
CBE ID

4630

Title

Cross-Setting Discharge Function Score for Inpatient Rehabilitation Facilities

Project

Advanced Illness and Post-Acute Care

Endorsement Status

Endorsed

Is Under Review

No

Next Maintenance Cycle

Fall 2029

Previous Endorsement Cycle

Fall 2024

Initial Endorsement

Fri, 03/14/2025 - 09:53

Steward

Centers for Medicare & Medicaid Services

1.0 New or Maintenance

New

1.1 Measure Structure

Single Measure

1.3 Electronic Clinical Quality Measure (eCQM)

No

1.6 Measure Description

This outcome measure estimates the percentage of Inpatient Rehabilitation Facility (IRF) Medicare patient stays that meet or exceed an expected discharge function score. The expected discharge function score is a risk-adjusted estimate that accounts for patient characteristics. The measure includes patients who are 18 years of age or older and the timeframe for the measure is 12 months.

1.7 Composite Measure

No

1.7 Measure Type

Outcome

1.8 Level of Analysis

Facility

1.9 Care Setting

Inpatient Rehabilitation Facility

1.10 Measure Rationale

Measuring functional status of inpatient rehabilitation facility (IRF) patients can provide valuable information about a IRF's quality of care. A patient's functional status may be associated with adverse health outcomes such as falls, fractures, exacerbation of chronic conditions, and a higher risk of readmissions following IRF care. Predictors of poorer recovery in function include greater age, complications after hospital discharge, and residence in a nursing home. Understanding factors associated with poorer functional recovery facilitates the ability to estimate expected functional outcome recovery for patients, based on their personal characteristics.

IRFs can positively impact their patients' functional outcomes. During a IRF stay, the goals of treatment include fostering the patient's ability to manage their daily activities so that the patient can complete functional (i.e., self-care and mobility) activities as independently as possible and, if feasible, return to a safe, active and productive life in a community-based setting.

The Cross-Setting Discharge Function Score (Discharge Function) measure determines how successful each IRF is at achieving or exceeding an expected level of functional ability for its patients at discharge. An expectation for discharge function score is built for each IRF stay by accounting for patient characteristics that impact their functional status. The Cross-Setting Discharge Function for a given IRF is the proportion of that IRF's stays where a patient's observed discharge function score meets or exceeds their expected discharge function score. IRFs with low percentage indicate that they are not achieving the functional gains at discharge that are expected based upon patient characteristics and patient status at admission for a larger share of their patients. The measure provides information to IRFs that has the potential to hold providers accountable for functional outcomes and encourages them to improve the quality of care they deliver. This measure also promotes patient wellness, encourages adequate nursing and therapy services to help prevent adverse outcomes (e.g., potentially preventable hospitalization) and increases the transparency of quality of care in the IRF setting. Discharge Function adds value to the IRF QRP function measure portfolio by using specifications that allow for better comparisons across Post-Acute Care settings, considering both self-care and mobility activities in the function score, and refining the approach to addressing missing activity scores including those coded with activity not attempted codes.

1.11 Measure Webpage

<https://www.cms.gov/files/document/irf-qm-calculations-and-reporting-users-manu...>

1.13 Data Dictionary

Attached

1.14 Numerator

The number of Medicare IRF stays in the denominator with a discharge function score that is equal to or higher than the calculated expected discharge function score. The function items used to determine the observed function score are: Eating (GG0130A3), Oral Hygiene (GG0130B3), Toileting Hygiene (GG0130C3), Roll left and right (GG0170A3), Lying to sitting on side of bed (GG0170C3), Sit to stand (GG0170D3), Chair/bed-to-chair transfer (GG0170E3), Toilet transfer (GG0170F3), and Walk 10 feet (GG0170I3) and Walk 50 feet with two turns (GG0170J3) if the patient walks, or Wheel 50 feet with two turns (GG0170R3) if the patient does not walk and uses a wheelchair. The specifications for calculation of the function score are provided in the following manual report: <https://www.cms.gov/files/document/irf-qm-calculations-and-reporting-us...>

1.14a Numerator Details

The numerator is the number of IRF stays during the reporting period in which the observed discharge function score (**Section 1**) for select GG function activities is equal to or greater than the expected discharge function score (**Section 2**).

Section 1. The observed discharge function score is the sum of individual function activities at discharge. The section in each PAC assessment instrument titled Section GG, Functional Ability and Goals, includes standardized patient assessment data elements that measure mobility and self-care functional status. The Discharge Function measure focuses on these standardized activities that are currently available across all PAC settings (listed below). Valid responses for the standardized functional items/activities are reported below,

The function items used to determine the observed function score are the standardized functional items/activities that are currently available across all PAC settings:

- Eating (GG0130A),
- Oral Hygiene (GG0130B),
- Toileting Hygiene (GG0130C),
- Roll left and right (GG0170A),
- Lying to sitting on side of bed (GG0170C),
- Sit to stand (GG0170D),
- Chair/bed-to-chair transfer (GG0170E),
- Toilet transfer (GG0170F),
- Walk 10 feet (GG0170I),
- Walk 50 feet with two turns (GG0170J),
- Wheel 50 feet with two turns (GG0170R)

Standardized Functional Assessment (GG) Item Responses:

- Six-level rating scale:
 - 06 = Independent
 - 05 = Setup or clean-up assistance
 - 04 = Supervision or touching assistance
 - 03 = Partial/moderate assistance

- 02 = Substantial/maximal assistance
- 01 = Dependent
- Activity Not Attempted Codes:
 - 07 = Patient refused
 - 09 = Not applicable
 - 10 = Not attempted due to environmental limitations
 - 88 = Not attempted due to medical condition or safety concerns
 - ^ = Skip pattern
- Missing data
 - - = Not assessed/no information

The following steps are used to determine the observed discharge function score for each stay:

- Step 1: If the code for an activity is between 06 (independent) to 01 (most independent), then use code as the score for that activity.
- Step 2: If code for an item is 07, 09, 10, 88, dashed (-), skipped (^), or missing, then the score for that activity is estimated with statistical imputation (see Section 3.5).
- Step 3: Sum scores across all items to calculate the total observed discharge function score.
- Step 4: Round the observed discharge function score to the fourth decimal place.

If the patient does not walk at the time of admission and discharge, different mobility item scores are used.

Use 2 * the Wheel 50 Feet with 2 Turns (GG0170R) score to calculate the total observed discharge function score for stays where (i) Walk 10 Feet (GG0170I) has an activity not attempted (ANA) code at both admission and discharge and (ii) either Wheel 50 Feet with 2 Turns (GG0170R) or Wheel 150 Feet (GG0170S) has a code between 1 and 6 at either admission or discharge. For all other patient stays, use Walk 10 Feet (GG0170I) and Walk 50 Feet with 2 Turns (GG0170J) to calculate the total observed discharge function score.

For all cases, 10 activities are used to calculate a patient's total observed discharge score and score values range from 10 - 60.

Section 2. The expected discharge function score is determined by applying the regression equation determined from risk adjustment to each IRF stay using admission Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) data. Risk adjustment controls for patient characteristics such as the admission function score, age, and clinical conditions. Refer to Section 4.4 for details on risk adjustment. For consistent comparison against the observed discharge function score, the expected discharge function score is also rounded to the fourth decimal place.

1.15 Denominator

The total number of Medicare IRF stays, except those that meet the exclusion criteria.

1.15a Denominator Details

The denominator is total number of Medicare IRF stays with an IRF-PAI discharge record in the

measure reporting period, which do not meet the exclusion criteria. The reporting period for the measure is 12 months (four quarters). Documentation on how IRF stays are constructed is available in the IRF Quality Reporting Program Measure Calculations and Reporting User's Manual: Version 6.0.

1.15b Denominator Exclusions

Medicare IRF stays are excluded from measure calculations if:

1) The Medicare IRF Stay is an incomplete stay: Patients with incomplete stays are identified based on the following criteria:

- Discharge to acute care that results in the patient's absence from the IRF for longer than three calendar days; or
- Died while in IRF or
- Discharged against medical advice or
- Length of stay is less than three days

2) The patient has the following medical conditions: Coma, persistent vegetative state, complete tetraplegia, locked-in syndrome, or severe anoxic brain damage, cerebral edema or compression of brain.

3) The patient is younger than age 18

4) The patient is discharged to hospice or received hospice while a patient

1.15c Denominator Exclusions Details

Medicare IRF stays are excluded from measure calculations if:

1) The IRF stay is an incomplete stay: Patients with incomplete stays (*incomplete* = [1]) are identified based on the following criteria using the specified data elements:

- Discharge to acute care that results in the patient's absence from the IRF for longer than three calendar days: Discharge destination/Living setting (Item 44D = [02, 63, 65, 66]) OR
- Died while in IRF (Item 44C = [0]) OR
- Discharged against medical advice (Item 41 = [1]); OR
- Length of stay is less than three days; Item 40 (Discharge Date) - Item 12 (Admission Date) is less than three days.

2) The patient has any of the following medical conditions at the time of admission: Coma, persistent vegetative state, complete tetraplegia, severe brain damage, locked-in syndrome, or severe anoxic brain damage, cerebral edema or compression of brain, as identified by:

- Impairment Group 0004.1221 or 0004.1222 or 0004.2221 or 0004.2222 on Item 21A; or
- ICD-10-CM codes on Item 22 or Item 24:
 - Coma = B15.0, B16.0, B16.2, B17.11, B19.0, B19.11, B19.21, E03.5, E08.01, E08.11,

E08.641, E09.01, E09.11, E09.641, E10.11, E10.641, E11.11, E11.01, E11.641, E13.01, E13.11, E13.641, E15, K70.41, K71.11, K72.01, K72.11, K72.91, P91.5, R40.20, R40.2113, R40.2114, R40.2123, R40.2124, R40.2213, R40.2214, R40.2223, R40.2224, R40.2313, R40.2314, R40.2323, R40.2324, R40.2333, R40.2334, R40.2343, R40.2344, R40.2433, R40.2434, R40.2443, R40.2444

- Persistent vegetative state = R40.3
- Severe brain damage = S06.A1XA, S06.A1XD, S06.A1XS
- Complete tetraplegia = G82.51, G82.52, G82.53, S14.111AS, 14.111DS1, 4.112A, S14.112D, S14.113A, S14.113D, S14.114A, S14.114D, S14.115A, S14.115D, S14.116A, S14.116D, S14.117A, S14.117D, S14.118A, S14.118D, S14.119A, S14.119D
- Locked-in state G83.5
- Severe anoxic brain damage, edema or compression G93.1 G93.5 G93.6

3) The patient is younger than age 18: Truncate (Item 12 (Admission Date) – Item 6 (Birth Date)).

