

# NATIONAL QUALITY FORUM

## Measure Submission and Evaluation Worksheet 5.0

This form contains the information submitted by measure developers/stewards, organized according to NQF's measure evaluation criteria and process. The evaluation criteria, evaluation guidance documents, and a blank online submission form are available on the [submitting standards web page](#).

<b>NQF #:</b> 0501	<b>NQF Project:</b> Patient Safety Measures-Complications Project
(for Endorsement Maintenance Review)	
<b>Original Endorsement Date:</b> Oct 24, 2008 <b>Most Recent Endorsement Date:</b> Oct 24, 2008 <b>Last Updated Date:</b> Oct 17, 2012	
<b>BRIEF MEASURE INFORMATION</b>	
<b>De.1 Measure Title:</b> Confirmation of Endotracheal Tube Placement	
<b>Co.1.1 Measure Steward:</b> Cleveland Clinic	
<b>De.2 Brief Description of Measure:</b> Any time an endotracheal tube is placed into a patients airway in the Emergency Department (ED) or a patient arrives to the ED with an endotracheal tube already in place ( via EMS or hospital transfer) there should be appropriate confirmation of ETT placement and documentation of its performance in the medical record.	
<b>2a1.1 Numerator Statement:</b> Number of ED patients with an endotracheal tube(ETT) placed or assesed with an endotracheal already in place who had the ETT confirmation performed.	
<b>2a1.4 Denominator Statement:</b> Total number of patients identified with an endotracheal tube cared for in the ED. This population includes those patients who had an ETT's placed in the ED and those patients who arrived to the ED with an ETT already in place.	
<b>2a1.8 Denominator Exclusions:</b> No exclusions	
<b>1.1 Measure Type:</b> Process <b>2a1. 25-26 Data Source:</b> Claims, Electronic Health Records, Other, Paper Records, Registry Data <b>2a1.33 Level of Analysis:</b> Clinician : Group/Practice, Clinician : Individual, Facility, Integrated Delivery System, Population : Community, County or City	
<b>1.2-1.4 Is this measure paired with another measure?</b> No	
<b>De.3 If included in a composite, please identify the composite measure (title and NQF number if endorsed):</b>	

<b>STAFF NOTES</b> <i>(issues or questions regarding any criteria)</i>
<b>Comments on Conditions for Consideration:</b>
<b>Is the measure untested?</b> Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> If untested, explain how it meets criteria for consideration for time-limited endorsement:
<b>1a. Specific national health goal/priority identified by DHHS or NPP addressed by the measure (check De.5):</b> <b>5. Similar/related <a href="#">endorsed</a> or submitted measures (check 5.1):</b> <b>Other Criteria:</b>

Staff Reviewer Name(s):

## 1. IMPACT, OPPORTUNITY, EVIDENCE - IMPORTANCE TO MEASURE AND REPORT

Importance to Measure and Report is a threshold criterion that must be met in order to recommend a measure for endorsement. All three subcriteria must be met to pass this criterion. See [guidance on evidence](#).

**Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria. (evaluation criteria)**

**1a. High Impact:** **H O M O L O I O**

(The measure directly addresses a specific national health goal/priority identified by DHHS or NPP, or some other high impact aspect of healthcare.)

**De.4 Subject/Topic Areas** (Check all the areas that apply): **Critical Care, Respiratory**

**De.5 Non-Condition Specific** (Check all the areas that apply): **Safety**

**1a.1 Demonstrated High Impact Aspect of Healthcare:** **A leading cause of morbidity/mortality, Frequently performed procedure, Patient/societal consequences of poor quality, Severity of illness**

**1a.2 If "Other," please describe:**

**1a.3 Summary of Evidence of High Impact** (Provide epidemiologic or resource use data):

Misplacing the endotracheal tube into the esophagus is a possible complication of endotracheal intubation. Sakles reviewed 610 ED intubations and reported a 5.5% incidence of inadvertent esophageal tube placement. (Sakles JC, Laurin EG, Rantapaa AA, Panacek E. Airway management in the emergency department: A one-year study of 610 tracheal intubations. Ann Emerg Med 1998;31:325-32) The main issue surrounding misplaced endotracheal tubes (ETT) is a matter of timely recognition. Timely and appropriate assessment of proper ETT placement is necessary to identify and avoid serious morbidity and mortality. There are limitations to the common perceived clinically based methods used to verify tube placement. Physicians rely on possible insensitive clinical detection methods, unaware of their insensitivity. The use of breath sounds or vapor in the tube have been shown to be insensitive methods for confirmation. The tools utilized to evaluate tube position in an ED must be rapidly available simple to use, inexpensive and reliable. There are direct confirmatory techniques like fiber optic bronchoscopic evaluation of proper ETT position but this is not commonly available in an ED setting. The chest x-ray should never be utilized for a confirmatory test to eliminate esophageal intubation not only because of the potential delay to obtaining an x-ray but more importantly because the anatomic projection of the trachea over the esophagus could easily result in misidentifying which tube the endotracheal tube is located in. Relying solely on the providers verification by direct visualization ( ie visualization of the tube passing through the cords) can also be hazardous.

Physicians who place endotracheal tubes into the airway to support ventilation agree that appropriate secondary confirmation of ETT placement is a critical patient safety action to be performed each time an airway is placed and appropriately documented. Secondary confirmation is a process, in contrast to primary verification (provider seeing the tube go through the vocal cords), of confirming the tube is in the trachea and ventilating the lungs. This process is usually performed utilizing the expired carbon dioxide from the lungs either confirming a color change on a device or observing appropriate levels on a capnography monitor. Other methods using physical exam findings (condensation of air in the endotracheal tube or listening for breath sounds) have generally been found to be inadequate as sole measures of confirmation, and can lead to the false belief the endotracheal tube is correctly placed when in fact it was not. There is evidence that overall documentation of airway management is poor. 1 Although there is no universal template for the documentation of an emergency airways procedure, one of the critical elements that should routinely be performed and documented is confirmation of ET placement. There is some published data

that consistent documentation of confirmation of ET placement is a concern. 2 Whether or not the performance of this critical patient safety action and its actual documentation in the medical record is related to patient outcomes would normally be difficult to evaluate because the incidence of esophageal intubation(when undetected) should be small. If the appropriate methods are utilized, performed and recorded universally there should be no difference in outcomes. While lack of documentation may simply reflect poor documentation in itself, without it one cannot determine if adequate confirmation methods were performed at all. The gap may also reflect inadequate knowledge about appropriate or best methods to confirm endotracheal tube placement.

A key component of emergency airway management is the ability to recognize and reposition an incorrectly placed endotracheal tube (ET) immediately. Unrecognized ET misplacement can result in ineffective oxygenation and ventilation, causing significant morbidity and mortality.<sup>3</sup> Failure to confirm ET placement objectively has been recognized as an issue in the prehospital setting (4% to 26%)<sup>4</sup> While appropriate documentation of ET placement confirmation is important, it is also critical to know whether documentation (or the absence thereof) may indirectly reflect on the process of care. Demonstrating an association between documentation quality and patient morbidity and mortality would strengthen the argument for quality improvement initiatives aimed at appropriate objective confirmation of ET placement and improved documentation. To attain a robust database of in-hospital cardiac arrests and resuscitation with Utstein-style definitions and outcome measures, the American Heart Association (AHA) developed the National Registry of Cardiopulmonary Resuscitation (NRCPR), now called "Get with the Guidelines-Resuscitation" (GWTG-R).<sup>5</sup> There is no equivalent data base for intubated ED patients. The AHA database contains information that can be used to assess the prevalence of appropriate documentation of ET placement confirmation as well as explore potential links between documentation quality and patient outcomes including mortality. The data base was evaluated specifically for intubated in-hospital arrest patients that documented performance of ET confirmation was performed.<sup>6</sup> The data indicated: 1. 18% of patients lacked any documentation indicating confirmation was performed, 2. 26% had auscultation alone and 3. there was some improved outcomes( retrun of spontaneous circulation and survival to discharge) in those patients with appropriate documentation of ET placement<sup>6</sup>. Traditional physical examination methods for ET confirmation, such as tube condensation, auscultation, and visualized movement of the epigastrium, can all yield significant errors.<sup>7,8</sup> Physical examination confirmation of ET placement may also be inaccurate in obese patients, patients with air in the esophagus, and those with copious pulmonary secretions.<sup>9,10,11</sup> This is why preferred means of ET position confirmation are limited to PetCO<sub>2</sub> detection in patients with spontaneous circulation, repeat direct laryngoscopy, and EDDs. Morbidity and mortality rates associated with ET misplacement are high, and complications related to incorrectly placed ETs are generally preventable if they are detected.<sup>12</sup>

1. Winton J, Celenza A, Jackson T. Improving documentation of endotracheal intubation in an adult emergency department. *Emerg Med Australas*. 2008;20:488.

2. Phelan MP, Glauser J, Wickline D, Schrupp S, Gaber-Patel K, Joyce M. How well do emergency physicians document confirmation of endotracheal tube placement? *Am J Med Qual*. 2011;26(4):300-307.

3 Henderson J. Airway management in the adult. In Miller RD, Eriksson LI, Fleisher LA, Wiener-Kronish JP, Young WL, eds. *Miller's Anesthesia*, 7th ed. Philadelphia: Churchill Livingstone Elsevier, 2010:1573.

