        ,e.care_class
        ,e.admit_date      format=datetime.
        ,e.discharge_date  format=datetime.
        ,(e.discharge_date-e.admit_date)/3600              as admit_hrs
    "admit_hrs"    format=8.2
        ,i.DRUG_ADMIN_DT_TM
    as ins_dtm      "ins_dtm"      format=datetime.
        ,i.ADMIN_DRUG_NAME
    as ins_name     "ins_name"
        ,d.DRUG_ADMIN_DT_TM
    as dex_dtm      "dex_dtm"      format=datetime.
        ,d.ADMIN_DRUG_NAME
    as dex_name     "dex_name"
        ,((d.DRUG_ADMIN_DT_TM)-(i.DRUG_ADMIN_DT_TM))/3600  as hours
    "hours"        format=8.2
    from            work.insulin          i
        inner join  work.dextrose         d on
i.hospital_account_record_num=d.hospital_account_record_num
        inner join  nzprod1.cons_encounter_fact  e on
i.hospital_account_record_num=e.hospital_account_record_num

```

and d.hospital_account_record_num=e.hospital_account_record_num

where 0 < calculated hours le 24

and e.care_class in ('Inpatient','Observation')

and calculated age_yrs < 18

and calculated admit_hrs > 24

and e.PRIMARY_CSN_IND='Y'

order by har, hours;

quit;

data T18;

set insulin_dextrose;

```

        by har;
        if first.har;
        keep mrn /*dob*/ age_yrs /*har care_class*/ admit_date discharge_date /*admit_hrs*/
ins_dtm ins_name dex_dtm dex_name hours;
run;
proc sort data=T18; by mrn; run;

```

```

*****
TRIGGER 19 - ABRUPT MEDICATION STOP
*****
,

```

```

/*CREATE OR REPLACE VIEW GAPPS_MEDSTOP_START07 AS*/
/*select distinct*/
/*      pt.MRN*/
/*      ,pt.DATE_OF_BIRTH*/
/*      ,o2.order_id*/
/*      ,o1.oa_sequence as oa_seq1*/
/*      ,o2.oa_sequence as oa_seq2 */
/*      ,o1.action_type as action1 */
/*      ,o2.action_type as action2 */
/*      ,o1.projected_stop_dt_tm */
/*      ,o2.action_dt_tm */
/*from      CHBPROD..PHARM_MED_ORDERS o1*/
/* inner join CHBPROD..PHARM_MED_ORDERS o2 on
o1.order_id=o2.order_id*/
/* inner join CHBPROD..CONS_PATIENT_FACT pt on
o2.PATIENT_KEY=pt.patient_key*/
/*where o2.action_dt_tm >= '2007-01-01'*/
/*      and o1.oa_sequence < o2.oa_sequence*/
/*      and o2.action_type_cd = 2532*/
/*      and o1.projected_stop_dt_tm > o2.action_dt_tm*/

proc sql;
create table T19 as
select distinct
        a.*
        ,(datepart(a.action_dt_tm)-a.date_of_birth)/365.25 as age_yrs "age_yrs"
format=8.2
        from devcrit.gapps_medstop_start07 a
        where a.action_dt_tm ge &startdate
        and a.action_dt_tm le &enddate
        and calculated age_yrs < 18
        and datepart(a.projected_stop_dt_tm) > datepart(a.action_dt_tm);
quit;

```

```

*****
TRIGGER 22 - OPIOID RELATED CONSTIPATION WITH INTERMITTENT LAXATIVE USE
*****
,

```



```
proc sql;
```

```
    ** Find QCC diagnosis of constipation ;
create table qcc_constipation as
SELECT distinct
    d.MRN
    ,d.date_of_birth
    ,c.hospital_account_record_num    as HAR "HAR"
    ,a.DIAGNOSIS_TERM
    ,b.SUBMITTED_DATETIME format=datetime.
FROM nzprod1.QCC_CHARGE_DIAGNOSIS          a
    inner join nzprod1.QCC_CHARGE          b on a.CHARGE_ID=b.charge_id
    inner join nzprod1.cons_encounter_fact  c on
b.ENCOUNTER_ID=c.CONTACT_SERIAL_NUMBER
    inner join nzprod1.cons_patient_fact d on c.PATIENT_KEY=d.patient_key
where a.SNOMED_CD = '14760008'
    and datepart(b.SUBMITTED_DATETIME) ge &startdate
    and datepart(b.SUBMITTED_DATETIME) le &enddate
    and c.hospital_account_record_num ne -1
    and c.care_class in ('Inpatient','Observation');
```

```
    ** Find times when constip was diagnosed within 7 days of opioid administration ;
create table opioid_constip as
select distinct
    c.mrn
    ,c.date_of_birth
    ,c.HAR
    ,m.admin_drug_name          as opioid_name          "opioid_name"
    ,m.drug_admin_dt_tm        as opioid_dtm            "opioid_dtm"
format=datetime.
    ,c.SUBMITTED_DATETIME as constip_dx_dtm            "constip_dx_dtm"
    ,(c.SUBMITTED_DATETIME-m.drug_admin_dt_tm)/86400 as days_to_dx
"days_to_dx" format=8.2
from          devcrit.cons_admin_meds_fact          m
    inner join nzprod1.cons_encounter_fact          e      on
m.encounter_key=e.encounter_key
    inner join work.qcc_constipation                c      on
e.hospital_account_record_num=c.HAR
    where upcase(m.admin_drug_name) in
        ('MORPHINE',
        'CODEINE','ACETAMINOPHEN-CODEINE',
        /* no HEROIN - not in BCH system */
        'ACETAMINOPHEN-HYDROCODONE',
        'OXYCODONE','ACETAMINOPHEN-OXYCODONE',
        'HYDROMORPHONE',
        'OXYMORPHONE',
        'METHADONE',
        'BUPRENORPHINE',
        'MEPERIDINE',
```

```

        'FENTANYL',
        'TRAMADOL',
        'BUTORPHANOL',
        /* no LEVORPHANOL - no documented administrations at BCH, okay to
leave out of the search */
        'NALBUPHINE'
        /* no PENTAZOCINE - no documented administrations at BCH, okay to
leave out of the search */)
        and m.drug_admin_dt_tm < c.SUBMITTED_DATETIME
        and calculated days_to_dx < 7;

```

```

create table opioid_constip2 as
select distinct

```

```

        oc.mrn
        ,(datepart(h.admit_date)-oc.date_of_birth)/365.25 as age_yrs      "age_yrs"
format=8.2
        ,oc.HAR
        ,h.care_class
        ,h.admit_date      format=datetime.
        ,h.discharge_date  format=datetime.
        ,(h.discharge_date-h.admit_date)/3600                        as admit_hrs
"admit_hrs"  format=8.2
        ,oc.opioid_name
        ,oc.opioid_dtm
        ,oc.constip_dx_dtm
        ,oc.days_to_dx
from          work.opioid_constip
inner join    nzprod1.cons_encounter_fact      h      oc
on
oc.HAR=h.hospital_account_record_num
where calculated age_yrs < 18
      and h.PRIMARY_CSN_IND='Y'
      and h.care_class in ('Inpatient','Observation')
      and calculated admit_hrs > 24
order by oc.har, oc.constip_dx_dtm;

```

```
quit;
```

```

data T22;
  set opioid_constip2;
  by har;
  if first.har;
  keep MRN age_yrs /*HAR CARE_CLASS*/ ADMIT_DATE DISCHARGE_DATE
/*admit_hrs*/ opioid_name opioid_dtm constip_dx_dtm days_to_dx ;
run;

```

```
data data.T22; set T22; run;
```

```
*****
```

```
TRIGGER 23 - Naloxone (Narcan) Administration
```

```
*****
,
```

```

proc sql;
create table naloxone as
select distinct
    pt.mrn
    ,pt.date_of_birth
    ,e.hospital_account_record_num as har "HAR"
    ,m.admin_drug_name
    ,m.drug_admin_dt_tm          as naloxone_dtm          "naloxone_dtm"
format=datetime.
    ,m.admin_dosage
    ,m.dose_unit
    ,m.route

    from          nzprod1.cons_admin_meds_fact  m
    inner join    nzprod1.cons_encounter_fact  e      on
m.encounter_key=e.encounter_key
    inner join    nzprod1.cons_patient_fact    pt     on
m.patient_key=pt.patient_key
    where upcase(m.admin_drug_name) = 'NALOXONE'
    and datepart(m.drug_admin_dt_tm) >= &startdate
    and datepart(m.drug_admin_dt_tm) <= &enddate
    and m.dose_unit ne "";
quit;

```