4) The patient is discharged to hospice or received hospice while a patient: Item 44D (Discharge destination/Living setting) = [50, 51].

1.15d Age Group

Adults (18-64 years), Older Adults (65 years and older)

1.16 Type of Score

Rate/proportion

1.17 Measure Score Interpretation

Better performance = Higher score

1.18 Calculation of Measure Score

Discharge Function measure is the proportion of IRF stays in which the observed discharge function score is equal to or greater than an expected discharge function score. A higher score indicates better performance in functional outcomes. For each IRF stay, observed discharge function score and expected discharge function score are determined. For each IRF, Discharge Function is the proportion of quality episodes where the observed discharge function score is greater than or equal to the expected discharge function score.

The Cross-Setting Discharge Function Score measure focuses on standardized functional assessment items listed below (the same set of items listed in in the numerator description in Section 1.14a) that are currently available across all PAC settings:

- GG0130A: Eating
- GG0130B: Oral Hygiene
- GG0130C: Toileting Hygiene
- GG0170A: Roll Left and Right
- GG0170C: Lying to Sitting on Side

- GG0170D: Sit to Stand
- GG0170E: Chair/Bed-to-Chair Transfer
- GG0170F: Toilet Transfer
- GG0170I: Walk 10 Feet
- GG0170J: Walk 50 Feet with 2 Turns
- GG0170R: Wheel 50 Feet with 2 Turns

Valid Responses for the Standardized Functional Assessment Items: The response categories of the standardized functional items/activities reflect the level of assistance required by the patient to perform these activities:

- Patient Functional Status Assessed:
 - 6: Independent
 - 5: Setup or clean-up assistance
 - 4: Supervision or touching assistance
 - 3: Partial/moderate assistance
 - 2: Substantial/maximal assistance
 - 1: Dependent
- Activity Not Attempted (ANA) Codes:
 - 7: Patient refused
 - 9: Not applicable
 - 10: Not attempted due to environmental limitations
 - 88: Not attempted due to medical condition or safety concerns
- Other NA Codes:
 - ^: Skip pattern
 - -: Not assessed/no information available

The process for calculating Discharge Function can be divided into two phases. In the first phase, standardized functional items/activities at admission and at discharge that have an Activity Not Attempted (ANA) code of 07, 09, 10, or 88, a dash (-), or a skip (^) recorded (hereafter referred to as NA) are estimated with statistical imputation methods. The estimation models include the predictors used in risk adjustment and covariates for scores on other standardized functional items/activities. Notably, the estimation process uses all GG items available in IRFs to estimate the NA scores for the subset of standardized functional items/activities used for the Discharge Function numerator. See the Attached file for more details on the estimation process. In the second phase, the calculation of Discharge Function continues. The steps below describe how to calculate the Discharge Function score.

Step1: For each IRF stay, calculate the observed discharge function score by summing the individual standardized functional items/activities. If the standardized functional items/activities has a score of 1 – 6, then use the score for that item. If the standardized functional item/activity has an NA value recorded, then use the imputed score.

A patient is determined to be a wheelchair user if (i) Walk 10 Feet (GG0170I) has an ANA code at both admission and discharge and (ii) either Wheel 50 Feet with 2 Turns (GG0170R) has a code between 01 and 06 at either admission or discharge.

For the patients who are wheelchair users, the observed discharge function score is calculated as

$\text{sum}(\text{GG0130A}, \text{GG0130B}, \text{GG0130C}, \text{GG0170A}, \text{GG0170C}, \text{GG0170D}, \text{GG0170E}, \text{GG0170F}, (2 \times \text{GG0170R}))$). For all other patients, the observed discharge function score is calculated as $\text{sum}(\text{GG0130A}, \text{GG0130B}, \text{GG0130C}, \text{GG0170A}, \text{GG0170C}, \text{GG0170D}, \text{GG0170E}, \text{GG0170F}, \text{GG0170I}, \text{GG0170J})$.

Since there are 10 GG items included in the observed discharge function score, each patient's total observed discharge score will range from 10 – 60.

Step 2: Identify excluded IRF stays. Excluded IRF stays are those that are incomplete stays. Also excluded are IRF stays where the patient has a diagnosis indicating coma, persistent vegetative state, complete tetraplegia, severe brain damage, locked-in syndrome, or severe anoxic brain damage, cerebral edema or compression of brain. IRF stays for patients who are younger than 18 are excluded. Finally, IRF stays where the patient is discharged to hospice (home or institutional facility) are also excluded.

Step 3: For each IRF stay, calculate the expected discharge function score. The risk adjustment model is an ordinary least squares linear regression model, which estimates the relationship between discharge function score and a set of risk adjustors.

The risk adjustment model is run on all IRF stays to determine the model intercept () and risk adjustor coefficients (). Expected discharge function scores are calculated by applying the regression equation to each IRF stay at admission.

Note that any expected discharge function score greater than the maximum (i.e., 60) would be recoded to the maximum score.

Step 4: Calculate the difference in observed and expected discharge function scores. For each IRF stay which does not meet the exclusion criteria, compare each patient's observed discharge function score (Step 1) and expected discharge function score (Step 3) and classify the difference as one of the following:

Observed discharge function score is equal to or greater than the expected discharge function score.

Observed discharge function score is lower than the expected discharge function score.

This is listed under Activity Not Attempted Codes in IRF.

Step 5: Determine the denominator count. Determine the total number of IRF stays with a discharge date in the measure reporting period, which do not meet the exclusion criteria.

Step 6: Determine the numerator count. The numerator for this quality measure is the number of IRF stays in which the observed discharge function score (rounded to four decimal places) is the equal to or greater than the expected discharge function score (rounded to four decimal places).

Step 7: Calculate the IRF-level discharge function percent. Divide the IRF's numerator count (Step 6) by its denominator count (Step 5) to obtain the IRF-level discharge function percent, then multiply by 100 to obtain a percent value.

Step 8: Round the percent value to two decimal places. If the digit in the third decimal place is 5 or greater, add 1 to the second decimal place, otherwise leave the second decimal place unchanged. Drop all the digits following the second decimal place.

1.18a Attach measure score calculation diagram

[1.18_Calculation_Algorithm_508.pdf](#)

1.19 Measure Stratification Details

Not applicable

1.20 Types of Data Sources

Standardized Patient Assessments

1.25 Data Source Details

The Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) data are collected on all Medicare patients who receive services from IRFs. More information about the IRF-PAI is available at: <https://www.cms.gov/medicare/payment/prospective-payment-systems/inpati...>

1.26 Minimum Sample Size

At least 20 eligible IRF stays are required for the Discharge Function measure in the reporting period. In FY 2023, 98.7% (n=1,150) of all IRFs (n=1,165) met this threshold and accounted for almost 100% (n=496,510) of all eligible IRF stays among all providers.

2.1 Attach Logic Model

[2.1_Logic_model_graphic_508.pdf](#)

2.2 Evidence of Measure Importance

IRF care includes the provision of intensive rehabilitation therapy to patients who experienced functional limitations due to an illness or injury. Research examining functional outcomes has included analyses focused on physical functioning, which encompasses self-care and mobility. Physical function is a modifiable predictor of several outcomes including successful discharge to the community [1], functional recovery [2, 3], and re-hospitalization rates [4, 5]. Evidence suggests that IRF care can improve functional outcomes [6, 17] and that outcomes vary across IRFs, which provides an opportunity to monitor provider-level variation through the Discharge Function Score measure. Higher functional status at discharge is associated with better quality of life and fewer complications post-rehabilitation. Patients with greater independence are also more likely to be discharged to the community. IRF care has been shown to improve patient functional status. Several studies have reported that IRF care improved patients' physical functioning at discharge for patients with various diagnoses, including traumatic brain injury [7, 8], stroke [3, 6, 9, 20, 21], and lower extremity joint surgery [8, 9]. For example, a pilot observational cohort study for IRF patients with stroke assessed functional improvements during rehabilitation and found

that over 75% of the participants had meaningfully improved in their function abilities [21]. An additional retrospective analysis identified significant functional mobility improvement among IRF patients that survived severe COVID-19 [11].

Functional improvement at discharge can vary based on the facility, indicating an opportunity to measure facility-level differences in patient outcomes. For example, two retrospective cohort studies including over 1,000 IRFs found that variation in functional improvement among patients recovering from hip fracture [12] and stroke [13] was more strongly related to differences on facility-level factors than by region. Functional outcomes can depend on whether providers develop person-centered care plans that are unique to each patient's clinical needs. For example, a retrospective cohort study by Cogan et al. (2020) found that the rate of recovery and length of stay were significantly associated with functional improvement and emphasized the need to evaluate each patient's rate of functional gain and cater therapy intensity and time accordingly [16]. Differences in facility profit status may relate to changes in functional outcomes. A retrospective database review of 877 IRF facilities between 2016 and 2018 identified that patients at for-profit and not-for-profit facilities had significant differences in outcomes due to differences in patient selection, coding and/or billing, or other unreported factors [19].

Patient characteristics are important predictors of discharge functional status. Evidence suggests that patient case-mix is associated with functional improvement [14, 15, 18]. Evans et al. (2021) observed that patients with better motor and cognition scores at admission and lower comorbidity burden were more likely to improve mobility at discharge [7]. An observational study with nearly 500,000 IRF patients found that IRF patients made significant functional improvement in mobility and self-care between admission and discharge, but the degree of improvement was negatively associated with the number of comorbidities [2]. Kao et al. (2022) found that traumatic spinal cord injury patients with obesity had less functional improvement than underweight or average weight patients and that among traumatic spinal cord injury patients with obesity, those with longer stays at an IRF showed greater improvements in functional outcome than those with the shortest stays [22]. Researchers suggest that obesity is negatively associated with functional improvement while IRF length of stay may be positively associated with functional improvement [22].

Overall, the literature provides evidence that IRFs can affect functional outcomes at discharge. As such, variations in functional status of IRF patients at discharge could be measured and monitored through the Discharge Function Score measure. Because function outcomes vary based on patient characteristics, the Discharge Function Score measure adjusts for relevant risk factors [20].