4. Gausche M, Lewis RJ, Stratton SJ, et al. Effect of out-of-hospital pediatric endotracheal intubation on survival and neurological outcome. *JAMA*. 2000;283:783-790

5. American Heart Association. Get With the Guidelines-Resuscitation. Available at [www.heart.org](http://www.heart.org). Accessed on August 11, 2011.
6. Phelan M, Oranato J, Peberdy M, Hustey F; Relationship Between Documentation Of Confirmed Endotracheal Tube Placement And Patient Outcomes In The National Registry Of Cardiopulmonary Resuscitation For The American Heart Association's Get With The Guidelines-Resuscitation (GWTG-R)( formerly National Registry of CPR( NRCPR)) Academic Emergency Medicine; May 2011:S146 (Vol.18, No 5, May 2011).
7. Wang HE, Yealy DM. Out-of-hospital endotracheal intubation: where are we? *Ann Emerg Med*. 2006;47:532-541.
8. Jones JH, Murphy MP, Dickson RL, et al. Emergency physician-verified out-of-hospital intubation: miss rates by paramedics. *Acad Emerg Med*. 2004;11:707-709
- 9 Lang DJ, Wafai Y, Salem MR, et al. Efficacy of the self-inflating bulb in confirming tracheal intubation in the morbidly obese. *Anesthesiology*. 1996;85:246-253.
10. Williams KN, Nunn JF. The esophageal detector device: a prospective trial on 100 patients. *Anesthesia*. 1989;44:412-414.
11. Ardagh M, Moodie K. The esophageal detector device can give false p positives for tracheal intubation. *J Emerg Med*. 1998;16:747-749.
12. Tobin MJ. Principles and Practice of Mechanical Ventilation, 2nd edition. New York, McGraw-Hill, 2006.28.

The American College of Emergency Physicians has identified proper confirmation of endotracheal tube placement worthy of a Policy Resource and Education Paper(<http://www.acep.org/content.aspx?id=29940>). The American Heart Association has also identified confirmation of endotracheal tube placement in their CPR guidelines as an important step in the evaluation of intubated arrest patients. Improper placement and timely failure to confirm placement can result in death or serious morbidity.

The following specialty organizations have endorsed the routine performance of secondary confirmation of ET placement: the AHA,<sup>1</sup> the American Association of Respiratory Care (AARC),<sup>2</sup> the American Society of Anesthesiologists, <sup>3</sup> and the American College of Emergency Physicians (ACEP). <sup>4</sup>

1. American Heart Association International Consensus Conference. Part 4: Advanced Life Support. *Circulation*. 2005;112:III-27–III-28.
2. Walsh BK, Crotwell DN, Restrepo RD. AARC Clinical Practice Guideline: Capnography/capnometry during mechanical ventilation: 2011. *Resp Care*. 2011;56(4):503-509.
3. The American Society of Anesthesiologists. Standard for Basic Anesthetic Monitoring. Approved by House of Delegates, October 1986, amended 1998. <http://www.asahq.org/publicationsAndServices/standards/02.pdf#2>
4. Clinical & Practice Management: Verification of Endotracheal Tube Placement. Dallas, TX: American College of Emergency Physicians, April 2009. Available at [www.acep.org/Content.aspx?id=29846](http://www.acep.org/Content.aspx?id=29846). Accessed on August 8, 2011.

For the ACEP guidelines : All articles were graded by at least 2 subcommittee members for strength of evidence and classified by the subcommittee members into 3 classes of evidence on the basis of the design of the study, with design 1 representing the strongest evidence and design 3 representing the weakest evidence for therapeutic, diagnostic, and prognostic clinical reports, respectively . Articles were then graded on 6 dimensions thought to be most relevant: blinded versus nonblinded outcome assessment, blinded or randomized allocation, direct or indirect outcome measures (reliability and validity), biases (eg, selection, detection, transfer), external validity (ie, generalizability), and sufficient sample size. Articles received a final grade (Class I, II, III) on the basis of a predetermined formula taking into account design and quality of study (Appendix B). Articles with fatal flaws were given an "X" grade. This area of study is not one that is suitable for randomization for ethical reason and no class 2 funding has been available.

**1a.4 Citations for Evidence of High Impact cited in 1a.3:** Michael P. Phelan, Jonathan Glauser, Donald Wickline, Stefanie Schrupp, Karen Gaber-Patel, and Maureen Joyce How Well Do Emergency Physicians Document Confirmation of Endotracheal Tube Placement? American Journal of Medical Quality, July/August 2011; vol. 26, 4: pp. 300-307

Michael P. Phelan, Jonathan Glauser, Ho-Wang A. Yuen, Elizabeth Sturges-Smith, and Stefanie E. Schrupp American Journal of Medical Quality, September/October 2010; vol. 25, 5: pp. 346-350., first published on May 26, 2010

Winton J., Celenza A., Jackson T. Improving documentation of endotracheal intubation in an adult emergency department . Emerg Med Australas. 2008;20:488-493.

Phelan MP, Oranato J, Peberdy M Relationship Between Documentation Of Confirmed Endotracheal Tube Placement And Patient Outcomes In The National Registry Of Cardiopulmonary Resuscitation For The American Heart Association's Get With The Guidelines-Resuscitation (GWTG-R)( formerly National Registry of CPR( NRCPR)) SAEM Boston MA May 2011. Academic Emergency Medicine; May 2011:S146 (Vol.18, No 5, May 2011

#### **1b. Opportunity for Improvement: H● M● L● I●**

*(There is a demonstrated performance gap - variability or overall less than optimal performance)*

##### **1b.1 Briefly explain the benefits (improvements in quality) envisioned by use of this measure:**

Currently there are no mandatory reviews of all intubations that occur in an Emergency Department. For obvious patient safety reasons intubated patients represent one of the highest risk patients that are evaluated in an Emergency Department setting. Evaluating the rate of appropriate documentation confirmation of endotracheal tube placement would highlight the importance of appropriately documenting this critical patient safety action. This maybe be more important especially since there appears to be a gap in documentation practices.

There is evidence that often times documentation of airway management is poor( Winston, Phelan) and that when evaluated one of the elements that should be documented when performed is confirmation of ET placement. Published data identified airway documentation from an ED airway registry is a concern. (Phelan American Journal of Medical Quality). Reviewing a multihospital in-hospital arrest registry(Get with the Guidelines- Resuscitation( formerly National Registry Cardiopulmonary Resuscitation) for hospitalized patients indicates there is inadequate documentation of endotracheal tube confirmation and that patients with appropriate documentation may result in a survival outcome difference. ( Phelan SAEM)

If this metric becomes a national patient safety measure there will likely be a significant effort and focus by hospitals/health care systems to look at their emergency airway documentation practices. By trying to abstract patient's charts who had an emergency airway placed and evaluating documentation and



deficiencies in documentation they will focus on units or physicians with poor documentation practices. The poor documentation maybe do to not performing, inadequate choice of method or just failure to document. This will require then to focus on what national guidelines recommend and learn the appropriate methods for performing and assuring that documentation is performed. If there are emergency airways being performed without performing appropriate guideline driven recommendations for secondary confirmation they should be fewer and fewer as the metric becomes more familiar to the point where because of knowledge and documentation practices becomes what it already should be the standard of care.

**1b.2 Summary of Data Demonstrating Performance Gap** (*Variation or overall less than optimal performance across providers*): [**For Maintenance** – *Descriptive statistics for performance results for this measure - distribution of scores for measured entities by quartile/decile, mean, median, SD, min, max, etc.*] Studies(Winton) have demonstrated that the overall documentation of airway procedures in the Emergency Department is inadequate. Other studies have specifically demonstrated poor documentation of confirmation of endotracheal tube placement( Phelan AJMQ) The performance and documentation of endotracheal tube confirmation is a critical patient safety action that should occur for every Emergency Department patient who is intubated and every patient who arrives in the ED already intubated. There is no large retrospective chart abstracted registry for intubated ED patients; however there is one for hospitalized in-patients with cardiopulmonary arrest. When the Get With The Guidelines Resuscitation registry (GTG-R) (formerly National Registry of CPR-NRCPR) data was analyzed; 18% of intubated, in-hospital patients had no documentation of confirmation and if reviewed for following specialty guideline recommendations , about 26% had inappropriate method ( auscultation alone)of documentation. Those patients in the GTG-R data base who were intubated and had appropriate documentation had a statistically improved outcome. ( Phelan SAEM) The study from the GTG-R data indicates there is a gap in documentation and that gap may be associated with outcome difference.(Phelan SAEM) The purpose of the registry was to develop a real-world, observational cohort of hospital resuscitation practices to guide quality improvement. One specific area studied in the registry includes resuscitation airway management including documentation of endotracheal tube confirmation. The methods were as follows: Consecutive cardiac arrest data from 507 hospitals participating in the National Registry of Cardiopulmonary Resuscitation (NRCPR) were analyzed to determine appropriate documentation of ET confirmation, defined as capnography or an esophageal detector device (EDD). Using binary logistic regression they examined whether there was an independent relationship between documented ET confirmation and ROSC or survival to hospital discharge.Between 4/17/00, and 12/7/09, data for 176,054 adult and pediatric patients were entered into the NRCPR; 166,919 were adults mean age, 65.5 [95% CI, 64.5-65.6]; male, 58%; initial rhythm: ventricular fibrillation, 22%; pulseless electrical activity, 42%, asystole, 36%). ET placement occurred in 76,465 (47%) patients; 13,897 (18%) cases showed no documentation of confirmation and auscultation alone was documented in 20,172 (26%) cases. Confirmation of ET placement by capnography (n=43,735) or EDD (n=653) was documented in 44,388 (58%) patients; ROSC occurred in 39,414 (51.6%), and 13,620 (17.8%) survived to discharge. Patients whose ET position was confirmed by capnography or EDD had a higher rate of ROSC (53.6% vs. 48.9% [p=.0001]) and survival (18.2% vs. 17.4% [p=.003]) than patients without documentation. Binary logistic regression indicated that documentation of ET placement was independently associated with survival to discharge (odds ratio, 1.23; 95% CI 1.19-1.26).The study concluded that documentation of ET tube placement in patients with cardiac arrest after endotracheal intubation(ET) is poor. Actual appropriate documentation of ET tube placement in the NRCPR is associated with higher rates of ROSC and is an independent predictor of higher rates of survival to discharge. Further study is needed to determine whether failure to document ET tube placement is actually reflective of inadequate ET tube confirmation. Although data from GTG-R(NRCPR) is not ED specific data the clinical processes are similar and point to lack of adequate documentation. This maybe either be due to failure to perform of confirmation of ET (just not documented) or worse yet this critical patient safety action was not performed. Education efforts focused on the awareness of the appropriate methods and need to document this critical patient safety activity should be a reasonable expectation.