```

proc sql;
create table naloxone3 as
select distinct
    n.mrn
    ,n.date_of_birth
    as dob      "dob"          format=date9.
    ,(datepart(h.admit_date)-n.date_of_birth)/365.25  as age_yrs      "age_yrs"
format=8.2
    ,n.HAR
    ,h.admit_date
    ,h.discharge_date
    ,h.discharge_date-h.admit_date)/3600              as admit_hrs
"admit_hrs" format=8.2
    ,n.admin_drug_name
    ,n.naloxone_dtm
    ,n.admin_dosage
    ,n.dose_unit
    ,n.route
    from work.naloxone n
    inner join nzprod1.cons_encounter_fact  h      on
n.har=h.hospital_account_record_num
    where h.primary_csn_ind='Y'
    and h.care_class in ('Inpatient','Observation')
    and calculated age_yrs < 18

```

```

        and calculated admit_hrs > 24
    order by har, admit_date;
quit;

```

```

data T23;
    set naloxone3;
    by har;
    if first.har;
    drop har admit_hrs;
run;
proc sort data=T23 out=data.T23; by mrn; run;

```

```

*****

```

TRIGGER 28 - Pressure Ulcer

```

*****

```

```

proc sql;

create table ulcer as
select distinct
    pt.mrn
    ,pt.date_of_birth
    ,DF.ENCOUNTER_KEY
    ,DF.DIAGNOSIS_DATE
    ,DD.DIAGNOSIS_FORMATTED_CODE
    ,DD.DIAGNOSIS_DESCRIPTION
FROM
    nzprod1.CONNS_DIAGNOSIS_FACT df
inner join
    nzprod1.CONNS_DIAGNOSIS_DIM dd on
df.DIAGNOSIS_KEY=dd.DIAGNOSIS_KEY
left join nzprod1.conns_patient_fact pt on df.patient_key=pt.patient_key
WHERE DD.DIAGNOSIS_FORMATTED_CODE IN
('707.0','707.00','707.01','707.02','707.03','707.04','707.05','707.06','707.07','707.09')
and datepart(DF.DIAGNOSIS_DATE) ge &startdate
and datepart(DF.DIAGNOSIS_DATE) le &enddate
and dd.diagnosis_source_vocabulary in ("ICD-9-CM");

```

```

create table ulcer2 as
select distinct
    u.mrn
    ,u.date_of_birth
    ,(datepart(h.admit_date)-u.date_of_birth)/365.25 as age_yrs
    format=8.2
    ,h.hospital_account_record_num as har "HAR"
    ,h.care_class
    ,h.admit_date
    ,h.discharge_date
    ,(h.discharge_date-h.admit_date)/3600
    format=8.2

```

```

,u.DIAGNOSIS_DATE
,u.icd9_code
,u.DIAGNOSIS_DESCRIPTION
FROM work.ulcer u
inner join nzprod1.CONNS_ENCOUNTER_FACT h on
u.ENCOUNTER_KEY=h.ENCOUNTER_KEY
WHERE h.PRIMARY_CSN_IND='Y'
and h.care_class in ('Inpatient','Observation')
and calculated age_yrs < 18
and calculated admit_hrs > 24
order by har, u.diagnosis_date;
quit;

data t28;
set ulcer2;
by har;
if first.har;
keep mrn age_yrs admit_date discharge_date diagnosis_date icd9_code
DIAGNOSIS_DESCRIPTION;
run;
proc sort data=T28; by mrn; run;

data data.T28; set T28; run;

```

```

*****
TRIGGER 30 - Embolus / Thrombus
*****

```

```

proc sql;
create table embolus as
select distinct
    pt.mrn
    ,pt.date_of_birth
    ,df.encounter_key
    ,DF.DIAGNOSIS_DATE format=datetime.
    ,DD.DIAGNOSIS_FORMATTED_CODE as icd9_code "icd9_code"
    ,DD.DIAGNOSIS_DESCRIPTION
FROM nzprod1.CONNS_DIAGNOSIS_FACT df
inner join nzprod1.CONNS_DIAGNOSIS_DIM dd on
df.DIAGNOSIS_KEY=dd.DIAGNOSIS_KEY
left join nzprod1.cons_patient_fact pt on df.patient_key=pt.patient_key
WHERE DD.DIAGNOSIS_FORMATTED_CODE IN
('453.41','453.42','453.40','415.19','415.11','415.13','673.20','673.21','453.82','453.84','453.86')
and datepart(DF.DIAGNOSIS_DATE) ge &startdate
and datepart(DF.DIAGNOSIS_DATE) le &enddate
and dd.diagnosis_source_vocabulary in ("ICD-9-CM");

create table embolus2 as
select distinct

```

```

        e.mrn
        ,e.date_of_birth
        ,(datepart(h.admit_date)-e.date_of_birth)/365.25 as age_yrs      "age_yrs"
format=8.2
        ,h.hospital_account_record_num as har "HAR"
        ,h.care_class
        ,h.admit_date          format=datetime.
        ,h.discharge_date      format=datetime.
        ,(h.discharge_date-h.admit_date)/3600      as admit_hrs  "admit_hrs"
format=8.2
        ,e.DIAGNOSIS_DATE
        ,e.icd9_code
        ,e.DIAGNOSIS_DESCRIPTION
FROM          work.embolus          e
inner join    nzprod1.CONNS_ENCOUNTER_FACT h on
e.ENCOUNTER_KEY=h.ENCOUNTER_KEY
WHERE h.PRIMARY_CSN_IND='Y'
      and h.care_class in ('Inpatient','Observation')
      and calculated age_yrs < 18
      and calculated admit_hrs > 24
order by har, e.diagnosis_date;

quit;

data t30;
    set embolus2;
    by har;
    if first.har ;
    keep mrn age_yrs admit_date discharge_date diagnosis_date icd9_code
DIAGNOSIS_DESCRIPTION;
run;
proc sort data=T30; by mrn; run;
data data.T30; set T30; run;

```

```

*****
TRIGGER 32 - ORAL VANCOMYCIN
*****
,

```

```

proc sql;
    ** Find oral vancomycin administrations ;
create table vanco_po as
select distinct
        pt.mrn
        ,pt.date_of_birth
        ,(datepart(har.admit_date)-pt.date_of_birth)/365.25 as age_yrs
        "age_yrs"      format=8.2
        ,enc.hospital_account_record_num
        "HAR"
HAR
as

```

```

        ,har.care_class
        ,har.admit_date          format=datetime.
        ,har.discharge_date    format=datetime.
        ,(har.discharge_date-har.admit_date)/3600          as admit_hrs
"admit_hrs"    format=8.2
        ,med.ADMIN_DRUG_NAME
        ,med.ROUTE
        ,med.DRUG_ADMIN_DT_TM    format=datetime.
from          devcrit.cons_admin_meds_fact    med
        inner join    nzprod1.cons_encounter_fact    enc on
med.encounter_key=enc.encounter_key
        inner join    nzprod1.cons_patient_fact    pt    on
med.patient_key=pt.patient_key
        inner join    nzprod1.cons_encounter_fact    har on
enc.hospital_account_record_num=har.hospital_account_record_num
        where med.ADMIN_DRUG_NAME in ('vancomycin-polymyxin B','vancomycin')
        and med.ROUTE in ('PO')
        and datepart(med.DRUG_ADMIN_DT_TM) ge &startdate
        and datepart(med.DRUG_ADMIN_DT_TM) le &enddate
        and har.PRIMARY_CSN_IND='Y'
        and har.care_class in ('Inpatient','Observation')
        and calculated age_yrs < 18
        and calculated admit_hrs > 24
        order by HAR, med.drug_admin_dt_tm;
quit;
data T32;
        set vanco_po;
        by HAR;
        if first.HAR;
        keep mrn /*dob*/ age_yrs /*HAR care_class*/ admit_date discharge_date /*admit_hrs*/
ADMIN_DRUG_NAME ROUTE DRUG_ADMIN_DT_TM;
run;
proc sort data=T32; by mrn age_yrs; run;

```

TRIGGER 33 - Blood cultures