Furthermore, the Discharge Function Score measure aligns well with value-based care models, which prioritize patient outcomes over service volume. Studies show that this measure serves as a reliable metric for value-based care initiatives, as it reflects functional improvement, a key indicator of quality care. This evidence supports health policies that promote independence and patient-centered outcomes as primary indicators of IRF care effectiveness.

Monitoring discharge function scores also has significant implications for healthcare cost reduction. Patients discharged with higher functional status are less likely to experience complications or require readmission, which reduces costs for both patients and the healthcare system overall. CMS data support that successful discharge outcomes correlate with lower post-discharge expenses, reducing long-term healthcare expenditures.

References

1. Minor M, Jaywant A, Toggia J, Campo M, O'Dell MW. Discharge Rehabilitation Measures Predict Activity Limitations in Patients with Stroke Six Months after Inpatient Rehabilitation. *Am J Phys Med Rehabil*. 2021 Oct 20. doi: 10.1097/PHM.0000000000001908. Epub ahead of print. PMID: 34686630.
2. Deutsch A, Palmer L, Vaughan M, Schwartz C, McMullen T. Inpatient Rehabilitation Facility Patients' Functional Abilities and Validity Evaluation of the Standardized Self-Care and Mobility Data Elements. *Arch Phys Med Rehabil*. 2022 Feb 11:S0003-9993(22)00205-2. doi: 10.1016/j.apmr.2022.01.147. Epub ahead of print. PMID: 35157893.
3. Hong I, Goodwin JS, Reistetter TA, Kuo YF, Mallinson T, Karmarkar A, Lin YL, Ottenbacher KJ. Comparison of Functional Status Improvements Among Patients With Stroke Receiving Postacute Care in Inpatient Rehabilitation vs Skilled Nursing Facilities. *JAMA Netw Open*. 2019 Dec 2;2(12):e1916646. doi: 10.1001/jamanetworkopen.2019.16646. PMID: 31800069; PMCID: PMC6902754.
4. Li CY, Haas A, Pritchard KT, Karmarkar A, Kuo YF, Hreha K, Ottenbacher KJ. Functional Status Across Post-Acute Settings is Associated With 30-Day and 90-Day Hospital Readmissions. *J Am Med Dir Assoc*. 2021 Dec;22(12):2447-2453.e5. doi: 10.1016/j.jamda.2021.07.039. Epub 2021 Aug 30. PMID: 34473961; PMCID: PMC8627458.
5. Middleton A, Graham JE, Lin YL, Goodwin JS, Bettger JP, Deutsch A, Ottenbacher KJ. Motor and Cognitive Functional Status Are Associated with 30-day Unplanned Rehospitalization Following Post-Acute Care in Medicare Fee-for-Service Beneficiaries. *J Gen Intern Med*. 2016 Dec;31(12):1427-1434. doi: 10.1007/s11606-016-3704-4. Epub 2016 Jul 20. PMID: 27439979; PMCID: PMC5130938.
6. Yu-Chien, C., Lin, H., Yu-Fu, C., Hong-Yaw, C., Yu-Tsz Shiu, & Hon-Yi, S. (2023). Minimal clinically important difference (MCID) in the functional status measures in patients with stroke: Inverse probability treatment weighting. *Journal of Clinical Medicine*, 12(18), 5828. doi:<https://doi.org/10.3390/jcm12185828>
7. Evans E, Krebill C, Gutman R, Resnik L, Zonfrillo MR, Lueckel SN, Zhang W, Kumar RG, Dams-O'Connor K, Thomas KS. Functional motor improvement during inpatient rehabilitation among older adults with traumatic brain injury. *PM R*. 2021 May 21:10.1002/pmrj.12644. doi: 10.1002/pmrj.12644. Epub ahead of print. PMID: 34018693; PMCID: PMC8606011.
8. Kowalski RG, Hammond FM, Weintraub AH, et al. Recovery of Consciousness and Functional Outcome in Moderate and Severe Traumatic Brain Injury. *JAMA Neurol*. 2021;78(5):548-557. doi:10.1001/jamaneurol.2021.0084
9. Li CY, Karmarkar A, Kuo YF, Haas A, Ottenbacher KJ. Impact of Self-Care and Mobility on One or More Post-Acute Care Transitions. *J Aging Health*. 2020;32(10):1325-1334. doi:10.1177/0898264320925259
10. Cogan AM, Weaver JA, McHarg M, Leland NE, Davidson L, Mallinson T. Association of Length of Stay, Recovery Rate, and Therapy Time per Day With Functional Outcomes After Hip Fracture Surgery. *JAMA Netw Open*. 2020 Jan 3;3(1):e1919672. doi: 10.1001/jamanetworkopen.2019.19672. PMID: 31977059; PMCID: PMC6991278.
11. Olezene CS, Hansen E, Steere HK, et al. Functional outcomes in the inpatient rehabilitation setting following severe COVID-19 infection. *PLoS One*. 2021;16(3):e0248824. Published

- 2021 Mar 31. doi:10.1371/journal.pone.0248824
12. Teppala, S., Ottenbacher, K. J., Eschbach, K., Kumar, A., Al Snih, S., Chan, W. J., & Reistetter, T. A. (2017). Variation in Functional Status After Hip Fracture: Facility and Regional Influence on Mobility and Self-Care. *The journals of gerontology. Series A, Biological sciences and medical sciences*, 72(10), 1376–1382. <https://doi.org/10.1093/gerona/glw249>
13. Reistetter TA, Kuo YF, Karmarkar AM, et al. Geographic and facility variation in inpatient stroke rehabilitation: multilevel analysis of functional status. *Arch Phys Med Rehabil*. 2015;96(7):1248-1254. doi:10.1016/j.apmr.2015.02.020
14. Cary MP Jr, Pan W, Sloane R, Bettger JP, Hoenig H, Merwin EI, Anderson RA. Self-Care and Mobility Following Postacute Rehabilitation for Older Adults With Hip Fracture: A Multilevel Analysis. *Arch Phys Med Rehabil*. 2016 May;97(5):760-71. doi: 10.1016/j.apmr.2016.01.012. Epub 2016 Feb 1. PMID: 26836951; PMCID: PMC5823692.
15. Oyesanya TO, Moran TP, Espinoza TR, Wright DW. Regional Variations in Rehabilitation Outcomes of Adult Patients With Traumatic Brain Injury: A Uniform Data System for Medical Rehabilitation Investigation. *Arch Phys Med Rehabil*. 2021 Jan;102(1):68-75. doi: 10.1016/j.apmr.2020.07.011. Epub 2020 Aug 27. PMID: 32861669.
16. Cogan AM, Weaver JA, McHarg M, Leland NE, Davidson L, Mallinson T. Association of Length of Stay, Recovery Rate, and Therapy Time per Day With Functional Outcomes After Hip Fracture Surgery. *JAMA Netw Open*. 2020 Jan 3;3(1):e1919672. doi: 10.1001/jamanetworkopen.2019.19672. PMID: 31977059; PMCID: PMC6991278.
17. Osundolire, S., Mbrah, A., Liu, S., & Lapane, K. L. (2024/01//). Association between patient and facility characteristics and rehabilitation outcomes after joint replacement surgery in different rehabilitation settings for older adults: A systematic review. *Journal of Geriatric Physical Therapy* (2001), 47(1), E1-E18. doi:<https://doi.org/10.1519/JPT.0000000000000369>.
18. Amanda A. Herrmann, Bo B. Podgorski, Sarah J. Hatton, Ella A. Chrenka, Leah R. Hanson, Steven D. Jackson, Identifying Racial and Ethnic Disparities in Acute Inpatient Rehabilitation, *Archives of Physical Medicine and Rehabilitation*, 2024, ISSN 0003-9993, <https://doi.org/10.1016/j.apmr.2024.02.727>.
19. Adam G. Lamm, Richard Goldstein, Chloe S. Slocum, Julie K. Silver, David C. Grabowski, Jeffrey C. Schneider, Ross D. Zafonte, For-Profit and Not-for-Profit Inpatient Rehabilitation in Traumatic Brain Injury: Analysis of Demographics and Outcomes, *Archives of Physical Medicine and Rehabilitation*, Volume 103, Issue 5, 2022, Pages 851-857, ISSN 0003-9993, <https://doi.org/10.1016/j.apmr.2021.11.003>.
20. Janet Herbold, Theodore O'Brien, Karrah Peters, Andrea Sanichar, Suzanne Babyar, Responsiveness of Section GG Scores in Tracking Post-Stroke Functional Recovery From Inpatient Rehabilitation Admission to 90-Day Follow-Up, *Archives of Physical Medicine and Rehabilitation*, Volume 104, Issue 12, 2023, Pages 2002-2010, ISSN 0003-9993, <https://doi.org/10.1016/j.apmr.2023.07.013>.
21. Erin Y. Harmon, Jerome Niyirora, Amy E. Teale, Matthew B. Sonagere, Mark A. Linsenmeyer, Lynne Nicolson, Assessing Clinically Important Differences During Rehabilitation for Stroke: A Pilot Study Evaluating Anchor and Distribution Derived Estimates of Physical Function Change in Classically Summed and Rasch Models of Section GG of the Inpatient Rehabilitation Facility Patient Assessment Instrument, *Archives of Physical Medicine and Rehabilitation*, 2024, ISSN 0003-9993, <https://doi.org/10.1016/j.apmr.2024.02.721>.
22. Yu-Hsiang Kao, Yuying Chen, Anne Deutsch, Huacong Wen, Tung-Sung Tseng,

Rehabilitation Length of Stay, Body Mass Index, and Functional Improvement Among Adults With Traumatic Spinal Cord Injury, Archives of Physical Medicine and Rehabilitation, Volume 103, Issue 4, 2022, Pages 657-664, ISSN 0003-9993, <https://doi.org/10.1016/j.apmr.2021.09.017>.

2.3 Anticipated Impact

Physical function is a modifiable factor associated with several outcomes, including successful discharge to the community, and re-hospitalization rates [1, 2, 3]. Thus, the Discharge Function Measure can improve patient outcomes in post-acute care by promoting functional independence, reducing adverse events, and lowering healthcare costs.