**1b.3 Citations for Data on Performance Gap:** [**For Maintenance** – *Description of the data or sample for*

measure results reported in 1b.2 including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included]

Michael P. Phelan, Jonathan Glauser, Donald Wickline, Stefanie Schrump, Karen Gaber-Patel, and Maureen Joyce How Well Do Emergency Physicians Document Confirmation of Endotracheal Tube Placement? American Journal of Medical Quality, July/August 2011; vol. 26, 4: pp. 300-307

Michael P. Phelan, Jonathan Glauser, Ho-Wang A. Yuen, Elizabeth Sturges-Smith, and Stefanie E. Schrump American Journal of Medical Quality, September/October 2010; vol. 25, 5: pp. 346-350., first published on May 26, 2010

Winton J., Celenza A., Jackson T. Improving documentation of endotracheal intubation in an adult emergency department . Emerg Med Australas. 2008;20:488-493.

Phelan MP, Oranato J, Peberdy M Relationship Between Documentation Of Confirmed Endotracheal Tube Placement And Patient Outcomes In The National Registry Of Cardiopulmonary Resuscitation For The American Heart Association's Get With The Guidelines-Resuscitation (GWTG-R)( formerly National Registry of CPR( NRCPR)) SAEM Boston MA May 2011. Academic Emergency Medicine; May 2011:S146 (Vol.18, No 5, May 2011.

**1b.4 Summary of Data on Disparities by Population Group:** [**For Maintenance** –Descriptive statistics for performance results for this measure by population group]

**1b.5 Citations for Data on Disparities Cited in 1b.4:** [**For Maintenance** – Description of the data or sample for measure results reported in 1b.4 including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included]

**1c. Evidence** (Measure focus is a health outcome OR meets the criteria for quantity, quality, consistency of the body of evidence.)

Is the measure focus a health outcome? Yes ☐ No ☐ If not a health outcome, rate the body of evidence.

Quantity: H ☐ M ☐ L ☐ I ☐ Quality: H ☐ M ☐ L ☐ I ☐ Consistency: H ☐ M ☐ L ☐ I ☐

Quantity	Quality	Consistency	Does the measure pass subcriterion1c?
M-H	M-H	M-H	Yes <input type="radio"/>
L	M-H	M	Yes <input type="radio"/> IF additional research unlikely to change conclusion that benefits to patients outweigh harms: otherwise No <input type="radio"/>
M-H	L	M-H	Yes <input type="radio"/> IF potential benefits to patients clearly outweigh potential harms: otherwise No <input type="radio"/>
L-M-H	L-M-H	L	No <input type="radio"/>

**Health outcome** – rationale supports relationship to at least one healthcare structure, process, intervention, or service

**Does the measure pass subcriterion1c?**  
Yes ☐ IF rationale supports relationship

**1c.1 Structure-Process-Outcome Relationship** (Briefly state the measure focus, e.g., health outcome, intermediate clinical outcome, process, structure; then identify the appropriate links, e.g., structure-process-health outcome; process- health outcome; intermediate clinical outcome-health outcome):

The performance of the actual confirmation of endotracheal tube placement is the direct process being evaluated. The indirect evidence that this was performed is the documentation in the medical record. The

process identified would be the documentation rate of secondary confirmation of endotracheal tube placement. Currently the only realistic way to assess performance is with abstraction of documentation of the activity( confirmation) in the medical record. Direct observation will likely never be feasible. Failure to perform this action could result in adverse health outcomes including death. The actual performance of the documentation would be the intermediate process, with the expectation that documenting this activity without actually performing the activity would be highly unlikely and unprofessional.

The immediate health outcome will be adequate ventilation through the appropriate documentation of endotracheal tube placement. Because failure to assess correct placement of ET tube with the appropriate confirmatory method could result in imminent death if not recognized immediately, it should be performed according to guidelines. In addition, since esophageal intubation in the Emergency Department is a very rare event, and is rarely measured in regularly, making a true outcome measure untenable and unlikely to drive performance improvement. Currently the only way to assess whether this critical action was performed is to review the chart of intubated patients to assess whether it was documented as performed and whether appropriate methods were utilized.

Because some in-hospital data indicates there is a documentation issue( some charts with no documentation other with inadequate) there is a concern that this process is either not being performed at all or being performed in correctly.

Most intubations performed correctly will result in adequate ventilation. Performance of secondary confirmation of endotracheal tube placement is a critical patient safety action that confirms through the most reliable method available correct placement of the endotracheal tube in the trachea. Performance of the critical action by a method approved by specialty societies like ACEP and the AHA can only be reasonably evaluated by the documentation of performance within the medical record via chart abstraction. Knowing the appropriate methods and that this must be documented in the chart should lead to improved rates of documentation and actual performance. The health outcome assessed would be documentation rates of endotracheal intubations with appropriate methods of secondary confirmation.

#### **1c.2-3 Type of Evidence** *(Check all that apply):*

Clinical Practice Guideline, Selected individual studies (rather than entire body of evidence)

#### **1c.4 Directness of Evidence to the Specified Measure** *(State the central topic, population, and outcomes addressed in the body of evidence and identify any differences from the measure focus and measure target population):*

Due to ethical and resource limitations certain areas of inquiry( especially surrounding patient safety) are not well suited to randomized controlled study or large multicenter observational studies ( see NQF report on evidence), and in these cases the performance measurement process allows for structured face validity to serve as the basis for measures of healthcare processes with clear benefit, limited measurement burden and unlikely unintended consequence. This measure fits this description as well as the NQF standards for face validity.

The data we can evaluate will usually come from case studies( ie a misplaced tube led to death) or registry studies of larger patient populations ie in-patient hospitalized arrest patients(GTG-R). The clinical guidelines like ACEPS and AHA can make recommendations but whether or not theses are being followed and documented is difficult in our current data retrieval systems to assess.

<http://www.acep.org/content.aspx?id=29940>

#### **1c.5 Quantity of Studies in the Body of Evidence** *(Total number of studies, not articles):* Studies for the type associated with patient safety issues like identification of misplaced endotracheal tubes, because of the



scarcity are unlikely to be performed. However, there are many studies cited above regarding the standards for intubation ( ACEP clinical practice guides for secondary confirmation of ET intubations)(<http://www.acep.org/content.aspx?id=29940>)

**1c.6 Quality of Body of Evidence** (*Summarize the certainty or confidence in the estimates of benefits and harms to patients across studies in the body of evidence resulting from study factors. Please address: a) study design/flaws; b) directness/indirectness of the evidence to this measure (e.g., interventions, comparisons, outcomes assessed, population included in the evidence); and c) imprecision/wide confidence intervals due to few patients or events*): <http://www.acep.org/content.aspx?id=29940>

See evidentiary table at end of document that summarizes data used for the ACEP guideline per the ACEP evidence grading system. (<http://www.acep.org/content.aspx?id=29940>)

AHA documents reviewed the importance of performing confirmation of endotracheal tube placement.

**1c.7 Consistency of Results across Studies** (*Summarize the consistency of the magnitude and direction of the effect*):

**1c.8 Net Benefit** (*Provide estimates of effect for benefit/outcome; identify harms addressed and estimates of effect; and net benefit - benefit over harms*):

Given the rare nature of esophageal intubation, measurement of the direct outcome and harms associated with incorrect intubation and difficult to reasonably capture and measure with reasonable burden. This metric, like many other measures of patients safety, uses a very proximate process to the outcome that has tremendous face validity as well as clear benefit to patients given the multitude of expert recommendations that consistently recommend secondary confirmation be performed. The potential for identification and correction of a misplaced tube would be sufficient. If even one patient was identified as having a misplaced tube and survived because the documentation of tube misplacement metric was being utilized and recognized serious problem, the benefits would be obviously apparent. The benefit would be to get all ED's on board with appropriate performance of and documentation of this critical patient safety action.

**1c.9 Grading of Strength/Quality of the Body of Evidence.** Has the body of evidence been graded? **Yes**

**1c.10 If body of evidence graded, identify the entity that graded the evidence including balance of representation and any disclosures regarding bias:** From the ACEP guidelines for confirmation all articles were graded by at least 2 subcommittee members for strength of evidence and classified by the subcommittee members into 3 classes of evidence on the basis of the design of the study, with design 1 representing the strongest evidence and design 3 representing the weakest evidence for therapeutic, diagnostic, and prognostic clinical reports, respectively (Appendix A). Articles were then graded on 6 dimensions thought to be most relevant: blinded versus nonblinded outcome assessment, blinded or randomized allocation, direct or indirect outcome measures (reliability and validity), biases (eg, selection, detection, transfer), external validity (ie, generalizability), and sufficient sample size. Articles received a final grade (Class I, II, III) on the basis of a predetermined formula taking into account design and quality of study (Appendix B). Articles with fatal flaws were given an "X" grade.

In the course of reviewing the body of literature for this question, the committee reviewed a large number of investigations that tested various devices and techniques in the setting of the operating room (anesthetized, paralyzed, fasted adults) or the delivery room (neonatal resuscitation). Although these studies tended to have good intrinsic quality, the committee did not consider these studies (were assigned "X" grade) because of problems generalizing the results of these studies to the emergency department and out-of-hospital settings.