```

proc sql;

create table blood as
select distinct
        p.MRN
        ,p.date_of_birth
        ,a.EVENT_CODE_KEY
        ,a.EVENT_CODE_DESCRIPTION
        ,e.hospital_account_record_num    as HAR
        ,b.event_end_dt_tm                as event_end_dtm
        "event_end_dtm"    format=datetime.
        ,b.EVENT_TAG

```

```

FROM          nzprod1.CONΣ_RESULT_EVENT_CODE_DIM
a
    inner join  nzprod1.CONΣ_RESULT_COMPLETE_EVENT_FACT    b
on a.EVENT_CODE_KEY=b.event_cd_key
    left join   nzprod1.CONΣ_RESULT_UNIT_DIM
c
    on b.RESULT_UNIT_KEY=c.result_unit_key
    inner join   nzprod1.CONΣ_ENCOUNTER_FACT
e
    on b.ENCOUNTER_KEY=e.encounter_key
    left join nzprod1.CONΣ_CURRENT_PATIENT_DIM                p
on e.patient_key = p.patient_key
WHERE event_code_key in (110739,110960,112116,112522,119035)
    and datepart(b.EVENT_END_DT_TM) ge &startdate
    and datepart(b.EVENT_END_DT_TM) le &enddate
    and b.event_tag="Check Result";

create table blood2 as
select distinct
    w.MRN
    ,w.date_of_birth
    ,(datepart(h.admit_date)-w.date_of_birth)/365.25 as age_yrs      "age_yrs"
format=8.2
    ,w.HAR
    ,h.care_class
    ,h.admit_date          format=datetime.
    ,h.discharge_date      format=datetime.
    ,(h.discharge_date-h.admit_date)/3600      as admit_hrs  "admit_hrs"
format=8.2
    ,w.event_end_dtm
    ,(w.event_end_dtm-h.admit_date)/3600      as event_hrs  "event_hrs"
format=8.2
    ,w.EVENT_TAG
FROM          work.blood
inner join     nzprod1.CONΣ_ENCOUNTER_FACT    h
on w.HAR=h.HOSPITAL_ACCOUNT_RECORD_NUM
WHERE h.PRIMARY_CSN_IND='Y'
    and h.care_class in ('Inpatient','Observation')
    and calculated age_yrs < 18
    and calculated admit_hrs > 24
    and calculated event_hrs > 48
ORDER BY HAR, event_end_dtm;

quit;
data T33;
    set blood2;
    by HAR;
    if first.HAR;
        keep mrn age_yrs admit_date discharge_date event_end_dtm event_hrs event_tag;
run;
proc sort data=t33; by mrn event_end_dtm; run;
data data.T33; set T33; run;

```


*****TRIGGER 34 - Urine

cultures

*****,

```
proc sql;
create table urine as
select distinct
    p.MRN
    ,p.date_of_birth
    ,a.EVENT_CODE_KEY
    ,a.EVENT_CODE_DESCRIPTION
    ,e.hospital_account_record_num as HAR
    ,b.event_end_dt_tm as event_end_dtm
    "event_end_dtm" format=datetime.
    ,b.EVENT_TAG
FROM
    nzprod1.CONNS_RESULT_EVENT_CODE_DIM
a
    inner join
    nzprod1.CONNS_RESULT_COMPLETE_EVENT_FACT b
on a.EVENT_CODE_KEY=b.event_cd_key
    left join
    nzprod1.CONNS_RESULT_UNIT_DIM
c
    on b.RESULT_UNIT_KEY=c.result_unit_key
    inner join
    nzprod1.CONNS_ENCOUNTER_FACT
e
    on b.ENCOUNTER_KEY=e.encounter_key
    left join nzprod1.CONNS_CURRENT_PATIENT_DIM
p
on e.patient_key = p.patient_key
WHERE event_code_key in (84859,92885,107899)
    and datepart(b.EVENT_END_DT_TM) ge &startdate
    and datepart(b.EVENT_END_DT_TM) le &enddate
    and b.event_tag="Check Result";
```

```
create table urine2 as
select distinct
    u.MRN
    ,u.date_of_birth
    ,(datepart(h.admit_date)-u.date_of_birth)/365.25 as age_yrs
    format=8.2
    ,u.HAR
    ,h.care_class
    ,h.admit_date format=datetime.
    ,h.discharge_date format=datetime.
    ,(h.discharge_date-h.admit_date)/3600 as admit_hrs
    format=8.2
    ,u.event_end_dtm
    ,(u.event_end_dtm-h.admit_date)/3600 as event_hrs
    format=8.2
    ,u.EVENT_TAG
FROM
    work.urine u
    inner join
    nzprod1.CONNS_ENCOUNTER_FACT h
on u.HAR=h.HOSPITAL_ACCOUNT_RECORD_NUM
WHERE h.PRIMARY_CSN_IND='Y'
    and h.care_class in ('Inpatient','Observation')
```

```

        and calculated age_yrs < 18
        and calculated admit_hrs > 24
        and calculated event_hrs > 48
ORDER BY HAR, event_end_dtm;

```

```

quit;
data T34;
    set urine2;
    by HAR;
    if first.HAR;
        keep mrn age_yrs admit_date discharge_date event_end_dtm event_hrs event_tag;
run;
proc sort data=t34; by mrn event_end_dtm; run;
data data.T34; set T34; run;

```

```

*****

```

TRIGGER 35 - POSITIVE VIRAL PANEL

```

*****

```

```

/*      gapps_viral_start07 */
/*select distinct*/
/*      pt.mrn*/
/*      ,pt.date_of_birth*/
/*      ,rf.encounter_key*/
/*      ,e.hospital_account_record_num*/
/*      ,l5.level5_code*/
/*      ,rd.EVENT_CODE_DESCRIPTION*/
/*      ,rf.event_end_dt_tm*/
/*      ,rf.result_val*/
/*      from      chbprod..cons_result_hierarchy_dim      l5*/
/*      inner join  chbprod..cons_result_complete_event_fact rf      on
l5.event_cd_key=rf.event_cd_key*/
/*      inner join  chbprod..cons_result_event_code_dim      rd      on
rf.event_cd_key=rd.event_code_key*/
/*      inner join  chbprod..cons_encounter_fact      e
on rf.encounter_key=e.encounter_key*/
/*      inner join  chbprod..cons_patient_fact      pt      on
e.patient_key=pt.patient_key*/
/*      where l5.level5_code in (33114776, 33114792, 33114793, 33114804, 33114805,
33114807, 33114808, 33114812, */
/*      33114814, 33114815, 33114819,
33114820, 33114821, 33114942, 33114943, 33114944, */
/*      33114945, 33114946, 33114947,
33114948, 33115010, 115275816, 115275817, 115275818, */
/*      119781432, 149833997, 184383162,
184383163, 230641827, 230641828, 244938216, */
/*      468655548, 468655549, 468655552,
483794618, 483794826, 483794827, 485567162, 489034182, 517918231)*/
/*      and rf.event_end_dt_tm >= '2007-01-01'*/
/*      and rf.RESULT_VAL is not null*/

```

```

proc sql;
create table viral as
select distinct
      v.mrn
/*      ,v.date_of_birth*/
      ,(datepart(h.admit_date)-v.date_of_birth)/365.25 as age_yrs      "age_yrs"
format=8.2
      ,v.hospital_account_record_num as har "HAR"
      ,h.admit_date      format=datetime.
      ,h.discharge_date      format=datetime.
      ,(h.discharge_date-h.admit_date)/3600      as admit_hrs      "admit_hrs"
format=8.2
/*      ,v.level5_code*/
      ,v.EVENT_CODE_DESCRIPTION
      ,v.event_end_dt_tm      format=datetime.
      ,v.result_val      as result "result"
from      devcrit.gapps_viral_start07 v
inner join      nzprod1.cons_encounter_fact      h      on
v.hospital_account_record_num=h.hospital_account_record_num
where h.primary_csn_ind='Y'
      and h.care_class in ('Inpatient','Observation')
      and datepart(v.event_end_dt_tm) ge &startdate
      and datepart(v.event_end_dt_tm) le &enddate
      and (v.event_end_dt_tm-h.admit_date)/3600 > 48
      and calculated age_yrs < 18
      and calculated admit_hrs > 24
      and v.result_val not in ('Negative','Not Detected')
      and v.event_code_description not in ('Adeno PCR','RVP')
order by har, result_val desc;
quit;
data viral2;
set viral;
by har;
if first.har;
drop admit_hrs har;
run;
proc sort data=viral2 out=T35; by mrn admit_date; run;
data data.T35;
set T35;
run;

```

TRIGGER 37 - Hospital readmission within 30 days

,