The cross-setting Discharge Function Score measure determines how successful each IRF is at achieving or exceeding an expected level of functional ability for its patients at discharge. An expectation for discharge function score is built for each IRF stay by accounting for patient characteristics that impact their functional status. The final cross-setting Discharge Function for a given IRF is the proportion of that IRF's stays where a patient's observed discharge function score meets or exceeds their expected discharge function score. IRFs with low scores indicate that they are not achieving the functional gains at discharge that are expected based upon patient characteristics and patient status at admission for a larger share of their patients. The measure provides information to IRFs that has the potential to hold providers accountable for functional outcomes and encourages them to improve the quality of care they deliver. This measure also promotes patient wellness, encourages adequate nursing and therapy services to help prevent adverse outcomes (e.g., potentially preventable hospitalization) and increases the transparency of quality of care in the IRF setting.

Discharge Function adds value to the IRF QRP function measure portfolio by using specifications that allow for better comparisons across post-acute care settings, considering both self-care and mobility activities in the function score, and refining the approach to addressing items coded with activity not attempted codes

One concern about unintended consequences with the Cross-Setting Discharge Function Score is that the measure may lead IRFs to selectively admit patients, either by encouraging or avoiding admission of certain types of patients and patients with certain characteristics. To address this, providers' performance is evaluated among their peers after adjusting for difference in patient case-mix across IRFs. The risk adjustment methodology applied to this measure will help reduce providers' incentive to selectively admit patients. Therefore, providers' performance on this measure will be adjusted for the characteristics of their patient population and "level the playing field" across providers. The detailed risk-adjustment strategy will be publicly available, allowing providers to understand that those who provide care for more "high risk" patients are not at a disadvantage given their patient case-mix.

Another potential concern about the cross-setting Discharge Function Score measure could be that it focuses on a subset of the available GG items. If the items are not included in this publicly reported measure, it could reduce the incentive to complete those items and could result in higher levels of ANAs. However, the GG items excluded from the Cross-Setting Discharge Function Score measure are used in other IRF Quality Reporting Program measures and Section GG items are

used in the IRF Prospective payment system. Together, these circumstances should provide an incentive for continued reporting of these GG items

Another possibility related to increased ANA rates is that providers could strategically code ANAs in an attempt to game the estimated values from the statistical imputation models. For instance, IRFs could record ANA codes for patients who did not improve by discharge if the discharge estimation models would predict higher scores based on that patient's characteristics. However, this type of gaming, where providers are determining in real-time which patients would perform better with statistical estimation than a true discharge score, would require sophisticated understanding and application of the estimation methodology. The Cross-Setting Discharge Function Score measure will be monitored to identify unintended consequences, including patient selection patterns or changes in ANA coding, which could lead to future re-specification of the measure as needed.

References:

1. Gustavson, A. M., Malone, D. J., Boxer, R. S., Forster, J. E., & Stevens-Lapsley, J. E. (2020). Application of High-Intensity Functional Resistance Training in a Skilled Nursing Facility: An Implementation Study. *Physical therapy*, 100(10), 1746-1758. <https://doi.org/10.1093/ptj/pzaa126>.
2. Sarguni Singh, Elizabeth Molina, Elisabeth Meyer, Sung-Joon Min, Stacy Fischer, Post-Acute Care Outcomes and Functional Status Changes of Adults with New Cancer Discharged to Skilled Nursing Facilities, *Journal of the American Medical Directors Association*, Volume 23, Issue 11, 2022, Pages 1854-1860, ISSN 1525-8610, <https://doi.org/10.1016/j.jamda.2022.02.010>.
3. Brian Downer, Ioannis Malagaris, Chih-Ying Li, Mi Jung Lee, Rachel Deer, The Influence of Prior Functional Status on Self-Care Improvement During a Skilled Nursing Facility Stay, *Journal of the American Medical Directors Association*, Volume 23, Issue 11, 2022, Pages 1861-1867, ISSN 1525-8610, <https://doi.org/10.1016/j.jamda.2022.03.003>

2.4 Performance Gap

There is evidence of a performance gap and variability in performance for this quality measure. In FY 2023, we examined variability in provider measure results for provider with at least twenty stays after applying denominator exclusion criteria. This testing included 496,510 stays treated in 1,150 IRFs. The mean measure results among these IRFs was 55.1% (median: 56.4%, IQR: 42.4% to 69.4%). Final scores ranged from a minimum of 0% to a maximum score of 94.8%. This wide variation indicates there is a performance gap in Discharge Function Scores across IRFs.

Table 1. Performance Scores by Decile

	Performance Gap												
	Overall	Minimum	Decile_1	Decile_2	Decile_3	Decile_4	Decile_5	Decile_6	Decile_7	Decile_8	Decile_9	Decile_10	Maximum
Mean Performance Score	55.1	0	21.1	35.1	42.2	48.2	53.9	59.6	64.7	69.4	74.6	82.6	94.8
N of Entities	1,150	1	115	115	115	116	114	115	115	115	115	115	1

	Overall	Minimum	Decile_1	Decile_2	Decile_3	Decile_4	Decile_5	Decile_6	Decile_7	Decile_8	Decile_9	Decile_10	Maximum
N of Persons													
/ Encounters	496,510	55	26,264	39,811	46,022	47,432	44,996	47,404	54,476	70,440	71,513	48,152	240
/ Episodes													

2.5 Health Care Quality Landscape

The Improving Medicare Post Acute Care Transformation (IMPACT) Act of 2014 requires the collection of standardized data across post-acute care providers and required the Centers for Medicare & Medicaid Services to develop and implement quality measures, including quality measures addressing self-care and mobility function.

The Cross Setting DC Function measure was developed based on input obtained during two Technical Expert Panel (TEP) meetings (July 2021 and January 2022). During these meetings, panelists expressed that:

1. The IRF QRP would benefit from having a cross-setting functional outcome measure to use instead function process measure (Application of Percent of Long-Term Care Hospital (LTCH) Patients With an Admission and Discharge Functional Assessment and a Care Plan That Addresses Function that was recently removed from the IRF QRP. The Cross-Setting Discharge Function measure has higher variation in provider performance and offers more informative comparisons between IRF for patients, caregivers, and stakeholders.
2. The Cross-Setting Discharge Function Score measure benefits from being specified to align across PAC settings (IRF, LTCH, SNF, HHA). Due to limited GG item availability in LTCH, only a subset of items can be used to produce measure scores that could be computed identically in each PAC setting. We calculated measure scores with all GG items available in IRF v. the subset available in LTCH. Panelists reviewed comparisons between provider scores and model fit and found that the narrower set of GG items provides similar capture of functional status. [1]
3. The Activity Not Attempted (ANA) codes are used frequently on assessments for certain GG items, and statistical imputation should be used as the method to estimate resulting missing item scores.

[1] <https://www.cms.gov/sites/default/files/2022-04/PAC-Function-TEP-Summar...>

2.6 Meaningfulness to Target Population

Functional status, including ability to perform daily activities, is important from patient and caregiver perspectives, with functional goal-setting being an important focus of patient- and family- centered care. For the majority of patients in post-acute care, promoting functional independence and setting functional goals to facilitate return to community living is a primary goal of care. For patients receiving home health services, functional assessment and goal-setting are also a primary focus to attain independent functioning in the home and community, return to or surpass prior level of functioning, maintain current level of functioning, or slow the process of functional decline. In LTCH settings, where patients are medically complex and sometimes referred to as chronically critically ill, promoting physical function is particularly important to

mitigate functional deterioration, morbidity, and medical complications from prolonged bedrest and hospitalization. From a caregiver perspective, focus on functional status and functional goal-setting is important to reduce caregiver burden, and minimize need for assistance at home.

CMS convened a Patient and Family Engagement Listening Session to discuss this measure with patients and their caregivers. The Patient and Family Engagement Listening Session demonstrated that the measure concept resonates with patients and caregivers. Participants' views of self-care and mobility were aligned with the functional domains captured by the measure, and they found them to be critical aspects of care. Participants emphasized the importance of measuring functional outcomes and were specifically interested in metrics that show how many patients discharged from particular facilities made improvements in self-care and mobility.

The Discharge Function Measure directly reflects the priorities of post-acute care patients, who value functional independence, quality of life, and avoiding rehospitalization or institutionalization.

Below are key points supported by peer-reviewed literature:

1. Patients Value Functional Independence:

Studies show that post-acute care patients prioritize functional recovery (e.g., mobility, self-care) as the most important outcome following discharge. Functional independence enables patients to return home and manage daily life without relying on long-term institutional care or home health services.

Source: Graham, J. E., et al. (2016). "Patients' perspectives on discharge from post-acute care settings: Priorities for functional recovery." Archives of Physical Medicine and Rehabilitation.

2. Improved Quality of Life:

Health-related quality of life encompasses patients' physical health perceptions and functional status. Patients who regain independence in activities of daily living report higher satisfaction with their health and overall life post-discharge. They value avoiding dependency on caregivers, especially for basic tasks like toileting and dressing.

Source: Greenfield, S., and Nelson, E. (2020). "The influence of functional independence on quality of life in post-acute care patients." Quality of Life Research.

Additionally, researchers exploring patient and consumer perspectives on function have reported that functional status and functional outcomes are important from the patient and consumer perspective (Stineman 2009, Kramer 1997, Kurz 2008). These studies show that patients place a value on their functional outcomes and rehabilitation goals mostly through research that examines how patients can categorize their functional goals in hierarchies of what they perceive as the most important to least important functional outcomes for the purpose of their own quality of life. Stineman's research shows patients and consumers value their functional outcomes although inpatient rehabilitation patients may have different perspectives on what is important for them to gain from their rehabilitation compared to community dwelling consumers. One study, specifically focused on patients undergoing rehabilitation in IRFs (n=79) found that eating was the most

valued functional activity for them, followed by bathing, toileting, and bowel/bladder function (Stineman 2009).

Sources:

Kramer AM. (1997) Rehabilitation care and outcomes from the patient's perspective. Medical care. 35(6):JS48-57.

Kurz AE, Saint-Louis N, Burke JP, Stineman MG. (2008) Exploring the personal reality of disability and recovery: A tool for empowering the rehabilitation process. Qualitative Health Research. 18(1):90-105.

Stineman MG, Rist PM, Kurichi JE, Maislin G. (2009) Disability meanings according to patients and clinicians: imagined recovery choice pathways. Quality of Life Research. 18:389-98.

3. Reduction in Hospital Readmissions:

Patients view avoiding rehospitalization as crucial to their recovery. Research demonstrates that patients who regain functional independence are less likely to be readmitted, an outcome patients find meaningful as it reduces the emotional and physical stress of hospitalization.

Source: Ouslander, J.G., and Berenson, R.A. (2011). "Reducing Unnecessary Hospitalizations of Nursing Home Residents." The New England Journal of Medicine .