The AHA guidelines utilized the AHA process as outlined in the evidence evaluation process in the introduction to the 2005 guidelines. guideline( [http://circ.ahajournals.org/content/112/24\\_suppl/IV-](http://circ.ahajournals.org/content/112/24_suppl/IV-)

[1.full.pdf+html](#)

**1c.11 System Used for Grading the Body of Evidence:** [Other](#)

**1c.12 If other, identify and describe the grading scale with definitions:** [The ACEP guidelines for the actual performance of secondary confirmation of ET placement utilized there own modified grading system. The AHA guidelines utilized there own modified system as well.](#)

**1c.13 Grade Assigned to the Body of Evidence:** [See evidentiary table](#)

**1c.14 Summary of Controversy/Contradictory Evidence:** [None](#)

**1c.15 Citations for Evidence other than Guidelines(*Guidelines addressed below*):**

[Salem MR. Verification of endotracheal tube position. Anesthesiol Clin North America. 2001;19:813-839.](#)

[Wagner CM. Verification of pediatric endotracheal tube placement. Air Med J. 2003;23:10-12.](#)

[Grmec S. Comparison of three different methods to confirm tracheal tube placement in emergency intubation. Intensive Care Med. 2002;28:701-704.](#)

[Grmec S, Mally S. Prehospital determination of tracheal tube placement in severe head injury. Emerg Med J. 2004;21:518-520.](#)

[Takeda T, Tanigawa K, Tanaka H, et al. The assessment of three methods to confirm tracheal tube placement in the emergency setting. Resuscitation. 2003;56:156-157.](#)

[Bhende MS, LaCovey DC. End-tidal carbon dioxide monitoring in the prehospital setting. Prehosp Emerg Care. 2001;5:208-213.](#)

[Bhende MS. End-tidal carbon dioxide monitoring in Pediatrics – Clinical Applications. J Postgrad Med 2001;47:215-218.](#)

[Donald MJ, Paterson B. End tidal carbon dioxide monitoring in prehospital and retrieval medicine: a review. Emerg Med J. 2006;23:728-730.](#)

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**1c.16 Quote verbatim, the specific guideline recommendation** (Including guideline # and/or page #):  
Discussion (section) from ACEP guidelines:

#### ACEP

As an adjunct to this policy statement, ACEP's Clinical Policies Committee developed a Policy Resource Education Paper (PREP), Verification of Endotracheal Tube Placement

Revised and approved by the ACEP Board of Directors April 2009

Originally approved by the ACEP Board of Directors October 2001 replacing "Expired Carbon Dioxide Monitoring" approved by the ACEP Board of Directors in September 1994 and rescinded October 2001.

Improper placement of endotracheal tubes into the esophagus ("esophageal intubation"), can remain undetected despite physical examination, chest radiography, and pulse oximetry methods that seem to confirm proper tube placement.<sup>1-7</sup> For this reason, an additional method should be used to verify correct initial placement of the endotracheal tube.

No single technique used for confirmation of endotracheal tube placement has been proven to be 100% accurate.<sup>1-7</sup> While visualization of the endotracheal tube passing through the vocal cords represents the primary method for assessing initial endotracheal tube placement, objective confirmation of proper placement is necessary.

Methods of endotracheal tube position assessment include repeat direct laryngoscopy, qualitative and quantitative end-tidal carbon dioxide detection, esophageal detector devices, and more recently, ultrasound utilization and transthoracic impedance.<sup>8-21</sup>

End-tidal carbon dioxide detection, using either qualitative or quantitative methods, approaches 100% sensitivity and specificity in the patient with spontaneous circulation.<sup>3,5,7,10,11</sup>

Assessment of endotracheal tube position by detection of exhaled carbon dioxide is less reliable in patients

with poor circulatory perfusion conditions, particularly cardiac arrest patients. In these patients, delivery of carbon dioxide to the lungs may be insufficient to produce a reliable confirmation of tube placement. Essentially all reported false negative (endotracheal tube in the trachea with no detection of exhaled carbon dioxide) events of carbon dioxide detection in intubated patients have been observed in the setting of a low perfusion state, including cardiac arrest patients or those in extensive pulmonary edema.<sup>8-13</sup> In these patients, an alternative method of confirming endotracheal tube placement may be required.

Esophageal detector devices have some utility as a technique for endotracheal tube position assessment. While these devices are often inexpensive and have generally demonstrated good utility in detecting esophageal intubations, inaccurate findings can result in obese patients, those with a large amount of air in the esophagus or stomach, and in patients with copious pulmonary secretions.<sup>14-16</sup> In addition, esophageal detector devices do not provide the possibility for ongoing assessment of continued proper tube location.

Ultrasound imaging and transthoracic impedance methods offer potential as techniques that may prove to be helpful as adjuncts to detect and monitor the proper location of endotracheal tubes.<sup>17-21</sup> The evidence is currently insufficient to endorse widespread implementation of these technologies for this purpose.

Endotracheal tubes that are initially placed into the trachea may be dislodged during patient movement or patient transport. Given the frequency of movements and transport, particularly in the emergency setting, tube position should be frequently reassessed. Continuous endotracheal tube monitoring is recommended to assure prompt detection of endotracheal tube dislodgement from the trachea. If equipment to continuously monitor endotracheal tube position is not available, at a minimum, endotracheal tube placement should be reconfirmed promptly if the patient's condition deteriorates.

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In retrospective studies, endotracheal intubation has been associated with a 6% to 25% incidence of unrecognized tube misplacement or displacement.<sup>68,-,72</sup> This may reflect inadequate initial training or lack of experience on the part of the provider who performed intubation, or it may have resulted from displacement of a correctly positioned tube when the patient was moved. The risk of tube misplacement, displacement, or obstruction is high,<sup>67,70</sup> especially when the patient is moved.<sup>73</sup> Thus, even when the endotracheal tube is seen to pass through the vocal cords and tube position is verified by chest expansion and auscultation during positive-pressure ventilation, providers should obtain additional confirmation of placement using waveform capnography or an exhaled CO<sub>2</sub> or esophageal detector device (EDD).<sup>74</sup> The provider should use both clinical assessment and confirmation devices to verify tube placement immediately after insertion and again when the patient is moved. However, no single confirmation technique is completely reliable.<sup>75,76</sup> Continuous waveform capnography is recommended in addition to clinical assessment as the most reliable method of confirming and monitoring correct placement of an endotracheal tube (Class I, LOE A).

If waveform capnography is not available, an EDD or nonwaveform exhaled CO<sub>2</sub> monitor in addition to clinical assessment is reasonable (Class IIa, LOE B). Techniques to confirm endotracheal tube placement are further discussed below.

#### Clinical Assessment to Confirm Tube Placement

Providers should perform a thorough assessment of endotracheal tube position immediately after placement. This assessment should not require interruption of chest compressions. Assessment by physical examination consists of visualizing chest expansion bilaterally and listening over the epigastrium (breath sounds should not be heard) and the lung fields bilaterally (breath sounds should be equal and adequate).

A device should also be used to confirm correct placement in the trachea (see below). If there is doubt about correct tube placement, use the laryngoscope to visualize the tube passing through the vocal cords. If still in doubt, remove the tube and provide bag-mask ventilation until the tube can be replaced.

#### Use of Devices to Confirm Tube Placement

Providers should always use both clinical assessment and devices to confirm endotracheal tube location immediately after placement and throughout the resuscitation. Two studies of patients in cardiac arrest<sup>72,77</sup> demonstrated 100% sensitivity and 100% specificity for waveform capnography in identifying correct endotracheal tube placement in victims of cardiac arrest. However, 3 studies demonstrated 64% sensitivity and 100% specificity when waveform capnography was first used for victims with prolonged resuscitation and transport times.<sup>78,-,80</sup> All confirmation devices should be considered adjuncts to other confirmation techniques.

**Exhaled CO<sub>2</sub> Detectors.** Detection of exhaled CO<sub>2</sub> is one of several independent methods of confirming endotracheal tube position. Studies of waveform capnography to verify endotracheal tube position in victims of cardiac arrest have shown 100% sensitivity and 100% specificity in identifying correct endotracheal tube placement.<sup>72,77,81,-,88</sup> Continuous waveform capnography is recommended in addition to clinical assessment as the most reliable method of confirming and monitoring correct placement of an endotracheal tube (Class I, LOE A).

Given the simplicity of colorimetric and nonwaveform exhaled CO<sub>2</sub> detectors, these methods can be used in addition to clinical assessment as the initial method for confirming correct tube placement in a patient in cardiac arrest when waveform capnography is not available (Class IIa, LOE B). However, studies of colorimetric exhaled CO<sub>2</sub> detectors<sup>89,-,94</sup> and nonwaveform PETCO<sub>2</sub> capnometers<sup>77,89,90,95</sup> indicate that the accuracy of these devices does not exceed that of auscultation and direct visualization for confirming the tracheal position of an endotracheal tube in victims of cardiac arrest.

When exhaled CO<sub>2</sub> is detected (positive reading for CO<sub>2</sub>) in cardiac arrest, it is usually a reliable indicator of tube position in the trachea. False-positive readings (ie, CO<sub>2</sub> is detected but the tube is located in the esophagus) have been observed in animals after ingestion of large amounts of carbonated liquids before the arrest; however, the waveform does not continue during subsequent breaths.<sup>96</sup>

False-negative readings (defined in this context as failure to detect CO<sub>2</sub> despite tube placement in the trachea) may be present during cardiac arrest for several reasons. The most common is that blood flow and delivery of CO<sub>2</sub> to the lungs is low. False-negative results also have been reported in association with pulmonary embolus because pulmonary blood flow and delivery of CO<sub>2</sub> to the lungs are reduced. If the detector is contaminated with gastric contents or acidic drugs (eg, endotracheally administered epinephrine), a colorimetric device may display a constant color rather than breath-to-breath color change. In addition, elimination and detection of CO<sub>2</sub> can be drastically reduced with severe airway obstruction (eg, status asthmaticus) and pulmonary edema.<sup>93,97,98</sup> For these reasons, if CO<sub>2</sub> is not detected, we recommend that a second method be used to confirm endotracheal tube placement, such as direct visualization or the esophageal detector device.

Use of CO<sub>2</sub>-detecting devices to determine the correct placement of other advanced airways (eg, Combitube, laryngeal mask airway) has not been studied; their utility will depend on airway design. However, effective ventilation through a supraglottic airway device should result in capnograph waveform during CPR and after ROSC.