```

** Find all readmissions;
proc sql;

```

```

create table readmit_30d as
select distinct
    h1.patient_key
    ,h1.hospital_account_record_num as har1
    "HAR1"
    ,h1.discharge_date as
h1_discharge_date "h1_discharge_date" format=datetime.
    ,h2.hospital_account_record_num as har2
    "HAR2"
    ,h2.admit_date as
h2_admit_date "h2_admit_date" format=datetime.
    ,(h2.admit_date-h1.discharge_date)/86400 as days_to_readmit
    "days_to_readmit" format=8.2
    ,h2.discharge_date as
h2_discharge_date "h2_discharge_date" format=datetime.
from nzprod1.cons_encounter_fact h1
inner join nzprod1.cons_encounter_fact h2 on
h1.patient_key=h2.patient_key
where datepart(h2.admit_date) ge &startdate
and datepart(h2.admit_date) le &enddate
and h1.primary_csn_ind='Y'
and h2.primary_csn_ind='Y'
and h1.care_class in ('Inpatient','Observation')
and h2.care_class in ('Inpatient','Observation')
and h2.admit_date > h1.discharge_date
and 0 lt calculated days_to_readmit le 30;

```

```

create table readmit_30d2 as
select distinct
    p.mrn
    ,p.date_of_birth
    ,(datepart(r.h2_admit_date)-p.date_of_birth)/365.25 as age_yrs "age_yrs"
format=8.2
    ,r.har1
    ,r.h1_discharge_date
    ,r.har2
    ,r.h2_admit_date
    ,r.days_to_readmit
    ,r.h2_discharge_date
    ,(r.h2_discharge_date-r.h2_admit_date)/3600 as admit_hrs
"admit_hrs" format=8.2
from work.readmit_30d r
inner join nzprod1.cons_patient_fact p on r.patient_key=p.patient_key
where calculated age_yrs < 18
and calculated admit_hrs > 24
order by har2;

```

```

** Find planned readmissions;
create table readmit_planned as
select distinct r.har2

```

```

        from          devcrit.proc_planned_icd9    p
            inner join  nzprod1.cons_encounter_fact e on
p.encounter_key=e.encounter_key
            inner join  work.readmit_30d2          r on
e.hospital_account_record_num=r.har2
        order by r.har2;

```

```
quit;
```

```

** Find unplanned readmissions;
data readmit_unplanned;
    merge readmit_30d2 (in=a) readmit_planned (in=b);
    by har2;
    if a=1 and b=0;
run;
proc sort data=readmit_unplanned; by mrn har2 days_to_readmit; run;

```

```

data T37;
    set readmit_unplanned;
    by mrn har2;
    if first.har2;
    keep mrn age_yrs h1_discharge_date h2_admit_date days_to_readmit
h2_discharge_date;
run;
data data.T37; set T37; run;

```

```
*****
```

TRIGGER 39 - Any code or arrest

```
*****
```

```

/*CREATE OR REPLACE VIEW CH157728.GAPPS_CODEBLUE_07TO12 AS */
/*SELECT DISTINCT */
/*    PT.MRN*/
/*    , EF.ENCOUNTER_KEY*/
/*    , MIN(NMF.EVENT_END_DT_TM) AS EVENT_END_DT_TM */
/*FROM (((CHBPROD.ADMIN.CONF_NOTE_CONTENT_FACT NCF */
/*    JOIN CHBPROD.ADMIN.CONF_NOTE_MASTER_FACT NMF ON ((NCF.NOTE_KEY =
NMF.NOTE_KEY))) */
/*    JOIN CHBPROD.ADMIN.CONF_PATIENT_FACT PT ON ((NMF.PATIENT_KEY =
PT.PATIENT_KEY)))*/
/*    JOIN CHBPROD.ADMIN.CONF_ENCOUNTER_FACT EF ON
((NMF.ENCOUNTER_KEY = EF.ENCOUNTER_KEY))) */
/*WHERE (((LOWER(NCF.BLOB_CONTENTS) ~~ LIKE_ESCAPE('%code
blue%':"VARCHAR", '\':"VARCHAR")) */
/*    AND (NMF.EVENT_END_DT_TM >= '2007-01-01 00:00:00':"TIMESTAMP")) */
/*    AND (NMF.EVENT_END_DT_TM <= '2012-12-31 00:00:00':"TIMESTAMP")) */
/*GROUP BY PT.MRN, EF.ENCOUNTER_KEY;*/

```

```
proc sql;
```

```

** Subjects with arrest ICD9 code ;
create table code as
select distinct
    pt.mrn
    ,pt.date_of_birth
    ,df.encounter_key
    ,DF.DIAGNOSIS_DATE format=datetime.
    ,DD.DIAGNOSIS_DESCRIPTION
    ,DD.DIAGNOSIS_FORMATTED_CODE as icd9_code "icd9_code"
FROM      nzprod1.CONNS_DIAGNOSIS_FACT df
inner join nzprod1.CONNS_DIAGNOSIS_DIM dd on
df.DIAGNOSIS_KEY=dd.DIAGNOSIS_KEY
left join nzprod1.conns_patient_fact pt on df.patient_key=pt.patient_key
WHERE DD.DIAGNOSIS_FORMATTED_CODE IN
('427.5','779.85','V12.53','799.1','770.87')
and datepart(DF.DIAGNOSIS_DATE) ge &startdate
and datepart(DF.DIAGNOSIS_DATE) le &enddate
and dd.diagnosis_source_vocabulary in ("ICD-9-CM");

```

```

create table code2 as
select distinct
    c.mrn
    ,c.date_of_birth
    ,(datepart(h.admit_date)-c.date_of_birth)/365.25 as age_yrs "age_yrs"
format=8.2
    ,h.hospital_account_record_num as har "har"
    ,h.admit_date format=datetime.
    ,h.discharge_date format=datetime.
    ,(h.discharge_date-h.admit_date)/3600 as admit_hrs "admit_hrs"
format=8.2
    ,c.DIAGNOSIS_DATE
    ,c.DIAGNOSIS_DESCRIPTION
    ,c.icd9_code
from      work.code c
inner join nzprod1.conns_encounter_fact h on
c.encounter_key=h.encounter_key
where h.primary_csn_ind='Y'
and h.care_class in ('Inpatient','Observation')
and calculated age_yrs < 18
and calculated admit_hrs > 24
order by h.hospital_account_record_num,c.DIAGNOSIS_DATE ;

```

```

** Subjects with code blue in note ;
create table codeblue as
select distinct
    cb.mrn
    ,(datepart(h.admit_date)-pt.date_of_birth)/365.25 as age_yrs "age_yrs"
format=8.2
    ,h.hospital_account_record_num as har "har"
    ,h.admit_date format=datetime.

```

```

        ,h.discharge_date    format=datetime.
        ,(h.discharge_date-h.admit_date)/3600      as admit_hrs  "admit_hrs"
format=8.2
        ,cb.event_end_dt_tm      as diagnosis_date
"diagnosis_date" format=datetime.
from          devcrit.gapps_codeblue_07to12    cb
inner join    nzprod1.cons_patient_fact        pt on cb.mrn=pt.mrn
inner join    nzprod1.cons_encounter_fact      h on
cb.encounter_key=h.encounter_key
where h.primary_csn_ind="Y"
      and h.care_class in ("Inpatient","Observation")
      and calculated age_yrs < 18
      and calculated admit_hrs > 24
order by h.hospital_account_record_num, cb.event_end_dt_tm;
quit;

data codeblue2;
length DIAGNOSIS_DESCRIPTION $ 255;
set codeblue;
DIAGNOSIS_DESCRIPTION="note contains 'code blue'";
run;

data codemerge;
set code2 (drop=date_of_birth) codeblue2;
run;

proc sort data=codemerge nodupkey out=codemerge2; by har; run;

proc sort data=codemerge2 out=T39 (keep=mrn age_yrs admit_date discharge_date
diagnosis_date diagnosis_description icd9_code);
by mrn admit_date;
run;

data data.T39; set T39; run;

```

TRIGGER 40 - Inpatient deaths

```

proc sql;
create table death as
select distinct
        pt.mrn
        ,pt.date_of_birth
        ,enc.encounter_key
        ,pt.DEATH_DATE    format=datetime.
from          nzprod1.CONC_ENCOUNTER_fact        enc
left join nzprod1.CONC_CURRENT_PATIENT_DIM pt      on
enc.PATIENT_KEY = pt.PATIENT_KEY

```