4. Desire to Return Home:

A primary goal for many PAC patients is to return home after their rehabilitation. Being discharged with higher functional ability is highly valued because it enables patients to live in their communities, reducing the need for institutional care or home health services.

Source: Harrison, S., et al. (2017). "Patient priorities in post-acute care: Returning home with functional independence." Journal of Aging & Health .

5. Patients Want to Avoid Institutional Long-Term Care:

Patients fear the loss of autonomy associated with long-term care facilities and express a strong preference for achieving the functional status that allows them to avoid this outcome. Functional independence is a top priority for maintaining control over their living situation.

Source: Kane, R.A. (2001). "Long-Term Care and Patient Preferences: Achieving Independence and Control." The Gerontologist .

In summary, input from a variety of stakeholders has been taken into consideration throughout the measure development process. Feedback was sought and considered from patients and caregivers on the salience of the measure concept and from Technical Expert Panels (TEPs) on the appropriate specifications for the cross-setting measure.

3.1 Contributions Towards Closing Care Gaps

The measure provides a means for assessing the impact of provider performance on patients who experience social risk factors (SRF) to a greater degree than those who have fewer SRFs. For example, dual-eligible patients tend to experience worse socioeconomic circumstances than other patients. These circumstances can negatively impact health outcomes. Some of the disparity in outcomes between dual and non-dual patients can be explained through differences in prevalence of clinical conditions addressed through risk adjustment. However, even after risk adjustment, dual patients fare worse, on average, than non-duals for all settings. One contributing factor could be that there are socioeconomic drivers of health disparities in dual patients beyond what is captured through risk adjustment. This raises the concern that providers who serve these populations are unduly penalized in quality measurement when dual-eligibility is not included in the risk adjustment model.

We tested three SRFs of interest:

1. Medicare vs. dually enrolled (patient is dually enrolled at any time during the quality episode)
2. Race/ethnicity
3. ADI

We used several approaches to test differences in performance scores across multiple SRFs and to consider some SRFs for inclusion in the risk adjustment model. First, we constructed alternative risk adjustment models that included additional covariates for payer, race/ethnicity, and ADI, and examined the impact on provider performance.

We find that across most of the alternative risk adjustment models considered, the SRF covariates are significant but small, and have little to no impact on model fit. The details of the alternative risk adjustment models are shown in the attachment for Section 4.4.4a.

Second, we stratified the performance scores by SRFs. Using the current model, we calculated provider scores for patients with and without SRFs and grouped SNFs into quintiles based on their proportion of Black/non-White, dual, and dual and high ADI patients. We then examined whether performance declines with the proportion of patients with SRFs, and whether this impacts patients both with and without SRFs.

Across SNFs, we compared Discharge Function FY 2023 performance by subgroups of agencies based on the percentage of patients who are Black, Non-White, Medicaid or Dual-eligible, and Dual-eligible or living in a neighborhood with ADI ≥ 85 . To be more specific, we defined subgroups of agencies based on quintiles of the percentage of patients within the agency who have the SRF. For race and ethnicity characteristics, we used the IRF-PAI item to identify patient's race/ethnicity as Black or Non-White.

As shown in **Table 5-1A in the supplemental files**, we observed lower patient-level performance on this measure for patients with some SRFs.

In addition, in **Table 5.1-B in the Supplemental Files** we see that providers that treat a larger proportion of patients with these identified SRFs also had differences in their outcomes. We compared Discharge Function performance based on the percentage of IRFs patients who are Black, Non-White, Medicaid or Dual-eligible, and Dual-eligible or living in a neighborhood with $ADI \geq 85$. IRFs that serve 16-86.8% of patients with a Black race have an average 54.5% performance score compared to a 61.7% performance score for IRFs that serve few patients with a Black race. However, patients with dual status had a lower mean score (56.5%) compared to Medicare only patients (59.3%).

Risk adjusting for these characteristics may mask systematic disparities in care that should be examined and ultimately providers for which should be held accountable.

4.1 Feasibility Assessment

A feasibility assessment was not necessary. The data elements used for measure construction are part of the standard data collection processes for IRF providers and are already used in existing IRF QRP measures.

4.3 Feasibility Informed Final Measure

The feasibility assessment was not necessary (see explanation in 3.1 above) therefore no changes were made to the measure specification.

4.4 Proprietary Information

Not a proprietary measure and no proprietary components

5.1.1 Data Used for Testing

The data used report results in this form are derived from several sources. The primary source of data for the measure is Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) data from Fiscal Year (FY) 2023. An IRF PAI record represents an IRF stays. AN IRF stay may include interrupted stays lasting 3 calendar days or less. The target period for the measure is 12 months (4 quarters). If a patient has multiple eligible SNF stays with a discharge date within the target period, then each eligible stay is included in the measure.

For analyses related to health equity, we also used Medicare administrative data to determine dual eligibility status for Medicare and Medicaid and Area Deprivation Index (ADI) data, derived from American Community Survey data. The ADI is presented as an index ranging from zero to 100, designed to represent neighborhood socioeconomic disadvantage, with 100 representing the most disadvantaged neighborhoods nationwide.

5.1.2 Differences in Data

The sample remained the same for all aspects of testing. For testing of differences in performance scores across socio-contextual variables, including race, ethnicity and socio-economics status (see

Section 5. Equity), we used additional data sources to incorporate ADI, derived from census data, and dual eligibility for Medicare and Medicaid from CMS administrative data.

5.1.3 Characteristics of Measured Entities

All testing used IRF stays completed in FY 2023. A total of 1,165 IRFs submitted IRF-PAI data for complete stays in the 12-month testing period. We identified providers that met the reportability threshold of at least twenty stays after applying denominator exclusion criteria. After applying denominator exclusion criteria and the reportability threshold of 20 stays, this testing ultimately included 496,510 stays spread across 1,150 IRFs. The included IRFs were geographically diverse, with no one region containing more than 25% of the IRFs. The IRFs were divided about equally between not-for-profit (43%) and For-profit entities (43%) and located in urban areas (88%). Facility size is presented based on the number of patient stays. A quarter (25%) of the IRFs were large with 581-3780 stays in FY 2023, and 51% of the included IRFs were medium sized with 163-580 stays in FY 2023. Only 24% were small IRFs with 20-162 stays in the FY 2023. Note that providers with less than 20 stays during the 12-month testing period are excluded from facility-level analyses presented below.

The provider-level characteristics give insight into the distribution of stays and providers across categories such as stay count, profit status, rurality, region, and provider type for publicly reportable providers. Here's a summary:

Overall Distribution: The below data captures publicly reportable providers, covering 496,510 stays across 1,150 providers

Stay Count: Providers are categorized by the number of stays, indicating their size. Most providers fall into the medium size category, though large providers account for the majority of stays, reflecting a higher volume of care provided by a smaller subset of providers.

- Large (581–3,780 stays): 58% of stays, 25% of providers.
- Medium (163–580 stays): 36% of stays, 51% of providers.
- Small (20–162 stays): 6% of stays, 24% of providers.

Profit Status: For-profit and not-for-profit providers are evenly split in terms of provider count, but for-profit providers handle a higher percentage of stays, indicating a potentially larger scale of operations. Providers' profit status distribution is as follows:

- For-Profit: 59% of stays, 43% of providers.
- Not-For-Profit: 32% of stays, 43% of providers.
- Government: 5% of stays, 5% of providers.
- Unknown: 4% of stays, 6% of providers.

Rurality: The vast majority of care is provided in urban settings, with rural providers making up a small fraction of both stays and provider counts, which may highlight challenges in rural healthcare access and coverage.

- Urban: 95% of stays, 88% of providers.
- Rural: 5% of stays, 12% of providers.

Region: The highest concentration of stays and providers is in the South - West South Central and South Atlantic regions, possibly reflecting higher demand or provider capacity in these areas. In contrast, the West regions (Mountain and Pacific) have fewer providers and stays, which may indicate regional disparities in provider availability. Providers and stays are distributed across U.S. regions as follows:

- South - West South Central: 22% of stays, 19% of providers.
- Midwest - East North Central: 13% of stays, 16% of providers.
- South - South Atlantic: 22% of stays, 17% of providers.
- Other regions with lower representation include West - Pacific (8% of stays, 6% of providers) and West - Mountain (7% of stays, 6% of providers).

5.1.4 Characteristics of Units of the Eligible Population

All testing used IRF stays completed in FY 2023. IRFs submitted a total of 571,948 completed stays that ended in FY 2023. After applying denominator exclusion criteria and applying the reportability threshold of 20 stays, we ultimately included 496,510 stays in the measure population and testing. For included IRF stays, 90.4% were for patients who were over the age of 65 and the majority were female (52.5%) and white (79.6%). The Area Deprivation Index (Neighborhood Atlas - Home (wisc.edu)) included 14% of included stays with an ADI of more than 85. The primary medical condition of included stays was varied – 21% had a stroke, 14.4% had fractures and other traumas, and the rest were scattered among a range of diagnoses.

The **stay-level characteristics** provides a large sample of stays, ensuring a comprehensive overview of patient characteristics across multiple demographics and conditions.

Overall:

- Total eligible stays: 496,510 (100%)

Race: The majority of stays involve White patients (80%), with limited representation from other racial and ethnic groups, indicating potential disparities in access or reporting among diverse populations.

- White: 80% (399,624)
- Black: 10% (48,969)
- Hispanic/Latinx: 6% (28,622)
- Asian: 2% (8,746)
- American Indian/Alaska Native: <1% (1,994)
- Native Hawaiian/Pacific Islander: <1% (526)
- Multiple Race/Ethnicity: <1% (712)
- No Information Available: 1% (7,317)

Sex: There is a fairly even split between male and female patients, with a slightly higher proportion of stays among females (53%).

- Male: 47% (232,290)
- Female: 53% (264,220)

Age: The majority of stays are among older adults, particularly those aged 65–84 years (71%), highlighting the predominance of elderly patients in need of post-acute care.

- <35 years: <1% (1,288)
- 35–44 years: 1% (3,849)
- 45–54 years: 2% (10,267)
- 55–64 years: 6% (31,769)
- 65–74 years: 34% (168,028)
- 75–84 years: 37% (185,575)
- 85–90 years: 14% (67,468)
- 90 years: 6% (28,266)

Payer: Most stays are covered by Medicare (83%), with a notable minority of patients being dual-eligible, indicating the significant role of public insurance in post-acute care financing.