**Esophageal Detector Devices.** The EDD consists of a bulb that is compressed and attached to the endotracheal tube. If the tube is in the esophagus (positive result for an EDD), the suction created by the EDD will collapse the lumen of the esophagus or pull the esophageal tissue against the tip of the tube, and the bulb will not re-expand. The EDD may also consist of a syringe that is attached to the endotracheal tube; the provider attempts to pull the barrel of the syringe. If the tube is in the esophagus, it will not be possible to pull the barrel (aspirate air) with the syringe.

However, studies of the syringe aspiration EDD<sup>79,99</sup> and the self-inflating bulb EDD<sup>78,-,80</sup> indicate that the accuracy of these devices does not exceed that of auscultation and direct visualization for confirming the tracheal position of an endotracheal tube in victims of cardiac arrest. Given the simplicity of the EDD, it can be used as the initial method for confirming correct tube placement in addition to clinical assessment in the victim of cardiac arrest when waveform capnography is not available (Class IIa, LOE B).



The EDD may yield misleading results in patients with morbid obesity, late pregnancy, or status asthmaticus, or when there are copious endotracheal secretions,<sup>100,101</sup> because the trachea tends to collapse in the presence of these conditions. There is no evidence that the EDD is accurate for the continued monitoring of endotracheal tube placement.

**Thoracic Impedance.** Transthoracic impedance is slightly but significantly higher during inspiration than during exhalation.<sup>102</sup> Air is a poor electric conductor. Preliminary studies suggest that changes in thoracic impedance, as measured through standard defibrillation pads, may distinguish tracheal from esophageal intubations.<sup>103,–,105</sup>

There are 2 published reports involving 6 patients where ventilation-induced changes in thoracic impedance disappeared after esophageal intubation.<sup>106,107</sup> There is little evidence for the use of thoracic impedance in diagnosing adequacy of ventilation during CPR. Treatment decisions should not be based solely on thoracic impedance measurements until further study has confirmed its utility and accuracy in this population.

#### Postintubation Airway Management

After inserting and confirming correct placement of an endotracheal tube, the provider should record the depth of the tube as marked at the front teeth or gums and secure it. There is significant potential for endotracheal tube movement with head flexion and extension<sup>108,–,110</sup> and when the patient is moved from one location to another.<sup>111,112</sup> Continuous monitoring of endotracheal tube placement with waveform capnography is recommended as discussed above. The endotracheal tube should be secured with tape or a commercial device (Class I, LOE C). Devices and tape should be applied in a manner that avoids compression of the front and sides of the neck, which may impair venous return from the brain.

One out-of-hospital study<sup>113</sup> and 2 studies in an intensive-care setting<sup>114,115</sup> indicate that backboards, commercial devices for securing the endotracheal tube, and other strategies provide equivalent methods for preventing inadvertent tube displacement when compared with traditional methods of securing the tube (tape). These devices may be considered during patient transport (Class IIb, LOE C). After tube confirmation and fixation, obtain a chest x-ray (when feasible) to confirm that the end of the endotracheal tube is properly positioned above the carina.

**1c.17 Clinical Practice Guideline Citation:** American College of Emergency Medicine  
<http://www.acep.org/content.aspx?id=29940>

As an adjunct to this policy statement, ACEP's Clinical Policies Committee developed a Policy Resource Education Paper (PREP), Verification of Endotracheal Tube Placement  
Revised and approved by the ACEP Board of Directors April 2009  
Originally approved by the ACEP Board of Directors October 2001 replacing "Expired Carbon Dioxide Monitoring" approved by the ACEP Board of Directors in September 1994 and rescinded October 2001.

American Heart Association. 2005 American Heart Association (AHA) Guidelines Cardiopulmonary Resuscitation (CPR) and Emergency Cardiovascular Care (ECC) of Pediatric and Neonatal Patients: Pediatric Basic Life Support. Pediatrics. 2006;117:e989-1004.

The International Liaison Committee on Resuscitation. The International Liaison Committee on Resuscitation (ILCOR) consensus on science with treatment recommendations for pediatric and neonatal patients: pediatric basic and advanced life support. Pediatrics. 2006;117:e955-e977.

2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science Part 8: Adult Advanced Cardiovascular Life Support  
[http://circ.ahajournals.org/content/122/18\\_suppl\\_3/S729.full](http://circ.ahajournals.org/content/122/18_suppl_3/S729.full)

**1c.18 National Guideline Clearinghouse or other URL:**

**1c.19 Grading of Strength of Guideline Recommendation.** Has the recommendation been graded? **No**

**1c.20 If guideline recommendation graded, identify the entity that graded the evidence including balance of representation and any disclosures regarding bias:**

**1c.21 System Used for Grading the Strength of Guideline Recommendation:** **Other**

**1c.22 If other, identify and describe the grading scale with definitions:** **ACEP**

A literature search was performed and articles were systematically graded. All articles were graded by at least 2 subcommittee members for strength of evidence and classified by the subcommittee members into 3 classes of evidence on the basis of the design of the study, with design 1 representing the strongest evidence and design 3 representing the weakest evidence for therapeutic, diagnostic, and prognostic clinical reports, respectively.

Literature classification schema.\*

Design/Class Therapy† Diagnosis‡ Prognosis§

1 Randomized, controlled trial or meta-analyses of randomized trials Prospective cohort using a criterion standard Population prospective cohort

2 Nonrandomized trial Retrospective observational Retrospective cohort

Case control

3 Case series

Case report

Other (eg, consensus, review) Case series

Case report

Other (eg, consensus, review) Case series

Case report

Other (eg, consensus, review)

\*Some designs (eg, surveys) will not fit this schema and should be assessed individually.

†Objective is to measure therapeutic efficacy comparing >2 interventions.

‡Objective is to determine the sensitivity and specificity of diagnostic tests.

§Objective is to predict outcome including mortality and morbidity.

Articles were then graded on 6 dimensions thought to be most relevant: blinded versus nonblinded outcome assessment, blinded or randomized allocation, direct or indirect outcome measures (reliability and validity), biases (eg, selection, detection, transfer), external validity (ie, generalizability), and sufficient sample size. Articles received a final grade (Class I, II, III) on the basis of a predetermined formula taking into account design and quality of study .

Approach to downgrading strength of evidence.

Downgrading 1 2 3

None I II III

1 level II III X

2 levels III X X

Fatally flawed X X X

Articles with fatal flaws were given an "X" grade.

In the course of reviewing the body of literature for this question, the committee reviewed a large number of investigations that tested various devices and techniques in the setting of the operating room (anesthetized, paralyzed, fasted adults) or the delivery room (neonatal resuscitation). Although these studies tended to have good intrinsic quality, the committee did not consider these studies (were assigned "X" grade) because of problems generalizing the results of these studies to the emergency department and out-of-hospital settings.

#### AHA Classes of Recommendation:

Following the 2005 Consensus Conference, AHA ECC experts adapted the ILCOR scientific statements and expanded the treatment recommendations to construct these new guidelines. In developing these guidelines, the ECC experts used a recommendation classification system that is consistent with that used by the American Heart Association–American College of Cardiology collaboration on evidence-based guidelines. The classes of recommendation used in this document are listed in Table 3. These classes represent the integration of the weight of scientific evidence with contextual factors such as

expert assessment of the magnitude of benefit, usefulness, or efficacy; cost; educational and training challenges; and difficulties

in implementation. For Class I recommendations, high-level prospective studies support the action or therapy, and the risk substantially outweighs the potential for harm. For Class IIa recommendations, the weight of evidence supports the action or therapy, and the therapy is considered acceptable and useful. Ideally all CPR and ECC recommendations should be based on large prospective randomized controlled clinical trials that find substantial treatment effects on long-term survival and carry a Class I or Class IIa label. In reality few

clinical resuscitation trials have sufficient power to demonstrate an effect on intact survival to hospital discharge. As a result the experts were often confronted with the need to make recommendations on the basis of results from human trials that reported only intermediate outcomes, nonrandomized or retrospective observational studies, animal models, or extrapolations. Recommendations were generally labeled Class IIb when the evidence documented only short-term benefits from the therapy (eg, amiodarone for pulseless ventricular fibrillation cardiac arrest) or when positive results were documented with lower levels of evidence. Class IIb recommendations fall into 2 categories: (1) optional and (2) recommended by the experts despite the absence of high-level supporting evidence. Optional interventions are identified by terms such as “can be considered” or “may be useful.” Interventions that the experts believe should be carried out are identified with terms such as “we recommend.”

#### AHA 2010 update

2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science Part 8: Adult Advanced Cardiovascular Life Support

[http://circ.ahajournals.org/content/122/18\\_suppl\\_3/S729.full](http://circ.ahajournals.org/content/122/18_suppl_3/S729.full)

#### **1c.23 Grade Assigned to the Recommendation:**

**1c.24 Rationale for Using this Guideline Over Others:** The ACEP guideline gives the rationale for performing endotracheal tube placement. Other organizations, like the AHA guidelines, are not as specific. Because the ACEP guidelines address Emergency Department physicians actions, (i.e., appropriate confirmation of endotracheal tube placement), they are much more relevant in the Emergency Department setting. The guidelines do not address documentation. Documentation of procedures, including patient safety actions like confirmation of endotracheal tube placement, is currently our only means to access performance of this action.

**Based on the NQF descriptions for rating the evidence, what was the developer's assessment of the quantity, quality, and consistency of the body of evidence?**

1c.25 Quantity: [High](#) 1c.26 Quality: [High](#) 1c.27 Consistency: [High](#)

1c.28 Attach evidence submission form:

1c.29 Attach appendix for supplemental materials:

**Was the threshold criterion, *Importance to Measure and Report*, met?**

(1a & 1b must be rated moderate or high and 1c yes) Yes ☐ No ☒

Provide rationale based on specific subcriteria:

**For a new measure if the Committee votes NO, then STOP.**

**For a measure undergoing endorsement maintenance, if the Committee votes NO because of 1b. (no opportunity for improvement), it may be considered for continued endorsement and all criteria need to be evaluated.**

## 2. RELIABILITY & VALIDITY - SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (**evaluation criteria**)

Measure testing must demonstrate adequate reliability and validity in order to be recommended for endorsement. Testing may be conducted for data elements and/or the computed measure score. Testing information and results should be entered in the appropriate field. Supplemental materials may be referenced or attached in item 2.1. See [guidance on measure testing](#).