```

        where enc.CARE_CLASS in ('Inpatient', 'Observation')
              and datepart(pt.death_date) ge &startdate
              and datepart(pt.death_date) le &enddate;

create table death2 as
select distinct
        d.mrn
        ,d.date_of_birth
        ,(datepart(h.admit_date)-d.date_of_birth)/365.25 as age_yrs      "age_yrs"
format=8.2
        ,h.admit_date          format=datetime.
        ,h.discharge_date      format=datetime.
        ,(h.discharge_date-h.admit_date)/3600          as admit_hrs  "admit_hrs"
format=8.2
        ,d.death_date          format=datetime.
from      work.death      d
inner join nzprod1.cons_encounter_fact  h      on
d.encounter_key=h.encounter_key
where h.primary_csn_ind="Y"
      and h.care_class in ('Inpatient', 'Observation')
      and calculated admit_hrs > 24
      and calculated age_yrs < 18
      and h.discharge_date ge d.death_date
order by d.mrn;

quit;

data T40 data.T40;
set death2;
by mrn;
if first.mrn;
drop date_of_birth admit_hrs;
run;

```

```

*****

TRIGGER 41 - Drop of Hbg or Hct
*****

/*CREATE OR REPLACE VIEW CH157728.GAPPS_HBGHCT_07TO12 AS */
/*SELECT DISTINCT */
/*      P.MRN*/
/*      , P.DATE_OF_BIRTH*/
/*      , B.ENCOUNTER_KEY*/
/*      , E.HOSPITAL_ACCOUNT_RECORD_NUM*/
/*      , A.EVENT_CODE_KEY*/
/*      , A.EVENT_CODE_DESCRIPTION*/
/*      , B.EVENT_END_DT_TM*/
/*      , B.RESULT_VAL*/
/*      , B.RESULT_UNIT_KEY*/

```



```

/*      , C.RESULT_UNIT_DISPLAY */
/*FROM (((CHBPROD.ADMIN.CONNS_RESULT_EVENT_CODE_DIM A */
/*      JOIN CHBPROD.ADMIN.CONNS_RESULT_COMPLETE_EVENT_FACT B ON
((A.EVENT_CODE_KEY = B.EVENT_CD_KEY))) */
/*      JOIN CHBPROD.ADMIN.CONNS_RESULT_UNIT_DIM C ON ((B.RESULT_UNIT_KEY =
C.RESULT_UNIT_KEY))) */
/*      JOIN CHBPROD.ADMIN.CONNS_ENCOUNTER_FACT E ON ((B.ENCOUNTER_KEY =
E.ENCOUNTER_KEY))) */
/*      JOIN CHBPROD.ADMIN.CONNS_PATIENT_FACT P ON ((E.PATIENT_KEY =
P.PATIENT_KEY))) */
/*WHERE ((((((A.EVENT_CODE_KEY IN */
/*      (86319, 86433, 86882, 87276, 87351, 87377, 88096, 88240, 88691, 88714,
92726, 93166, 94713, 95604,*/
/*      97224, 100163, 100479, 100871, 103374, 103861, 106112, 106117, 106544,
107939, 108157, 109543, 112319,*/
/*      113941, 119767, 120413, 121832, 122142, 134299, 134307))) */
/*      AND (B.EVENT_END_DT_TM >= '2007-01-01 00:00:00'::"TIMESTAMP"))) */
/*      AND (B.EVENT_END_DT_TM <= '2012-12-31 00:00:00'::"TIMESTAMP"))) */
/*      AND (E.HOSPITAL_ACCOUNT_RECORD_NUM <> -1)) AND (B.RESULT_UNIT_KEY
<> -1))*/
/*      AND (B.RESULT_VAL NOTNULL));*/

```

```

proc sql;
create table hcthg as
select distinct
      a.MRN
      ,a.date_of_birth
      ,(datepart(h.admit_date)-a.date_of_birth)/365.25 as age_yrs      "age_yrs"
format=8.2
      ,a.ENCOUNTER_KEY
      ,a.HOSPITAL_ACCOUNT_RECORD_NUM      as
HAR "HAR"
      ,h.admit_date
format=datetime.
      ,h.discharge_date
format=datetime.
      ,(h.discharge_date-h.admit_date)/3600      as admit_hrs
"admit_hrs" format=8.2
      ,a.EVENT_CODE_KEY
      ,a.EVENT_CODE_DESCRIPTION
      ,a.event_end_dt_tm
format=datetime.
      ,input(a.RESULT_VAL,best12.)      as result
"result" format=8.2
      ,a.RESULT_UNIT_KEY
      ,a.RESULT_UNIT_DISPLAY
from      devcrit.GAPPS_HBGHCT_07TO12      a
inner join      nzprod1.cons_encounter_fact      h      on
a.hospital_account_record_num=h.hospital_account_record_num
where h.primary_csn_ind="Y"

```

```

        and h.care_class in ('Inpatient','Observation')
        and calculated_age_yrs < 18
        and calculated_admit_hrs > 24 ;
quit;

** create separate datasets for hct & hgb;
data hct hgb hgb_oth;
    set hcthgb;
    if mrn=. then delete;
    if result=. then delete;
    if event_code_key in (87377,94713,103374,106117,107939,109543,100871) then output
hct;
    else if event_code_key in (87351,88691,88714,103861,106112,108157,119767) then
output hgb;
    else output hgb_oth;
run;

**macro to pull subjects with a drop of >25% in 24 hours;
options mcompilenote=all;
%macro DROP25PCT (outds,inds);
    proc sql;
        create table &outds as
        select distinct
            h1.mrn
            ,h1.age_yrs
            ,h1.har
            ,h1.admit_date
            ,h1.discharge_date
            ,h1.event_code_description
            as
event_type1 "event_type1"
            ,h1.event_end_dt_tm
            as
event_dtm1 "event_dtm1"
            ,h1.result
            as result1 "result1"
            ,h2.event_code_description
            as
event_type2 "event_type2"
            ,h2.event_end_dt_tm
            as
event_dtm2 "event_dtm2"
            ,h2.result
            as result2 "result2"
            ,h1.RESULT_UNIT_DISPLAY
            as result_unit "result_unit"
            ,(((h1.result)-(h2.result))/h1.result)
            as pct_decr
            format=percent8.2
            ,((h2.event_end_dt_tm-h1.event_end_dt_tm)/3600) as timechg_hr
            format=8.2
        from
            &inds h1
            inner join &inds h2 on h1.har=h2.har
        where 0 le calculated_timechg_hr le 24
            and calculated_pct_decr ge 0.25
            and h1.result_unit_key=h2.result_unit_key
    ;
%macroend;

```

```

        order by h1.har, pct_decr desc, timechg_hr;
quit;

data &outds;
    set &outds;
    by har;
    if first.har;
run;

%mend DROP25PCT;
%DROP25PCT (outds=hct_drop,inds=hct);
%DROP25PCT (outds=hgb_drop,inds=hgb);

data dropmerge;
    set hct_drop hgb_drop;
run;
proc sort data=dropmerge;
    by har descending pct_decr;
run;
data T41;
    set dropmerge;
    by har;
    if first.har;
    drop har;
run;
proc sort data=T41;
    by mrn admit_date;
run;
data data.T41; set T41; run;

*****
TRIGGER 42 - Mechanical ventilation > 48 hours post-operatively
*****
,

proc sql;