- Medicare only: 83% (412,164)
- Dual (Medicare & Medicaid): 17% (84,274)
- Unknown: <1% (66)

Area Deprivation Index (ADI): Patients are distributed across various socioeconomic levels, with a significant portion (14%) from highly disadvantaged areas ($ADI \geq 85$), indicating the need for tailored support for socioeconomically vulnerable populations.

- $ADI \geq 85$: 14% (69,229)
- ADI 75–84: 10% (49,313)
- ADI 50–74: 27% (136,152)
- ADI 25–49: 27% (135,993)
- ADI 0–24: 18% (88,278)
- Unknown: 4% (17,545)

Health-Related Social Needs/SDOH Items: A significant portion of patients (26%) require health literacy support, emphasizing the need for accessible and understandable health information in patient care.

- Interpreter need: 3% (12,435)
- Transportation need: 3% (14,439)
- Health literacy need: 26% (131,044)
- Social isolation: 9% (46,468)

Primary Diagnosis Group: Stroke and cardiorespiratory conditions make up a substantial portion of stays (40%), indicating a focus on complex rehabilitation needs in IRFs for these conditions.

- Hip/Knee Replacement: 4% (17,997)
- Stroke: 21% (104,879)
- Non-Traumatic Brain Dysfunction: 7% (36,080)
- Traumatic Brain Dysfunction: 4% (21,545)
- Non-Traumatic Spinal Cord Dysfunction: 4% (21,100)

- Traumatic Spinal Cord Dysfunction: 1% (4,169)
- Progressive Neurological Conditions: 2% (10,537)
- Other Neurological Conditions: 11% (56,995)
- Fractures and Other Multiple Trauma: 14% (69,276)
- Amputation: 3% (12,701)
- Other Orthopedic Conditions: 8% (39,128)
- Debility, Cardiorespiratory Conditions: 19% (95,311)
- Medically Complex Conditions: 1% (6,792)

5.2.1 Level(s) of Reliability Testing Conducted

Person or encounter level (i.e., data element) (e.g., inter-abstractor reliability), Accountable entity level (i.e., measure score) (e.g., signal-to-noise analysis)

5.2.2 Method(s) of Reliability Testing

We report testing results throughout this document at two levels: 1) data elements (i.e., items) and the function scale (i.e., summed value derived from item codes) and 2) the computed quality measure result.

To assist the reader in understanding the testing analysis and results, we begin by providing a brief overview of these components of the performance measure:

1. Data Elements:

- a. Clinicians code 11 motor function data elements included in Section GG of each PAC assessment instrument. One is a wheelchair data elements used for patients who do not walk as part of the recoding approach. Depending on the context, we sometimes refer to these data elements as “items” or “activities.”
- b. The motor function data elements are collected at the time of admission and discharge using a 6-level rating scale (01 to 06), or activity not attempted codes if, for example, the activity was not attempted due to medical or safety concerns.
- c. Higher scores indicate higher ability (i.e., more independence)
- d. For the performance measure calculation, data element activity not attempted codes and missing data are recoded using statistical imputation to estimate the item score.
- e. A discharge function scale score is created by summing the data element scores, after re-coding. The range of the discharge function score is 10 to 60 units.
- f. For the Discharge Function Score, a score of 10 indicates the patient is dependent on a helper to perform all activities (i.e., data elements) and a score of 60 means the patient is independent on all activities.

2. Calculated Performance Measure Score: The Percentage of IRF Patient stays that Meet or Exceed an Expected Discharge Function Score

- a. The calculated performance measure score is the percentage of IRF patient stays that meet or exceed an expected discharge function score within an IRF. The risk-adjustment procedure used to calculate the expected score is described in Section 4.4.
- b. This performance measure estimates the percentage of IRF patient stays that meet or exceed an expected discharge function score.

Reliability testing of the items was conducted when the items were initially developed and a summary of the inter-rater and the video reliability studies are described in the attachment focused on reliability.

Internal Consistency of the Items (unit of analysis is patient assessments): We examined the internal consistency of the function scale/instrument scores for each patient stay. Internal consistency provides a general assessment of how well the function data elements interrelate within the mobility scale/instrument. This internal consistency analysis is an indicator of the reliability of the function scale/instrument.

Internal consistency was assessed using the Cronbach's alpha coefficient, which is the average correlation of all possible half-scale divisions. Cronbach's alpha is a statistic frequently calculated when testing instrument or scale psychometrics. The Cronbach's alpha reliability estimate ranges from zero to one, with an estimate of zero indicating that there is no consistency of measurement among the items, and one indicating perfect consistency. Many cutoff criteria exist to determine whether or not a scale shows good consistency or whether the items "hang together" well. General consensus is that Cronbach's alpha should be at least 0.70 for an adequate scale for group-level decisions, and alphas closer to 1 indicate a good scale

Aron A, Aron EN Statistics for Psychology. 2nd ed. Upper Saddle River, NJ: Prentice Hall, 1999

Computed Performance Measure Score Reliability - Split-half Reliability (unit of analysis of providers):

Split-half reliability was used to examine the reliability of the computed performance measure scores. We used measure scores only for IRFs that met the reportability threshold of 20 stays after denominator exclusions are applied. We conducted split-half reliability by randomly splitting each provider's patient stays into two groups and calculating correlations between the computed performance measure scores of the randomly divided groups. When a provider's data, after being randomly divided into two groups, show similar scores to one another, the performance measure score is more likely to reflect systematic differences in IRF providers quality rather than random variation. The Intraclass Correlation Coefficient (ICC) were used to measure internal reliability. We calculated Shrout-Fleiss intraclass correlation coefficients $ICC_{(2,1)}^*$ between the split-half scores to measure reliability. Because each half of each facility's split-half pair has – by definition – half as many beneficiaries, the measurement of each half-facility is less statistically reliable than a measurement of a full facility would be. Therefore, after calculating ICC estimates, we then applied the Spearman-Brown formula to correct for the attenuation bias that stems from splitting samples. Intraclass correlations were also calculated by facility volume (quartile of stay count, with quartiles 2 and 3 grouped into the "Medium" category) to examine whether there were

differences in performance measure reliability by IRF size. Guidelines for interpretation vary, but largely agree a value of 0.75 indicates acceptable or good reliability and values exceeding 0.9 indicate excellent reliability (Adams, 2009; Cicchetti, 2001; Koo & Li, 2016; Portney & Watkins, 2009)

Adams JL. (2009). The Reliability of Provider Profiling: A Tutorial. Santa Monica, CA: RAND Corporation. https://www.rand.org/pubs/technical_reports/TR653.html

Cicchetti, D. V. (2001). The precision of reliability and validity estimates re-visited: Distinguishing between clinical and statistical significance of sample size requirements. *Journal of Clinical and Experimental Neuropsychology*, 23(5), 695-700.

Koo, T. K., & Li, M. Y. (2016). A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. *Journal of chiropractic medicine*, 15(2), 155-163. <https://doi.org/10.1016/j.jcm.2016.02.012>

Portney, L. G., & Watkins, M. P. (2009). *Foundations of clinical research: applications to practice* (Vol. 892, pp. 11-15). Upper Saddle River, NJ: Pearson/Prentice Hall.

Shrout, Patrick E. and Fleiss, Joseph L. Intraclass correlations: uses in assessing rater reliability. *Psychological Bulletin*, 1979, 86, 420-3428.).

Signal to Noise (unit of analysis of providers): If a measure is reliable, then true differences in providers should explain a substantial proportion of the variance in quality measure scores. The computed performance measure scores are the risk-adjusted discharge function scores. We used measure scores only for IRFs that met the reportability threshold of 20 stays after denominator exclusions are applied. Reliability was assessed by following the RAND methodology*. The RAND methodology (Adams, 2009) estimates a reliability statistic for each measured entity; that statistic evaluates the within-provider variance in the context of the overall between-providers variance of the measure. The method assumes a beta-binomial model for patient outcomes. The beta-binomial assumption implies that providers vary with regard to the probability of observed outcomes (in this case, the probability that a given beneficiary will have a discharge function score greater than or equal to the expected discharge score): higher-quality providers produce higher probabilities of positive outcomes relative to lower-quality providers. Those probabilities are assumed to be sampled from a beta distribution. Within each provider, the provider-specific probabilities result in binary outcomes that are binomially-distributed, and the observed proportions of outcomes represent quality measure scores. Adams (2009) notes that values of that are between 0.7 and 0.8 indicate acceptable reliability. We used the Betabin SAS macro described in the paper to estimate Signal-to-Noise Reliability (CBB) in by using CBB method for the provider-to-provider variance. As a robustness check, we also estimated Signal-to-Noise Reliability (VAR) using the sample variance to estimate the provider-to-provider variance (not presented in the table in 4.2.3 but discussed in 4.2.4)

Adams JL. (2009). The Reliability of Provider Profiling: A Tutorial. Santa Monica, CA: RAND Corporation. https://www.rand.org/pubs/technical_reports/TR653.html

5.2.3 Reliability Testing Results

Summary of critical data element reliability testing:

As reported in the attached document 4.2.3, inter-rater and the video reliability study found good to very good reliability testing.

Scale Analysis- Internal Consistency (unit of analysis is patient assessments):

The attached table 4.3.3A-1 includes Cronbach Alpha results for the discharge assessment for non-wheelchair and wheelchair users using the estimated values.

Computed Quality Measure Score Reliability

Split-half Reliability (unit of analysis of providers): The attached table 4.2.3A-2 includes the split-half reliability (unit of analysis of providers) as described above.

Signal to Noise (unit of analysis of providers): Signal-to-noise testing (Table 2 below) suggests that a high proportion of the variation in quality measure scores is due to differences in provider quality measure results rather than variation within providers.

5.2.3a Attach Additional Reliability Testing Results

[4.2.3a Additional Reliability Testing Results Items IRF_508.zip](#)

5.2.4 Interpretation of Reliability Results

Cronbach's alpha (unit of analysis of assessment data)

Cronbach's alpha results show the items measure the concept of function in a consistent manner.

Split-half Reliability (unit of analysis of providers)

Split-half analysis results indicated strong, positive correlations between the IRF providers' randomly divided groups' computed performance measure scores, providing strong evidence of measure reliability with an ICC of 0.97 overall. ICCs were exceptionally strong across providers regardless of volume, with ICC of 0.94 even among the smallest providers (20-162 discharges).