**S.1 Measure Web Page** (In the future, NQF will require measure stewards to provide a URL link to a web page where current detailed specifications can be obtained). Do you have a web page where current detailed specifications for this measure can be obtained? [No](#)

**S.2 If yes, provide web page URL:**

**2a. RELIABILITY. Precise Specifications and Reliability Testing:** [H](#) ☒ [M](#) ☒ [L](#) ☒ [I](#) ☒

**2a1. Precise Measure Specifications.** (The measure specifications precise and unambiguous.)

**2a1.1 Numerator Statement** (Brief, narrative description of the measure focus or what is being measured about the target population, e.g., cases from the target population with the target process, condition, event, or outcome):

[Number of ED patients with an endotracheal tube\(ETT\) placed or assessed with an endotracheal already in place who had the ETT confirmation performed.](#)

**2a1.2 Numerator Time Window** (The time period in which the target process, condition, event, or outcome is eligible for inclusion):

[Same visit](#)

**2a1.3 Numerator Details** (All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, codes with descriptors,

*and/or specific data collection items/responses:*

Confirmation of endotracheal tube placement should always be performed on every ED patient with an endotracheal tube according to the specifications of the American College of Emergency Physicians (ACEP) clinical practice guidelines for secondary confirmation of ET intubations(  
<http://www.acep.org/content.aspx?id=299400>. The performance of this confirmation should be documented in the medical record including physician, nursing or respiratory therapy notes. Confirmation can be performed by qualitative and quantitative end-tidal carbon dioxide detection, repeat direct laryngoscopy or esophageal detector device.

**2a1.4 Denominator Statement** *(Brief, narrative description of the target population being measured):*

Total number of patients identified with an endotracheal tube cared for in the ED. This population includes those patients who had an ETT's placed in the ED and those patients who arrived to the ED with an ETT already in place.

**2a1.5 Target Population Category** *(Check all the populations for which the measure is specified and tested if any):* Populations at Risk

**2a1.6 Denominator Time Window** *(The time period in which cases are eligible for inclusion):*

**2a1.7 Denominator Details** *(All information required to identify and calculate the target population/denominator such as definitions, codes with descriptors, and/or specific data collection items/responses):*

Patients who arrive to the Emergency Department and either require endotracheal tube placement or who arrived with an endotracheal tube already in place are eligible for inclusion.

**2a1.8 Denominator Exclusions** *(Brief narrative description of exclusions from the target population):*  
 No exclusions

**2a1.9 Denominator Exclusion Details** *(All information required to identify and calculate exclusions from the denominator such as definitions, codes with descriptors, and/or specific data collection items/responses):*

**2a1.10 Stratification Details/Variables** *(All information required to stratify the measure results including the stratification variables, codes with descriptors, definitions, and/or specific data collection items/responses):*

**2a1.11 Risk Adjustment Type** *(Select type. Provide specifications for risk stratification in 2a1.10 and for statistical model in 2a1.13):* No risk adjustment or risk stratification      **2a1.12 If "Other," please describe:**

**2a1.13 Statistical Risk Model and Variables** *(Name the statistical method - e.g., logistic regression and list all the risk factor variables. Note - risk model development should be addressed in 2b4.):*

**2a1.14-16 Detailed Risk Model Available at Web page URL** (or attachment). Include coefficients, equations, codes with descriptors, definitions, and/or specific data collection items/responses. Attach documents only if they are not available on a webpage and keep attached file to 5 MB or less. NQF strongly prefers you make documents available at a Web page URL. Please supply login/password if needed:



**2a1.17-18. Type of Score:** [Ratio](#)

**2a1.19 Interpretation of Score** (Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score):  
[Better quality = Higher score](#)

**2a1.20 Calculation Algorithm/Measure Logic**(Describe the calculation of the measure score as an ordered sequence of steps including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; aggregating data; risk adjustment; etc.):  
[Patients who have an endotracheal tube placed can be identified either through billing records \(i.e., billed procedure endotracheal tube placement\) or through chart abstraction for patients who arrived with endotracheal in place.](#)

**2a1.21-23 Calculation Algorithm/Measure Logic Diagram URL or attachment:**  
[Attachment  
 confrimation1.ppt](#)

**2a1.24 Sampling (Survey) Methodology.** If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate):

**2a1.25 Data Source** (Check all the sources for which the measure is specified and tested). If other, please describe:  
[Claims, Electronic Health Records, Other, Paper Records, Registry Data](#)

**2a1.26 Data Source/Data Collection Instrument** (Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.): [The data will need to be collected from each patient's medical record. For those patients that are intubated in the Emergency Department, there will likely be a billed procedure for an endotracheal tube intubation. Other charts like patients who expired or patients who admitted to an ICU may be another source of identification of patients who had an endotracheal tube placed. If a surveillance mechanism is in place \(i.e., airway registry\)is in place to capture all patients who either arrived intubated or are intubated in the Emergency Department then the data can be collected from there.](#)

**2a1.27-29 Data Source/data Collection Instrument Reference Web Page URL or Attachment:**

**2a1.30-32 Data Dictionary/Code Table Web Page URL or Attachment:**

**2a1.33 Level of Analysis** (Check the levels of analysis for which the measure is specified and tested):  
[Clinician : Group/Practice, Clinician : Individual, Facility, Integrated Delivery System, Population : Community, County or City](#)

**2a1.34-35 Care Setting** (Check all the settings for which the measure is specified and tested): [Emergency Department and Services, Inpatient/Hospital](#)

**2a2. Reliability Testing.** *(Reliability testing was conducted with appropriate method, scope, and adequate demonstration of reliability.)*

**2a2.1 Data/Sample** *(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):*

The measure as written is a chart abstracted measure that measures the rate of documentation of endotracheal tube placement confirmation. The goal performance is 100%. Because of the very nature of patient safety metrics this will be difficult but not impossible. The measure is well defined and precisely specified and can be implemented consistently within and across organizations and allow for comparability. Its reliability depends on honest reporting through self reported data. These are the most critical patients in our ED's and developing a surveillance method to identify these patients then review them would be an ideal outcome of this measure. Variability in reliability due to poor documentation however should be eliminated by good measure performance, which will improve measure validity once reporting commences.

**2a2.2 Analytic Method** *(Describe method of reliability testing & rationale):*

The measure will require more reliability testing to demonstrate that the measure data elements are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period and/or that the measure score is precise. There is no reason to think that they would not. If a surveillance mechanism is put in place and as charts are abstracted and reviewed for detailed documentation, the results should be repeatable across any hospital or hospital system.

The use two blinded chart abstractors will be needed to assess institutional data in order to verify the reliability of chart abstraction tool used for this measurement.

**2a2.3 Testing Results** *(Reliability statistics, assessment of adequacy in the context of norms for the test conducted):*

The critical data elements, the actual documentation in the medical record of confirmation of ET placement are supposed to be found in the medical record. These data elements contribute to the computed measure score, the percentage of ED intubated patients with documentation of ETT confirmation. We performed an analysis of finding this data in an ED record by type of provider. Since during an intubation of an ED patient or if a intubated patient arrives to the ED, multiple care givers will often time document confirmation, therefore multiple sources( physician, nursing and respiratory therapy)of notes, within the medical record can be utilized.

A single hospital study was published and able to describe the methods of how to collect patients and abstract the data from the medical record. (Phelan MP. Glauser J. Wickline D. Schrupp S. Gaber-Patel K. Joyce M. How Well Do Emergency Physicians Document Confirmation of Endotracheal Tube Placement? Am J Med Qual. 2011 Jul-Aug;26(4):300-7))

The following represents unpublished data that tested the reliability of this measure. All measure specifications are unambiguous and consistently identify who is included( intubated patients). The computation of the score is calculated by dividing the number of patients with appropriate documentation of endotracheal tube confirmation by the total number of identified intubated patients.

Evaluation of Documentation of ED Endotracheal Tube Confirmation by Provider Type:

**Study Objective**

The objective of this study was to assess the prevalence of appropriate documentation of endotracheal tube (ET) placement confirmation in intubated emergency department (ED) patients among ED health care providers.

## Methods

Prospective, observational. Inclusions: all patients in the ED of a tertiary care center either undergoing ET placement, or arriving with an ET placed in an outside setting. A surveillance process was developed to prospectively capture all patients who underwent ET placement either in the study ED, or arrived to the study ED with an ET placed in an outside setting. This process included a standardized airway registry form that was completed by the ED physician during the ED visit. Forms were used to identify all study patients and then medical records were reviewed using a standardized audit form for documentation of ET placement confirmation. Appropriate documentation of endotracheal tube (ET) placement confirmation was defined according to American College of Emergency Physician (ACEP) recommendations, which include the use of one of three methods for confirmation: end-tidal CO2 detection, re-evaluation with direct laryngoscopy, or an esophageal detection device (EDD). Proportions with 95% confidence intervals are reported.

## Results

A total of 344 patients from March 1, 2010 to June 30, 2011 were contained within the registry for analysis. Overall documentation rates for confirmation of ET tube placement were 76.5% for physicians, 91.0% for respiratory therapists and 53.6% for nurses. When the sample was analyzed by location of intubation, documentation was highest for patients intubated in the ED: Physician – 94.3%, Respiratory Therapy – 94.7%, Nursing – 62.7%. Patients arriving intubated from an outside hospital were found to have documentations rates lower than those intubations performed in the ED: Physician – 31.3% Respiratory Therapy – 87.5% and Nursing – 20.8%. Physician documentation for EMS intubated patients was comparable to ED intubated rates – 95.6%. Documentation for EMS patients was lower than the ED intubated patients for respiratory therapy (77.7%) and lower than the ED for nursing (13.2%). Different health care provider's documentation rates of ET tube confirmation are highest for patients intubated in the ED as compared to patients who arrive already intubated.