    ** Find the time when operation ended ;
create table operation_end as
select distinct
    pt.mrn
    ,pt.date_of_birth
    ,e.hospital_account_record_num as har
    ,s.ACTUAL_START_DT_TM_ET as surgstart_dtm
    format=datetime.
    ,s.ACTUAL_STOP_DT_TM_ET as surgstop_dtm
    "surgstop_dtm" format=datetime.
FROM
    inner join
    on s.encounter_key=e.encounter_key
    nzprod1.CONF_SURGICAL_CASE_FACT s
    nzprod1.CONF_ENCOUNTER_FACT e

```

```

inner join      nzprod1.cons_patient_fact      pt      on
s.patient_key=pt.patient_key
where datepart(s.ACTUAL_STOP_DT_TM_ET) ge &startdate
and datepart(s.ACTUAL_STOP_DT_TM_ET) le &enddate
and s.ACTUAL_START_DT_TM_ET ne .;

** Add filtering criteria ;
create table operation_hosp as
select distinct
    o.mrn
    ,o.date_of_birth
    ,(datepart(h.admit_date)-o.date_of_birth)/365.25 as age_yrs      "age_yrs"
format=8.2
    ,o.har
    ,h.admit_date      format=datetime.
    ,h.discharge_date      format=datetime.
    ,(h.discharge_date-h.admit_date)/3600      as admit_hrs
"admit_hrs"      format=8.2
    ,o.surgstart_dtm
    ,o.surgstop_dtm
from      work.operation_end      o
inner join      nzprod1.CONF_ENCOUNTER_FACT
h      on o.HAR=h.hospital_account_record_num
where h.primary_csn_ind="Y"
and h.care_class in ('Inpatient','Observation')
and calculated age_yrs < 18
and calculated admit_hrs > 24 ;

```

```

** Find when patient is on ventilator at least 2 days after surgery;
create table operation_vent as
select distinct
    o.*
    ,ef.EVENT_END_DT_TM      as post_o2_dtm
"post_o2_dtm"format=datetime.
    ,(ef.EVENT_END_DT_TM-o.surgstop_dtm)/86400 as diff_days "diff_days"
format=8.2
from      nzprod1.CONF_RESULT_COMPLETE_EVENT_FACT      ef
inner join      nzprod1.cons_encounter_fact      h
on ef.encounter_key=h.encounter_key
inner join      work.operation_hosp      o
on h.hospital_account_record_num=o.har
where ef.event_cd_key = 106228 /*cons_result_hierarchy_dim - level4_code or
level5_code = Oxygen (FiO2) Delivery Device*/
and ef.result_val = "Ventilator"
and calculated diff_days > 2
order by har, post_o2_dtm;

```

quit;

```

** Keep one hospitalization record;
data operation_vent2;

```

```

        set operation_vent;
        by har;
        if first.har;
run;

** Find times when patient is on ventilation during surgery;
proc sql;
create table operation_vent3 as
select distinct
        o.mrn
        ,o.age_yrs
        ,o.har
        ,o.admit_date
        ,o.discharge_date
        ,o.surgstart_dtm
        ,ef.EVENT_END_DT_TM as surg_o2_dtm "surg_o2_dtm" format=datetime.
        ,o.surgstop_dtm
        ,o.post_o2_dtm
        ,o.diff_days
    from      nzprod1.CONNS_RESULT_COMPLETE_EVENT_FACT    ef
        inner join    nzprod1.CONNS_ENCOUNTER_FACT
    e      on ef.encounter_key=e.encounter_key
        inner join    work.operation_vent2                o      on
e.hospital_account_record_num=o.har
        where ef.event_cd_key = 106228 /*cons_result_hierarchy_dim - level4_code or
level5_code = Oxygen (FiO2) Delivery Device*/
        and ef.result_val = "Ventilator"
        and ef.EVENT_END_DT_TM ge o.surgstart_dtm
        and ef.EVENT_END_DT_TM le o.surgstop_dtm
        order by har, surg_o2_dtm;
quit;
data T42;
        set operation_vent3;
        by har;
        if first.har;
        drop har;
run;
proc sort data=T42; by mrn admit_date; run;
data data.T42;
        set T42;
run;

```

```

*****

```

TRIGGER 43 - Operative Time > 6 Hours

```

*****

```

```

proc sql;
create table operation as
select distinct
        pt.mrn

```

```

        ,pt.date_of_birth
        ,e.hospital_account_record_num
        as HAR                                "HAR"
        ,(s.SURG_CASE_STOP_DT_TM_ET-
s.SURG_CASE_START_DT_TM_ET)/3600 as duration_hr      "duration_hr" format=8.2
        ,s.SURG_CASE_START_DT_TM_ET
            as start_dtm                        "start_dtm"    format=datetime.
        ,s.SURG_CASE_STOP_DT_TM_ET
            as stop_dtm                        "stop_dtm"      format=datetime.
        ,e.clinic_description
        as clinic                            "clinic"
        ,s2.surg_procedure_desc
            as primary_surgery                "primary_surgery"
FROM      nzprod1.CONF_SURGICAL_CASE_FACT s
        inner join  nzprod1.cons_patient_fact      pt      on
s.patient_key=pt.patient_key
        inner join  nzprod1.cons_encounter_fact     e      on
s.encounter_key=e.encounter_key
        left join   nzprod1.CONF_SURG_PROCEDURES_DIM s2      on
s2.SURG_PROCEDURE_KEY=s.primary_procedure_fk
        where calculated duration_hr > 6
            and datepart(s.SURG_CASE_START_DT_TM_ET) ge &startdate
            and datepart(s.SURG_CASE_STOP_DT_TM_ET) le &enddate
            and e.clinic_code not in

('003','201701','201715','201801','201812','270','410','452','460','610','611','612','613','614
','615','616','618','620','621','622','678','703','806')
        and s.primary_procedure_fk not in /*Spinal Fusion Surgery*/

(48,228,814,932,954,977,1023,1054,1056,1058,1139,1140,1144,1149,1150,1158,1161,
1163,1167,1284,1337,1338,1339,1340,1343,1552,1650,1669,1670,1710,53999);

create table operation2 as
select distinct
        o.mrn
        ,o.date_of_birth
        ,(datepart(har.admit_date)-o.date_of_birth)/365.25 as age_yrs
"age_yrs"      format=8.2
        ,o.HAR
        ,har.care_class
        ,har.admit_date      format=datetime.
        ,har.discharge_date format=datetime.
        ,(har.discharge_date-har.admit_date)/3600      as admit_hrs
"admit_hrs"    format=8.2
        ,o.start_dtm
        ,o.stop_dtm
        ,o.duration_hr
        ,o.clinic
        ,o.primary_surgery
from      work.operation      o

```

```

            inner join      nzprod1.cons_encounter_fact          har on
o.HAR=har.hospital_account_record_num
  where har.PRIMARY_CSN_IND='Y'
        and har.care_class in ('Inpatient','Observation')
        and calculated age_yrs < 18
        and calculated admit_hrs > 24
  order by har, start_dtm;

quit;
data T43;
  set operation2;
  by har;
  if first.har;
    keep mrn /*date_of_birth*/ age_yrs /*har care_class*/ admit_date discharge_date
/*admit_hrs*/ start_dtm stop_dtm duration_hr clinic primary_surgery;
run;
proc sort data=T43; by mrn start_dtm; run;
data data.T43;
set T43;
run;

```

TRIGGER 45 - INTRAOPERATIVE EPINEPHRINE

```

proc sql;
create table intraop_epi as
select distinct
      pt.MRN
      ,pt.date_of_birth
      ,m.ENCOUNTER_KEY
      ,e.hospital_account_record_num as HAR "HAR"
      ,s.SURG_CASE_START_DT_TM_ET      as start_dtm   "start_dtm"
format=datetime.
      ,m.DRUG_ADMIN_DT_TM
      ,s.SURG_CASE_STOP_DT_TM_ET      as stop_dtm    "stop_dtm"
format=datetime.
      ,m.ADMIN_DRUG_NAME
      ,m.DOSE_UNIT
      ,m.ROUTE
      ,e.clinic_code
      ,e.clinic_description      as clinic           "clinic"
      ,s2.surg_procedure_desc      as primary_surgery "primary_surgery"
from      devcrit.cons_admin_meds_fact      m
  left join      nzprod1.cons_patient_fact      pt
on m.PATIENT_KEY=pt.patient_key
  inner join      nzprod1.CONF_SURGICAL_CASE_FACT      s
on pt.PATIENT_KEY=s.patient_key

```