Signal to Noise (unit of analysis of providers)

Signal to Noise Testing suggests very strong reliability across providers, with a reliability statistic of 0.97. Robustness checks in which we calculated the Signal-to-Noise Reliability (VAR) using the sample variance also gave an overall statistic of 0.97. Both of these pass the threshold of acceptable reliability.

Table 2. Accountable Entity Level Reliability Testing Results by Denominator, Target Population Size

Accountable Entity-Level Reliability Testing Results

	Overall	Minimum	Decile_1	Decile_2	Decile_3	Decile_4	Decile_5	Decile_6	Decile_7	Decile_8	Decile_9	Decile_10	Maximum
Reliability	0.97	0.73	0.97	0.96	0.96	0.96	0.96	0.96	0.97	0.98	0.98	0.98	1.00
Mean Performance Score	0.55	0	0.21	0.35	0.42	0.48	0.54	0.60	0.65	0.69	0.75	0.83	0.95
N of Entities	1,150	1	115	115	115	116	114	115	115	115	115	115	1
N of Persons / Encounters / Episodes	496,510	55	26,264	39,811	46,022	47,432	44,996	47,404	54,476	70,440	71,513	48,152	240

5.3.1 Level(s) of Validity Testing Conducted

Person or encounter level (i.e., data element) (e.g., sensitivity and specificity), Accountable entity level (i.e., measure score) (e.g., criterion validity)

5.3.3 Method(s) of Validity Testing

We report testing results throughout this document at two levels: 1) data elements/scale and 2) Computed Quality Measure results.

1. Critical Data Elements/Scale

Several studies have examined the validity of the data elements by examining the relationship between the items and length of stay, discharge to community rates and risk of falls.

2. Computed Quality Measure Score

Convergent Validity: To evaluate convergent validity of measure scores, we measured Spearman's rank correlation between the Cross-Setting Discharge Function Score measure and other SNF QRP measures (See Table 4.3.3 in the attachment). The analysis used FY 2023 data and only included data from SNFs with at least 20 stays.

Face validity of performance measure score:

To assess face validity of the Cross-Setting Discharge Function Score measure, two Technical Expert Panel (TEP) meetings (July 2021 and January 2022), as well as a Patient and Family Engagement Listening Session, were convened. TEP members showed strong support for the face validity of this measure. Though a vote was not taken at the meeting, the TEP agreed with the conceptual and operational definition of the measure. Many patients enter rehabilitation care after an acute event for the purpose of regaining function. This measure directly assesses the ability of providers to enable patients to reach their highest level of function possible. Panelists reviewed the validity analyses described herein and agreed they demonstrated measure validity.

The Patient and Family Engagement Listening Session demonstrated that the measure concept resonates with patients and caregivers. Participants' views of self-care and mobility were aligned with the functional domains captured by the measure, and they found them to be critical aspects of care. Participants emphasized the importance of measuring functional outcomes and were specifically interested in metrics that show how many patients discharged from particular

facilities made improvements in self-care and mobility.

In developing the measures, statistical imputation was implemented to estimate item scores for patients where a GG item was NA using models that adjust for patient clinical characteristics. We evaluated the empiric validity of our estimation methodology using the following analyses.

1. We estimated admission and discharge scores for each GG item used in measure construction. To evaluate model fit of estimation models, we calculated C-statistics for each of the 22 estimation models. C-statistics ranged from 0.83-0.99, and the mean C-statistic was 0.94..
2. A bootstrapping method was used to measure bias and mean squared error (MSE) in the estimation method that uses statistical imputation compared to the recode approach used in the self-care and mobility functional outcome measures. Bias measures the average amount by which the estimated value differs from the true value. Bias is signed, with a positive amount meaning that the estimated values were higher, on average, than were the true values. MSE measures how far away the method is, on average from the truth. It is unsigned and can be positive even if bias is zero. In IRFs, statistical estimation also resulted in lower levels of bias (-0.39 at admission; -0.07 at discharge) and MSE (2.17 at admission; 0.50 at discharge) compared to the bias (-1.43 at admission; -0.51 at discharge) and MSE (6.99 at admission; 2.58 at discharge) produced from the recode approach, which supports the validity of the statistical estimation method in this setting.
3. We calculated the difference in discharge function between episodes that have bona fide item scores at admission and stays with NA codes at admission where we estimate the item score. This difference provides a metric of how accurately estimated item scores reflect true patient function. For all 11 items, the difference was lower than if these ANAs were recoded to the most dependent level of functional status. This result indicates that statistical estimation produced more accurate results.

5.3.4 Validity Testing Results

1. Critical Data Elements/Scale

The validity of the items used to calculate the quality measure has been evaluated by examining the relationship between each item and other indicators. Results of these analyses showed that higher admission function item scores, indicating higher functional ability, were associated with shorter inpatient stays, as expected. Further, higher admission function item scores, indicating higher functional ability, were associated with higher rates of community discharge.

These studies also examine content validity of the standardized functional assessment items that are used to calculate the measure and found the self-care and mobility activities (items) used in the DC Function measure are items used in many other functional assessment instruments.

Sources:

Toth M, Palmer L, Marino ME, Smith A, Schwartz C, Deutsch A, McMullen T. Validation of the Standardized Function Data Elements among Medicare Skilled Nursing Facility Residents, Journal

of the American Medical Directors Association. 24(3): 307-313.e1, 2023, <https://doi.org/10.1016/j.jamda.2022.12.014>.

Deutsch A, Palmer L, Vaughan M, Schwartz C, McMullen T. Inpatient Rehabilitation Facility Patients' Functional Abilities and Validity Evaluation of the Standardized Self-Care and Mobility Data Elements. Arch Phys Med Rehabil. 2022 Jun; 103(6): 1070-1084.e3. <https://doi.org/10.1016/j.apmr.2022.01.147>

2. Computed Quality Measure Result

Face Validity Based on TEP Feedback

A Technical Expert Panel provided feedback on the Cross Setting Discharge Function measure representing face validity.

1. Expert Consensus on Discharge Function Score

- The discharge function measure was reviewed and supported by a multi-disciplinary panel of experts, including persons with lived experience.
- Evidence: The panelists favored reporting discharge function measures due to their ability to reflect patient recovery at discharge. They preferred reporting discharge function rather than change in function measures because it better captures patient status at the point of leaving the provider.

"Panelists from the July 2021 TEP favored Discharge Function Score measures over Change in Function Score measures and recommended moving forward with Discharge Function Score for the cross-setting measure."

Source: PAC Function TEP Summary Report – July 2021 and PAC Function TEP Summary Report – January 2022.

Robust Risk Adjustment for Fair Comparisons

- The measure uses a robust risk adjustment methodology, which supports fair comparisons of measure results across providers by accounting for differences in patient age, clinical characteristics and comorbidities.
- Evidence: This ensures that providers are compared on a level playing field, taking into account the complexity of patients treated at each provider.

"Calculate expected Discharge Function Mobility Score for each eligible stay using risk adjustment coefficients, including demographics, health characteristics, and admission function score."

Source: PAC Function TEP Summary Report – January 2022.

Handling of Activities Not Attempted codes

- The discharge function measure incorporates statistical imputation to address that not all patients can complete each of the functional activities and are thus coded using the Activities Not Attempted codes. This supports measure validity even when certain activities cannot be completed during the patient's stay.
- Evidence: The TEP strongly favored using statistical imputation over simply coding missing data as "dependent," ensuring that the discharge function measure more accurately reflects the patient's true capabilities.

"Panelists tended to favor statistical imputation with continued refinement to improve cross-setting performance. Panelists agreed that the current recode could be improved upon."

Source: PAC Function TEP Summary Report – July 2021 and PAC Function TEP Summary Report – January 2022.

Alignment with Patient-Centered Outcomes

- The discharge function measure is designed to reflect patient-centered goals, focusing on the safe and functional transition of patients back to their community or home setting.
- Evidence: Functional outcomes at discharge are aligned with patient goals of regaining independence, which is a key measure of quality in post-acute care.

"The discharge function score is designed to reflect the ability of post-acute care providers to successfully rehabilitate patients, ensuring they regain functional independence at discharge and beyond."

Source: PAC Function TEP Summary Report – January 2022.

Interested Parties Engaged and Broad Support

- The measure was reviewed by a diverse group of interested parties with broad support and clinical relevance across different care settings.
- Evidence: Clinicians, policy experts, and performance measurement specialists contributed their feedback, ensuring that the measure is relevant and usable across different PAC settings.

"The PAC QRP Functions TEP comprised 15 stakeholders with diverse perspectives and areas of expertise, including clinical, policy and program, measures development, and technical expertise."

Source: PAC Function TEP Summary Report – January 2022.

Convergent Validity.

Measure validity was assessed by comparing the Discharge Function measure with other QRP measures using Spearman (rank) correlations between provider's performance scores presented in attached Table 4.3.4a.

5.3.4a Attach Additional Validity Testing Results

[4.3.4a Additional Validity Testing Results IRF_508.xlsx](#)

5.3.5 Interpretation of Validity Results

1. Critical Data Elements

We reviewed and the described results from several published studies that examined the validity of the function items.

2. Computed Quality Measure Score

Convergent Validity. First, as expected, scores for the Discharge Function Score measure correlated well but not perfectly with the Cross-Setting Discharge Function Score measures including Discharge Self-Care (0.91) and Discharge Mobility (0.93). This is expected because the IRF QRP self-care and mobility functional outcome measures use overlapping but not identical GG items and a different method for handling NA codes. We observed a weak positive correlation with the Discharge to Community measure (0.30). There was also a weak correlation with the Potentially Preventable Readmissions within 30-Days Post-Discharge measure (0.13) and Falls with Major Injury (0.13). The measure had weaker associations with measures in which the stay ended with acute events (Potentially Preventable Readmissions within stay), which would be excluded from this measure's denominator, and measures with a rare outcome (new/worsened pressure ulcers/injuries).

5.3.2 Type of Accountable Entity Level Validity Testing Conducted (derived)

Empirical validity testing at the accountable entity-level (e.g., criterion validity, construct validity, known groups analysis), Systematic assessment of face validity of the measure's performance score as an indicator of quality or resource use

5.4.1 Methods Used to Address Risk Factors

Statistical risk adjustment model with risk factors

5.4.2 Conceptual Model Rationale

The rationale for risk adjustment is to account for differences in patient populations. By risk adjusting, the performance measure assesses providers based on their quality of care and not the underlying health of the population. Providers are not penalized for serving patients with greater clinical need, and fair comparisons can be made across providers.