## Conclusion

Identification of the appropriate ED patient and rates of documentation of methods of ETT confirmation from a medical record review can be performed based on provider type.

This simple study was able to demonstrate that identification of the appropriate patients was possible and by performing a chart abstraction process utilizing a standardized chart audit tool we could determine a rate of documentation of confirmation of intubated ED patients.

## 2b. VALIDITY. Validity, Testing, including all Threats to Validity: H● M● L● I●

### 2b1.1 Describe how the measure specifications (*measure focus, target population, and exclusions*) are consistent with the evidence cited in support of the measure focus (*criterion 1c*) and identify any differences from the evidence:

The measure specifications are consistent with the evidence presented to support the focus of measurement under criterion 1c. The measure is specified to capture the most inclusive target population indicated by the evidence.

Data can be extrapolated from recent study of the NRCPR hospital data.(Academic Emergency Medicine; May 2011:S146 (Vol.18, No 5, May 2011) These is no large patients specific ED registry of intubated patients but the National Registry of CPR( now Get with the Guidelines -Resuscitation) provides a window

into hospitalized arrests patients that can be extrapolated to critically ill ED patients. This data indicates 1. There was a performance gap and 2. There was a difference in outcome from those where appropriate documentation was performed and those that did not have appropriate documentation.

**2b2. Validity Testing.** (*Validity testing was conducted with appropriate method, scope, and adequate demonstration of validity.*)

**2b2.1 Data/Sample** (*Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):

Data can be extrapolated from recent study of the NRCPR hospital data (Academic Emergency Medicine; May 2011:S146 (Vol.18, No 5, May 2011. These are no large patients specific ED registry of patients intubated but the National Registry of CPR (now Get with the Guidelines -Resuscitation) provides a window into hospitalized arrests patients that can be extrapolated to critically ill ED patients. This data indicates 1. There was a performance gap and 2. There was a difference in outcome from those where appropriate documentation was performed and those that did not have documentation. Consecutive cardiac arrest data from 507 hospitals participating in the National Registry of Cardiopulmonary Resuscitation (NRCPR) were analyzed.

**2b2.2 Analytic Method** (*Describe method of validity testing and rationale; if face validity, describe systematic assessment*):

Validity can be supported by face validity or by data from the NRCPR study or even a single hospital's data. The metric itself has face validity based on the fact that there is an ACEP/AHA derived clinical guideline describing the available techniques that are considered standard of care for confirmation of endotracheal tube placement confirmation along with the fact that there is inconsistent documentation of many procedures including placement of an endotracheal tube during an ED visit. A 100% rate of documentation of endotracheal tube confirmation documentation is not just a goal but actually should be a considered standard of care for any hospitalized patient having an endotracheal tube inserted as should documentation of confirmation of its location.

The study from the GTG-R data indicates there is a gap and that gap may be associated with outcome difference.

The purpose of the registry evaluation was to determine the rate of documentation of ET confirmation and whether outcomes of in-hospital cardiac arrest patients differ in relation to documentation rate. The methods were as follows: Consecutive cardiac arrest data from 507 hospitals participating in the National Registry of CardioPulmonary Resuscitation (NRCPR) were analyzed to determine appropriate documentation of ET confirmation, defined as capnography or an esophageal detector device (EDD). Using binary logistic regression we examined whether there was an independent relationship between documented ET confirmation and ROSC or survival to hospital discharge. Between 4/17/00, and 12/7/09, data for 176,054 adult and pediatric patients were entered into the NRCPR; 166,919 were adults mean age, 65.5 [95% CI, 64.5-65.6]; male, 58%; initial rhythm: ventricular fibrillation, 22%; pulseless electrical activity, 42%, asystole, 36%). ET placement occurred in 76,465 (47%) patients; 13,897 (18%) cases showed no documentation of confirmation and auscultation alone was documented in 20,172 (26%) cases. Confirmation of ET placement by capnography (n=43,735) or EDD (n=653) was documented in 44,388 (58%) patients; ROSC occurred in 39,414 (51.6%), and 13,620 (17.8%) survived to discharge. Patients whose ET position was confirmed by capnography or EDD had a higher rate of ROSC (53.6% vs. 48.9% [p=.0001]) and survival (18.2% vs. 17.4% [p=.003]) than patients without documentation. Binary logistic regression indicated that documentation of ET placement was independently associated with survival to discharge (odds ratio, 1.23; 95% CI 1.19-1.26). We concluded that documentation of ET tube placement in patients with cardiac arrest after endotracheal intubation is poor. Documentation of ET tube placement in the NRCPR is associated with higher rates of ROSC and is an independent predictor of higher rates of survival to discharge. Further study is needed to determine whether failure to document ET tube placement is actually reflective of inadequate ET tube confirmation.

**2b2.3 Testing Results** *(Statistical results, assessment of adequacy in the context of norms for the test conducted; if face validity, describe results of systematic assessment):*

18% of patients in the NRCPR data base had no documentation of appropriate method of confirmation while 26% had only documentation of auscultation( not appropriate) as the means of secondary confirmation. A single hopsital study showed ET confirmation was documented by physicians for 96% patients intubated in the ED and 34% patients intubated before arrival.

**POTENTIAL THREATS TO VALIDITY.** *(All potential threats to validity were appropriately tested with adequate results.)*

**2b3. Measure Exclusions.** *(Exclusions were supported by the clinical evidence in 1c or appropriately tested with results demonstrating the need to specify them.)*

**2b3.1 Data/Sample for analysis of exclusions** *(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):*  
None

**2b3.2 Analytic Method** *(Describe type of analysis and rationale for examining exclusions, including exclusion related to patient preference):*

**2b3.3 Results** *(Provide statistical results for analysis of exclusions, e.g., frequency, variability, sensitivity analyses):*

Results might be sensitive to documentation patterns but also may reflect poor intubating practices utilized at a hospital. Perhaps, then 100% measure performance( i.e. documentation) may not be reflected by better outcomes.

**2b4. Risk Adjustment Strategy.** *(For outcome measures, adjustment for differences in case mix (severity) across measured entities was appropriately tested with adequate results.)*

**2b4.1 Data/Sample** *(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):*  
None

**2b4.2 Analytic Method** *(Describe methods and rationale for development and testing of risk model or risk stratification including selection of factors/variables):*

**2b4.3 Testing Results** *(Statistical risk model: Provide quantitative assessment of relative contribution of model risk factors; risk model performance metrics including cross-validation discrimination and calibration statistics, calibration curve and risk decile plot, and assessment of adequacy in the context of norms for risk models. Risk stratification: Provide quantitative assessment of relationship of risk factors to the outcome and differences in outcomes among the strata):*

**2b4.4 If outcome or resource use measure is not risk adjusted, provide rationale and analyses to justify lack of adjustment:** This is a pure measure of endotracheal tubes placed and evaluation of lack of documentation of confirmations. There is no need for risk adjustment.

**2b5. Identification of Meaningful Differences in Performance.** *(The performance measure scores were appropriately analyzed and discriminated meaningful differences in quality.)*

**2b5.1 Data/Sample** *(Describe the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):*



**2b5.2 Analytic Method** (Describe methods and rationale to identify statistically significant and practically/meaningfully differences in performance):

ED's where performance of documentation was not 100% would indicate work would be needed to identify intubated patients and improve confirmation practices and rates of documentation of confirmation of ETT's.

**2b5.3 Results** (Provide measure performance results/scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance):

**2b6. Comparability of Multiple Data Sources/Methods.** (If specified for more than one data source, the various approaches result in comparable scores.)

**2b6.1 Data/Sample** (Describe the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included):

Given that documentation is being measured in an unguided sample, there is significant room for poor comparability based on difference in documentation practices; however data suggest an outcome relationship to documented confirmation of intubations and there is no data to demonstrate an excessive burden or unintended consequence associated with this measurement.

**2b6.2 Analytic Method** (Describe methods and rationale for testing comparability of scores produced by the different data sources specified in the measure):

**2b6.3 Testing Results** (Provide statistical results, e.g., correlation statistics, comparison of rankings; assessment of adequacy in the context of norms for the test conducted):

The expectation is that 100% of intubated patients should have documentation of ET placement. Failure to document may reflect poor documentation or failure to perform this critical patient's safety action.

**2c. Disparities in Care:** H ☐ M ☐ L ☐ I ☐ NA ☐ (If applicable, the measure specifications allow identification of disparities.)

**2c.1 If measure is stratified for disparities, provide stratified results** (Scores by stratified categories/cohorts):

**2c.2 If disparities have been reported/identified (e.g., in 1b), but measure is not specified to detect disparities, please explain:**

**2.1-2.3 Supplemental Testing Methodology Information:**

**Steering Committee: Overall, was the criterion, Scientific Acceptability of Measure Properties, met?** (Reliability and Validity must be rated moderate or high) Yes ☐ No ☐

**Provide rationale based on specific subcriteria:**

**If the Committee votes No, STOP**

### 3. USABILITY

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)

**C.1 Intended Actual/Planned Use** (Check all the planned uses for which the measure is intended): [Public Reporting](#), [Quality Improvement \(external benchmarking to organizations\)](#), [Quality Improvement \(Internal to the specific organization\)](#)

**3.1 Current Use** (Check all that apply; for any that are checked, provide the specific program information in the following questions): [Quality Improvement \(Internal to the specific organization\)](#)

**3a. Usefulness for Public Reporting: H ☒ M ☒ L ☒ I ☒**

(The measure is meaningful, understandable and useful for public reporting.)