```

        inner join      nzprod1.cons_encounter_fact          e
on s.encounter_key=e.encounter_key
    left join          nzprod1.CONF_SURGICAL_CASE_PROCEDURE_DIM  s2
on s2.surg_procedure_pk=s.primary_procedure_fk
where datepart(s.SURG_CASE_START_DT_TM_ET) ge &startdate
    and datepart(s.SURG_CASE_START_DT_TM_ET) le &enddate
    and m.ADMIN_DRUG_NAME in
        ('EPINEPHrine','EPINEPHrine-lidocaine','bupivacaine-
EPINEPHrine','epinephrine OR preparation',
        'lidocaine-epinephrine-tetracaine','norepinephrine','racemic
epinephrine','racepinephrine','phenylephrine')
    and m.ROUTE in ('IV','ICU-IV')
    and s.SURG_CASE_START_DT_TM_ET < m.DRUG_ADMIN_DT_TM
    and s.SURG_CASE_STOP_DT_TM_ET > m.DRUG_ADMIN_DT_TM
    and e.clinic_code not in

('003','201701','201715','201801','201812','270','410','452','460','610','611','612','613','614
','615','616','618','620','621','622','678','703','806');

```

create table intraop_epi2 as
select distinct

```

    e.MRN
    ,e.date_of_birth
    ,(datepart(har.admit_date)-e.date_of_birth)/365.25 as age_yrs
"age_yrs"      format=8.2
    ,e.HAR
    ,har.care_class
    ,har.admit_date      format=datetime.
    ,har.discharge_date  format=datetime.
    ,(har.discharge_date-har.admit_date)/3600      as admit_hrs
"admit_hrs"    format=8.2
    ,e.start_dtm
    ,e.DRUG_ADMIN_DT_TM      format=datetime.
    ,e.stop_dtm
    ,e.ADMIN_DRUG_NAME
    ,e.DOSE_UNIT
    ,e.ROUTE
    ,e.clinic_code
    ,e.clinic
    ,e.primary_surgery
from work.intraop_epi e
    inner join      nzprod1.cons_encounter_fact          har on
e.HAR=har.hospital_account_record_num
where har.PRIMARY_CSN_IND='Y'
    and har.care_class in ('Inpatient','Observation')
    and calculated age_yrs < 18
    and calculated admit_hrs > 24
order by har, start_dtm;
quit;

```

data T45 data.T45;


```

        set intraop_epi2;
        by har;
        if first.har;
        keep mrn /*date_of_birth*/ age_yrs /*har care_class*/ admit_date discharge_date
/*admit_hrs*/ start_dtm DRUG_ADMIN_DT_TM stop_dtm ADMIN_DRUG_NAME
/*DOSE_UNIT*/ route
        clinic primary_surgery;
run;

```

TRIGGER 47 - Return to surgery

*****,

```
/*GAPPS_T47BACKTOSURG_START07*/
```

```

/*select distinct */
/*      pt.MRN*/
/*      ,pt.DATE_OF_BIRTH*/
/*      ,e1.HOSPITAL_ACCOUNT_RECORD_NUM as HAR*/
/*      ,e2.ADMIT_DATE*/
/*      ,e2.DISCHARGE_DATE*/
/*      ,e1.ENCOUNTER_KEY                      as enc1*/
/*      ,p1.SURG_PROCEDURE_DESC                as surg1_desc*/
/*      ,s1.ACTUAL_START_DT_TM_ET              as surg1_start*/
/*      ,s1.ACTUAL_STOP_DT_TM_ET              as surg1_stop*/
/*      ,e2.ENCOUNTER_KEY                      as enc2*/
/*      ,p2.SURG_PROCEDURE_DESC                as surg2_desc*/
/*      ,s2.ACTUAL_START_DT_TM_ET              as surg2_start*/
/*      ,s2.ACTUAL_STOP_DT_TM_ET              as surg2_stop*/
/**/
/**/
/*from      CHBPROD..CONS_SURGICAL_CASE_FACT s1*/
/*      inner join CHBPROD..CONS_ENCOUNTER_FACT      e1 on
s1.ENCOUNTER_KEY=e1.encounter_key*/
/*      inner join CHBPROD..CONS_ENCOUNTER_FACT      e2 on
e1.hospital_account_record_num=e2.hospital_account_record_num*/
/*      inner join CHBPROD..CONS_SURGICAL_CASE_FACT s2      on
e2.ENCOUNTER_KEY=s2.encounter_key*/
/*      inner join CHBPROD..CONS_PATIENT_FACT      pt      on
s1.PATIENT_KEY=pt.patient_key */
/*      left join CHBPROD..CONS_SURGICAL_CASE_FACT      c1      on
s1.SURGICAL_CASE_KEY=c1.SURGICAL_CASE_KEY*/
/*      left join CHBPROD..CONS_SURGICAL_CASE_FACT      c2      on
s2.SURGICAL_CASE_KEY=c2.SURGICAL_CASE_KEY*/
/*      left join CHBPROD..CONS_SURGICAL_CASE_PROCEDURE_DIM p1 on
c1.PRIMARY_PROCEDURE_FK=p1.SURG_PROCEDURE_PK */
/*      left join CHBPROD..CONS_SURGICAL_CASE_PROCEDURE_DIM p2 on
c2.PRIMARY_PROCEDURE_FK=p2.SURG_PROCEDURE_PK*/

```

```

/*where      e2.PRIMARY_CSN_IND='Y' */
/*      and e2.CARE_CLASS in ('Inpatient','Observation')*/
/*      and s2.ACTUAL_START_DT_TM_ET >= '2007-01-01'*/
/*      and s2.ACTUAL_START_DT_TM_ET > s1.ACTUAL_STOP_DT_TM_ET*/

proc sql;

    ** Find all admissions with multiple surgeries;
create table returntosurg as
select distinct
    s.MRN
    ,(datepart(s.ADMIT_DATE)-s.date_of_birth) as age_yrs      "age_yrs" format=8.2
    ,s.HAR
    ,s.ADMIT_DATE      format=datetime.
    ,s.DISCHARGE_DATE      format=datetime.
    ,(s.discharge_date-s.admit_date)/3600      as admit_hrs
    "admit_hrs"      format=8.2
    ,s.surg1_desc
    ,s.surg1_start      format=datetime.
    ,s.surg1_stop      format=datetime.
    ,s.surg2_desc
    ,s.surg2_start      format=datetime.
    ,s.surg2_stop      format=datetime.
    ,(s.surg2_start-s.surg1_stop)/86400      as days_to_surgreturn
    "days_to_surgreturn" format=8.2
from      devcrit.gapps_t47backtosurg_start07 s
WHERE s.surg2_start ge &startdate
    and s.surg2_start le &enddate
    and calculated age_yrs < 18
    and calculated admit_hrs > 24
    and calculated days_to_surgreturn le 1
order by s.har, s.surg1_start, s.surg2_start;

quit;