The performance measure is cross-setting, calculated for inpatient rehabilitation (IRF), skilled nursing (SNF), long-term care hospital (LTCH), and home health (HH). The development team sought to align risk factors across settings as much as possible. The team presented to a TEP an overview of the availability of clinically meaningful risk factors in each setting. TEP members supported setting-specific parameters for risk adjustment since there are different data points available as well as clinical considerations for each setting.

The development team also presented to the TEP the conceptual model shown below in 4.4.2a. TEP members agreed that the conceptual model presented does represent the salient points about the relationship between social risk factors (SRFs), patient functional outcomes, and provider quality. TEP members provided examples of ways in which providers are able to, and should be expected to, mitigate the influence of SRFs on patient outcomes.

TEP members supported further analysis to understand the effect of measurable SRFs. Specifically, the TEP cited the following as potential measurable SRFs that can impact functional outcomes: dual enrollment, ADI, and race/ethnicity (although noting that these are impacted by provider bias).

Below are the currently measurable SRFs included in risk adjustment testing, but not used in the final risk adjustment model. Health-related social needs items are not yet available cross-setting but can be tested for inclusion in the future.

Social Risk Factors (SRFs) Included in Risk Adjustment Testing

Dual Enrollment:

- Medicare (reference group)
- Dual
- Medicaid
- Neither Medicare nor Medicaid
- Unknown Payer

Race:

- American Indian or Alaska Native
- Asian
- Black
- Hispanic or Latino
- Multiple Race
- Native Hawaiian or Other Pacific Islander
- No Race/Ethnicity Information Available
- White (reference group)

Area Deprivation Index (ADI):

- ADI (≥ 85)
- ADI Missing

5.4.2a Attach Conceptual Model

[4.4.2a_DC_function_CBE_model_508.pdf](#)

5.4.3 Variable Distribution Across Measured Entities

Table 4.4.4A-1 in the attached file shows the number, percent, and average observed score of quality episodes that have the associated risk factor covariate. The table presents information for

each risk factor covariate in the final model plus the additional SRF risk factors considered but not used in the final risk adjustment model are listed in Table 4.4.4A-2.

5.4.4 Risk/Case-Mix Adjustment Modeling and/or Stratification Results

Discharge Function is a cross-setting performance measure calculated for IRF, SNF, LTCH, and HH. Because different data elements are collected across the assessment instruments for each setting, the development team aligned clinically meaningful covariates as much as possible.

The development team then presented to a TEP an overview of the data availability in each setting, shown below, and solicited feedback on which covariates should be included in the cross-setting measure risk adjustment model.

Covariate Availability Across Settings of Care for Discharge Function Measure

1. Age: LTCH, IRF, SNF, HH
2. Admission Mobility Score: LTCH, IRF, SNF, HH
3. Primary Medical Condition Category (PMCC): LTCH, IRF, SNF, HH
4. Interaction of Admission Mobility Score and PMCC: LTCH, IRF, SNF, HH
5. Prior Function/Device Use: LTCH, IRF, SNF
6. Pressure Ulcers: LTCH, SNF
7. Cognitive Function: LTCH, IRF, SNF, HH
8. Communication Impairment: LTCH, IRF, SNF, HH
9. Incontinence: LTCH, IRF, SNF, HH
10. Falls: LTCH, IRF, SNF, HH
11. Nutritional Approach: LTCH, IRF, SNF
12. Comorbidities: LTCH, IRF, SNF, HH
13. Ventilation Status: LTCH, IRF
14. Availability of Assistance: LTCH, IRF, SNF
15. Living Arrangements: LTCH, IRF, SNF, HH

The TEP members expressed support for setting-specific models since there are different data points available as well as different clinical considerations for each setting. The panelists suggested additional risk adjustors to consider, including Prior living site; Prior hospitalization; Chronic conditions; Obesity; Severity of health condition(s); Low BMI; Pain; Wound infection; Transportation; and Health literacy.

Below is a listing of the covariate groups included in the final risk adjustment model for IRF. Information on the covariates were obtained from the IRF-PAI.

The final risk adjustment approach includes adjusting for the following patient characteristics:

- **Age Category:** Age was calculated as of the admission date of the IRF stay using the beneficiary's date of birth.
- **Admission Function Score:** Sum of admission scores for function items included in the discharge score (Section 3.4.1), which can range from 10-60, with a higher score indicating

greater independence. ANAs in the admission item scores are treated the same way as NAs in the discharge item scores, with ANAs replaced with imputed scores (Appendix). Walking items and wheeling item are used in the same manner as for the discharge score (See Appendix). Admission score squared is also included as a risk adjustor.

- **Primary Diagnosis Group:** Primary diagnosis is the principal reason for admitting the patient into IRF care
- **Prior surgery:** This covariate captures whether or not the patient had prior surgery
- **Prior Function/Device Use:** These covariates capture patient's functional status prior to the stay.
- **Pressure Ulcers:** These covariates capture the presence of pressure ulcer(s) at different stages.
- **Cognitive Function:** These covariates capture the patient's cognitive function by assessing whether or not the patient's mental status at admission is impaired, and if impaired, at what level.
- **Communication impairment:** These covariates capture the patient's communication function, and indicate whether or not the patient's communication status at admission is impaired, and if impaired, at what level.
- **Incontinence** These covariates indicate the patient's level of bladder and bowel incontinence.
- **Nutritional Status:** These covariates indicate patient's swallowing ability at IRF admission and patient's body mass index
- **History of Falls:** This covariate indicates a history of falls prior to the IRF admission
- **Comorbidities:** Comorbidities are obtained from Item 24 in the IRF-PAI. Comorbidities are grouped using CMS Hierarchical Condition Categories (HCC) software version 24.

Significantly, discharge Function is a cross-setting performance measure calculated for IRFs , SNFs, LTCHs, and HH. Because different data elements are collected across the assessment instruments for each setting, the development team aligned clinically meaningful covariates as much as possible.

The risk adjustment model is an ordinary least squares (OLS) linear regression. It estimates the relationship between discharge function score and the set of risk adjustors. The risk adjustment model is run on all stays to determine the model intercept and risk adjustor coefficients.

Table 4.4.4A-1 in the attached file presents the model results for the final risk adjustment model and the alternative risk adjustment model with additional SRF covariates options is in **Table 4.4.4A-2**.

5.4.4a Attach Risk/Case-mix Adjustment Modeling and/or Stratification Specifications

[4.4.4a_Risk_adjustment_Model-IRF_508.xlsx](#)

5.4.5 Calibration and Discrimination

A well-calibrated model demonstrates good predictive ability to distinguish high-risk from low-risk patients. To assess risk adjustment model calibration, we divided our dataset into deciles of expected values and calculated the ratio of average expected discharge score to average observed

discharge score within each decile. A ratio of 1 would indicate perfect agreement between average expected and observed discharge function scores. We expect that the risk adjusted model performance will be stable among IRFs regardless of whether they have patients with low or high expected discharge scores on average.

As seen in **Table 4.4.5A-2**, the average expected to observed discharge score ratios within each decile approximated 1.0, with a range of 0.99 to 1.01, validating model performance. There was little variability in average expected to observed discharge score ratios across deciles, supporting model stability across the range of expected discharge function scores and across the sample.

We analyzed model fit using adjusted R-squared to determine if the risk adjustment model can accurately predict discharge function while controlling for patient case-mix. The adjusted R-squared value was 0.49, which suggests good model discrimination. Please see **Table 4.4.5A-1** in the attached file.

5.4.5a Attach Calibration and Discrimination Testing Results

[4.4.5a_Calibration_Discrimination_IRF_508.pdf](#)

5.4.6 Interpretation of Risk/Case-mix Factor Findings

Risk factors were chosen based on clinical relevance to Discharge Function performance. Risk factors were recommended by clinician members of the measure development team and by the TEP. The Final risk adjustment model has an adjusted R-squared value of 0.49.

5.4.7 Final Approach to Address Risk Factors

Statistical risk adjustment model with risk factors

6.1.1 Current Status

In use

6.1.2 Current or Planned Use(s)

Public Reporting, Quality Improvement with Benchmarking (external benchmarking to multiple organizations), Quality Improvement (Internal to the specific organization)

6.1.3 Program Details

Name of the program and sponsor

CMS Inpatient Rehabilitation Facility Quality Reporting Program

URL of the program

<https://www.cms.gov/medicare/quality/inpatient-rehabilitation-facility/irf-qual...>

Purpose of the program

<https://www.cms.gov/medicare/quality/inpatient-rehabilitation-facility>

Geographic area and percentage of accountable entities and patients included

Inpatient Rehabilitation Facilities in the United States

Applicable level of analysis and care setting

Level of Analysis: Facility, Care

Setting: Inpatient Rehabilitation Facility

Number of Inpatient Rehabilitation Facilities: 1,150

Number of Inpatient Rehabilitation Facility Stays: 496,510

6.2.1 Actions of Measured Entities to Improve Performance

All IRFs with at least 20 qualifying stays receive quarterly measure reports on all their publicly reported measures. In addition, providers can run on-demand, confidential reports showing individual measure results and national averages, through CMS' iQIES.

There is an email box that IRFs may submit questions to as well as a website on which the latest measure updates are posted. The IRF Quality Reporting Quality Measure User's Manual describes the provider reports that are available. IRFs make use of these reports to monitor and improve the quality of care.

6.2.2 Feedback on Measure Performance

IRFs receive quarterly measure reports on all their measures. There is an email box that IRFs may submit questions to as well as a website on which the latest measure updates are posted. CMS makes available information about risk models and covariates on its website.

6.2.3 Consideration of Measure Feedback

No measure specifications changes requested or made.

6.2.4 Progress on Improvement

This measure is too new to provide an assessment on impacts on improvement.

6.2.5 Unexpected Findings

None

7.1 Supplemental Attachment

[Supplemental_Tables_IRF_508.xlsx](#)

Developer POC email

adeutsch@rti.org

Measure Developer POC

Anne Deutsch

RTI international
Research Triangle Park, NC
United States

The measure developer is different from the measure steward

Yes

Steward Address

Rebekah Natanov
Baltimore, MD
United States

Steward Organization

Centers for Medicare & Medicaid Services

Steward Organization URL

<https://www.cms.gov/>

Steward POC email

Rebekah.Natanov@cms.hhs.gov