**3a.1. Use in Public Reporting - disclosure of performance results to the public at large** (If used in a public reporting program, provide name of program(s), locations, Web page URL(s)). If not publicly reported in a national or community program, state the reason AND plans to achieve public reporting, potential reporting programs or commitments, and timeline, e.g., within 3 years of endorsement: **[For Maintenance** – If not publicly reported, describe progress made toward achieving disclosure of performance results to the public at large and expected date for public reporting; provide rationale why continued endorsement should be considered.]

There is no large ED airway data set, other than a single hospital based airway registry, that provides surveillance data on ED intubations. However there is a registry of in hospital arrest patients the National Registry of CPR that abstracts and collects data on patients including data on confirmation of endotracheal tube confirmation. This registry has been queried and analyzed and found that for almost half of the patients intubated there is inadequate or no documentation of ET confirmation based on the ACEP clinical practice guidelines.( see SAEM abstract Academic Emergency Medicine; May 2011:S146 (Vol.18, No 5, May 2011). While many ED intubations were excluded In this data set( ie arrived from ems in arrest), this maybe extrapolated to ED care as failure to document ( and possibly perform) is not exclusive to in-hospital care physicians. Airway documentation and documentation confirmation of ET placement has been demonstrated to be an issue.( Wilson paper and Phelan ajmq paper). The Joint commission is currently piloting several cardiac arrest measures including one for documentation of ET placement. The need to be patient and persistent by maintaining the current metric until further similar metrics can be promulgated is important and keeps the metric around so further testing and refinement can be performed.

**3a.2. Provide a rationale for why the measure performance results are meaningful, understandable, and useful for public reporting.** If usefulness was demonstrated (e.g., focus group, cognitive testing), describe the data, method, and results: [ED physicians and those that care for patients critically ill recognize this as an important patient's safety action: the performance of and documentation of secondary confirmation of ET placement. Specialty societies \(ACEP\) have also recognized this by developing clinical practice guidelines and also by including the documentation within their abstractable registries data points \(GTG-R\). Hospitals and hospitals quality officers will also easily recognize this metric as important patient safety action and be able to develop a system to abstract chart of intubated patients. Patients and their families should have an expectation that standard safety actions related to the performance of a complex life saving procedures like placing a tube in the airway are verified as a standard of care practice and documented in the medical record. Deviation indicates lack of highly functioning systems, and be considered substandard care requiring work to improve their documentation practices.](#)

Another rational is that the Emergency Medicine technical advisory panel convened by NQF in 2006 and the selection of "confirmation of endotracheal tube placement" as a measure for Emergency Medicine in 2007. There was consensus that the documentation of verification of endotracheal tube was critically important. The clinicians on the panel agreed that it should be performed and documented for every patient intubated and every patients who arrived intubated

**3.2 Use for other Accountability Functions (payment, certification, accreditation).** If used in a public accountability program, provide name of program(s), locations, Web page URL(s):

**3b. Usefulness for Quality Improvement: H ☒ M ☒ L ☒ I ☒**

See Guidance for Definitions of Rating Scale: H=High; M=Moderate; L=Low; I=Insufficient; NA=Not Applicable  
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*(The measure is meaningful, understandable and useful for quality improvement.)*

**3b.1. Use in QI.** If used in quality improvement program, provide name of program(s), locations, Web page URL(s):

**[For Maintenance – If not used for QI, indicate the reasons and describe progress toward using performance results for improvement].**

Surveillance of Emergency Department intubations and appropriate documentation of critical patient safety actions like endotracheal tube placement should lead to improvement in documentation of the procedure itself and of the confirmation of endotracheal tube placement. In the ED at the main campus of the Cleveland Clinic we have utilized the single hospital airway registry to track and improve our documentation rates.

**3b.2. Provide rationale for why the measure performance results are meaningful, understandable, and useful for quality improvement.** If usefulness was demonstrated (e.g., QI initiative), describe the data, method and results:

Physicians understand the importance of appropriate documentation. When an intervention like placement of an endotracheal tube in a patient occurs there are critical elements to documentation of the procedure itself as well as the confirmation of placement. Emergency Department physicians are well aware of this critical patient safety action but may be unaware that they are failing to document this in their procedure notes.

**Overall, to what extent was the criterion, *Usability*, met? H M L I**

**Provide rationale based on specific subcriteria:**

#### 4. FEASIBILITY

Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. **(evaluation criteria)**

**4a. Data Generated as a Byproduct of Care Processes: H M L I**

**4a.1-2 How are the data elements needed to compute measure scores generated?** *(Check all that apply).*

Data used in the measure are:

generated by and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition, Abstracted from a record by someone other than person obtaining original information (e.g., chart abstraction for quality measure or registry)

**4b. Electronic Sources: H M L I**

**4b.1 Are the data elements needed for the measure as specified available electronically** *(Elements that are needed to compute measure scores are in defined, computer-readable fields):* **Some data elements are in electronic sources**

**4b.2 If ALL data elements are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources:** **There is no uniform billing code for the practice of confirmation of endotracheal tube placement. A near term path is the abstraction of the data from the medical record including nursing and RT notes.**

The development of a templated procedure note that would capture data elements like confirmation of endotracheal tube placement could be developed within an EHR or paper record. Also the same can be said for nursing and respiratory therapy templated notes to ensure capture of this patient safety action.

**4c. Susceptibility to Inaccuracies, Errors, or Unintended Consequences: H M L I**

**4c.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measurement**

identified during testing and/or operational use and strategies to prevent, minimize, or detect. If audited, provide results:

**4d. Data Collection Strategy/Implementation: H M L I**

**A.2 Please check if either of the following apply (regarding proprietary measures):**

**4d.1 Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues (e.g., fees for use of proprietary measures):**

The development of an Emergency Department airway registry in order to survey the population of patients (that is patients who are intubated in the ED or arrive intubated ) is a great starting point. Once patients are captured in this registry chart abstraction needs to occur, that is each patient record needs to be reviewed for appropriate documentation of the event. Once a chart abstraction tool is developed, aggregate data can be collected on a department as well as individual clinicians to provide feedback regarding their performance.

**Overall, to what extent was the criterion, *Feasibility*, met? H M L I**  
Provide rationale based on specific subcriteria:

**OVERALL SUITABILITY FOR ENDORSEMENT**

**Does the measure meet all the NQF criteria for endorsement? Yes No**  
**Rationale:**

**If the Committee votes No, STOP.**

**If the Committee votes Yes, the final recommendation is contingent on comparison to related and competing measures.**

**5. COMPARISON TO RELATED AND COMPETING MEASURES**

If a measure meets the above criteria and there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure before a final recommendation is made.

**5.1 If there are related measures (either same measure focus or target population) or competing measures (both the same measure focus and same target population), list the NQF # and title of all related and/or competing measures:**

**5a. Harmonization**

**5a.1 If this measure has EITHER the same measure focus OR the same target population as NQF-endorsed measure(s): Are the measure specifications completely harmonized?**

**5a.2 If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden:**

**5b. Competing Measure(s)**

**5b.1 If this measure has both the same measure focus and the same target population as NQF-endorsed measure(s):**

**Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to**

*measure quality*); **OR provide a rationale for the additive value of endorsing an additional measure.**  
(Provide analyses when possible):

Currently the Joint Commission(JC) is evaluating a similar measure as part of an in-hospital wide cardiac arrest quality of care performance measure set. It is about to enter the pilot-testing phase and so is not completed. This measure evaluates in-hospital cardiac arrests and whether if a patient was intubated was there documentation of confirmation of endotracheal tube placement. The current measure could be rolled into a single measure of all out of the operating room intubations( ED and inhospital) metrics but this may have to wait for a more fully developed and endorsed JC measure. There are reasons to maintain the current measure as the ED care not only includes cardiac arrest victims but also respiratory and trauma arrest patients that could not be captured in the hospital wide cardiac arrest measure.

## CONTACT INFORMATION

**Co.1 Measure Steward (Intellectual Property Owner):** Cleveland Clinic, 9500 Euclid Avenue, Mail Code E-19, Cleveland, Ohio, 44195

**Co.2 Point of Contact:** Michael, Phelan, MD, phelanm@ccf.org, 216-444-4545-

**Co.3 Measure Developer if different from Measure Steward:** Cleveland Clinic, 9500 Euclid Avenue, Mail Code E-19, Cleveland, Ohio, 44195

**Co.4 Point of Contact:** Michael, Phelan, MD, phelanm@ccf.org, 216-445-4545-

**Co.5 Submitter:** Michael, Phelan, MD, phelanm@ccf.org, 216-445-4545-, Cleveland Clinic

**Co.6 Additional organizations that sponsored/participated in measure development:**

**Co.7 Public Contact:** Michael, Phelan, MD, phelanm@ccf.org, 216-445-4545-, Cleveland Clinic

## ADDITIONAL INFORMATION

**Workgroup/Expert Panel involved in measure development**

**Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.**

**Ad.2 If adapted, provide title of original measure, NQF # if endorsed, and measure steward. Briefly describe the reasons for adapting the original measure and any work with the original measure steward:** 501 Confirmation of Endotracheal Tube Placement, measure steward Michael P. Phelan, MD.

This measure was uniformly accepted by the Emergency Med TAP as a ED patient safety metric. Confirmation of ET placement was recognized as a critical patients safety action to be performed each time a patient is intubated or to be done on arrival to the ED for every patient who is already intubated. Without adequate surveillance there is likely some failures to document could also be failure to perform this action.

**Measure Developer/Steward Updates and Ongoing Maintenance**

**Ad.3 Year the measure was first released:** 2008

**Ad.4 Month and Year of most recent revision:** 09, 2011

**Ad.5 What is your frequency for review/update of this measure?**

**Ad.6 When is the next scheduled review/update for this measure?**

**Ad.7 Copyright statement:**

**Ad.8 Disclaimers:**



<b>Ad.9 Additional Information/Comments:</b>
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<b>Date of Submission (MM/DD/YY):</b> <a href="#">11/18/2011</a>
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