** Find unique hospitalizations;
data returntosurg2;
    set returntosurg;
    by HAR;
    if first.HAR;
    drop admit_hrs;
run;
proc sort data=returntosurg2 out=T47;
    by mrn surg1_start surg2_start;
run;
data data.T47;
    set T47;
run;

```

TRIGGER 49 - Readmission to ICU

*****;

** Clinics ;

%let acute_code =

'201700','201701','201702','201703','201704','201705','201706','201707','201708','201712','201713','201716','201730','201802','201803','201804','201805','201810','201812','201813';

%let transitional_code = '201808';

%let icu_code = '201709','201710','201711','201800','201801','201809';

proc sql;

** find all icu encounters;

create table icu_enc as

select distinct

pt.mrn
 ,pt.date_of_birth
 ,e.HOSPITAL_ACCOUNT_RECORD_NUM
 ,e.ADMIT_DATE
 ,e.DISCHARGE_DATE
 ,e.care_class

from nzprod1.cons_encounter_fact e
 inner join nzprod1.cons_patient_fact pt on e.patient_key=pt.patient_key

where e.clinic_code in (&icu_code)
 and datepart(e.admit_date) ge &startdate
 and datepart(e.admit_date) le &enddate
 and e.care_class in ('Inpatient','Observation');

** find icu readmissions within 24 hours;

create table T49 as

select distinct

e2.MRN
 ,(datepart(e2.admit_date)-e1.date_of_birth)/365.25 as age_yrs
 "age_yrs" format=8.2
 ,e1.discharge_date as
 icu1_discharge "icu1_discharge" format=datetime.
 ,e2.admit_date as
 icu2_admit "icu2_admit" format=datetime.
 ,(e2.admit_date-e1.discharge_date)/3600 as hours_to_readmit
 "hours_to_readmit" format=8.2
 from icu_enc e1
 inner join icu_enc e2 on e1.mrn=e2.mrn

WHERE e1.discharge_date ne .
 and e2.admit_date > e1.discharge_date
 and calculated hours_to_readmit le 24
 and calculated age_yrs < 18
 order by e2.mrn, icu1_discharge, icu2_admit;

quit;

TRIGGER 50 - Transfer to higher level of care

1. Acute >> Transitional
2. Transitional >> ICU (exclude ED patients)
3. Acute >> ICU

,

/*Attempt 3 - using CONS_DEPARTMENT_TRANSFER_HISTORY_FACT*/

/** NETEZZA - create or replace view gapps_transfer as ;*/

/*select distinct*/

```
/*      pt.mrn*/
/*      ,pt.date_of_birth*/
/*      ,h.HOSPITAL_ACCOUNT_RECORD_NUM*/
/*      ,h.ADMIT_DATE*/
/*      ,h.DISCHARGE_DATE*/
/*      ,t.encounter_key*/
/*      ,t.PREV_DEPARTMENT_NAME*/
/*      ,t.DEPT_NAME*/
/*      ,t.CHECKIN_TIME*/
/*      ,t.CHECKOUT_TIME*/
/*      ,t.NEXT_DEPARTMENT_NAME*/
/*      ,t.TRANSFER_SEQUENCE_NUMBER*/
/*      */
/*      FROM
      CHBPROD..CONS_DEPARTMENT_TRANSFER_HISTORY_FACT      t*/
/*      inner join      CHBPROD..cons_patient_fact      pt on
t.PATIENT_KEY=pt.patient_key*/
/*      inner join      CHBPROD..cons_encounter_fact      e on
t.encounter_key=e.encounter_key*/
/*      inner join      CHBPROD..cons_encounter_fact      h on
(e.HOSPITAL_ACCOUNT_RECORD_NUM=h.HOSPITAL_ACCOUNT_RECORD_NUM and
h.PRIMARY_CSN_IND='Y')*/
/*      where h.ADMIT_DATE >= '2007-01-01'*/
/*      and h.DISCHARGE_DATE <= '2012-12-31'*/
/*      and e.CARE_CLASS in ('Inpatient','Observation')*/
```

proc sql;

create table transfer as

select distinct

```
      t.mrn
      ,(datepart(t.admit_date)-t.date_of_birth) as age_yrs "age_yrs" format=8.2
      ,t.hospital_account_record_num as har "HAR"
      ,t.admit_date      format=datetime.
      ,t.discharge_date      format=datetime.
```

```

        ,(t.discharge_date-t.admit_date)/3600                                as admit_hrs
"admit_hrs"    format=8.2
        ,t.prev_department_name
        ,t.dept_name
        ,t.next_department_name
        ,t.checkin_time                format=datetime.
        ,t.checkout_time               format=datetime.
from          devcrit.gapps_transfer t
where t.dept_name in (&cliniclist)
      and calculated age_yrs < 18
      and calculated admit_hrs > 24
order by t.hospital_account_record_num, t.checkin_time;
QUIT;

data transfer2;
  set transfer;
  if prev_department_name in (&acutelist) then prev_dept=1;
  else if prev_department_name in (&translist) then prev_dept=2;
  else if prev_department_name in (&iculist) then prev_dept=3;

  if dept_name in (&acutelist) then dept=1;
  else if dept_name in (&translist) then dept=2;
  else if dept_name in (&iculist) then dept=3;

  if prev_dept ne . and prev_dept<dept then flag=1; else flag=0;
  if flag=1;

run;
data transfer3;
  set transfer2;
  by har;
  if first.har;
  keep mrn age_yrs admit_date discharge_date prev_department_name dept_name
  checkin_time;
run;
proc sort data=transfer3 out=T50; by mrn admit_date; run;
data data.T50; set T50; run;

```

TRIGGER 53 - RACEMIC EPINEPHRINE ADMINISTRATION W/IN 24 HOURS OF MECHANICAL VENTILATION

*****,

```

proc sql noprint;
  ** find racemic epinephrine administrations;
create table epi as
select distinct
      pt.mrn
      ,pt.date_of_birth
      ,(datepart(h.admit_date)-pt.date_of_birth)/365.25 as age_yrs "age_yrs"
format=8.2

```

```

        ,ef.hospital_account_record_num as HAR "HAR"
        ,h.admit_date                        format=datetime.
        ,h.discharge_date                    format=datetime.
        ,(h.discharge_date-h.admit_date)/3600 as admit_hrs
"admit_hrs" format=8.2
        ,m.admin_drug_name
        ,m.drug_admin_dt_tm                  as epi_dtm "epi_dtm"
format=datetime.
    from          nzprod1.cons_admin_meds_fact    m
        inner join nzprod1.cons_encounter_fact    ef    on
m.encounter_key=ef.encounter_key
        inner join nzprod1.cons_patient_fact      pt    on
ef.patient_key=pt.patient_key
        inner join nzprod1.cons_encounter_fact    h    on
ef.hospital_account_record_num=h.hospital_account_record_num
    where m.admin_drug_name = 'racepinephrine'
        and datepart(m.drug_admin_dt_tm) ge &startdate
        and datepart(m.drug_admin_dt_tm) le &enddate
        and h.primary_csn_ind='Y'
        and h.care_class in ('Inpatient','Observation')
        and calculated age_yrs < 18
        and calculated admit_hrs > 24;

** create macro variable for list of epi hospitalizations;
select distinct har
    into :epi_har separated by ","
    from epi;
%put &=epi_har;

** find all times when epi patients were taken off mechanical ventilation and started on 'room
air';
create table epi_vent as
select distinct
    e.mrn
    ,e.age_yrs
    ,e.HAR
    ,e.admit_date
    ,e.discharge_date
    ,o2.result_val
    ,o2.event_end_dt_tm                  format=datetime.
    ,e.epi_dtm
    ,(e.epi_dtm-o2.event_end_dt_tm)/3600 as timediff_hrs "timediff_hrs" format=8.2
    from          work.epi                e
        inner join devcrit.gapps_oxygen2_07to12    o2    on
e.HAR=o2.hospital_account_record_num
    where e.epi_dtm > o2.event_end_dt_tm
        and calculated timediff_hrs < 24
    order by har, event_end_dt_tm, epi_dtm;

create table epi_vent2 as

```

```

select *
    from epi_vent
    group by har
    having sum(result_val='Ventilator') > 0
    order by har, event_end_dt_tm, epi_dtm;
quit;

** clean up vent info;
data epi_vent3 /*(drop=prev_.);*/;
    set epi_vent2 (rename=(result_val=o2_type event_end_dt_tm=o2_dtm));
    by har;
    prev_o2_type=lag(o2_type);
    prev_o2_dtm=lag(o2_dtm);
    if first.har then
        do;
            prev_o2_type="";
            prev_o2_dtm=.;
        end;
    if prev_o2_type=o2_type then delete;
    if prev_o2_type="Ventilator";
    format o2_dtm prev_o2_dtm datetime.;
    label o2_type="o2_type";
    label prev_o2_type="prev_o2_type";
    label o2_dtm="o2_dtm";
    label prev_o2_dtm="prev_o2_dtm";
run;

data epi_vent4;
    set epi_vent3 (rename=(o2_dtm=offventilator_dtm));
    by har;
    if first.har;
    label offventilator_dtm="offventilator_dtm";
    keep mrn age_yrs admit_date discharge_date offventilator_dtm epi_dtm timediff_hrs;
run;

proc sort data=epi_vent4 out=T53; by mrn admit_date; run;
data data.T53;
    set T53;
run;

```