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Final Specifications for IRF QRP Quality Measures and Standardized Patient Assessment Data Elements (SPADEs)

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Chapter 1 IMPACT ACT Measures Beginning with the FY 2022 IRF QRP

Section 1. Cross-Setting Measures Development Work: An Introduction

The Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act), enacted October 6, 2014, directs the Secretary of Health and Human Services to "specify quality measures on which post-acute care (PAC) providers are required under the applicable reporting provisions to submit standardized patient assessment data" in several quality measure domains, including incidence of major falls, skin integrity and changes in skin integrity, medication reconciliation, functional status, transfer of health information and care preferences when an individual transitions, and resource use and other measures. The IMPACT Act requires the implementation of quality measures to address these measure domains in inpatient rehabilitation facilities (IRFs), skilled nursing facilities (SNFs), long-term care hospitals (LTCHs), and home health agencies (HHAs).

The IMPACT Act also requires, to the extent possible, the submission of such quality measure data through the use of a PAC assessment instrument and the modification of the instrument as necessary to enable such use. This requirement refers to the collection of such data by means of the IRF Patient Assessment Instrument (IRF-PAI) for IRFs, the LTCH Continuity Assessment Record and Evaluation Data Set (LTCH CARE Data Set or LCDS) for LTCHs, the Minimum Data Set (MDS) 3.0 for SNFs, and the Outcome and Assessment Information Set (OASIS) for HHAs.

For more information on the statutory history of the IRF, LTCH, or SNF Quality Reporting Program (QRP), please refer to the Fiscal Year (FY) 2016 final rules, and for the HH QRP, please refer to the Calendar Year (CY) 2016 final rule. More information on the IMPACT Act is available at https://www.govtrack.us/congress/bills/113/hr4994.

In this document, we present specifications for the standardized patient assessment data elements (SPADEs) and two measures finalized for adoption for the IRF QRP through the FY 2020 IRF Prospective Payment System (PPS) final rule.

The Transfer of Health Information measure concept consists of two companion measures:

1. Transfer of Health Information to the Provider–Post-Acute Care Measure
2. Transfer of Health Information to the Patient–Post-Acute Care Measure

We also provide updated specifications for the previously adopted Discharge to Community measure.

Section 2. Cross-Setting Measure: Transfer of Health Information to the Provider–Post-Acute Care Measure

Measure Description

This measure, the Transfer of Health Information to the Provider, assesses for and reports on the timely transfer of health information, specifically transfer of a reconciled medication list. This measure evaluates for the transfer of information when a patient/resident is discharged from their current setting to a subsequent provider. For this measure, the subsequent provider is defined as a short-term general hospital, a SNF, intermediate care, home under care of an organized home health service organization or hospice, hospice in an institutional facility, an IRF, an LTCH, a Medicaid nursing facility, an inpatient psychiatric facility, or a critical access hospital.

This measure, developed under the IMPACT Act, has been developed conceptually for the IRF, LTCH, SNF, and HHA settings. This measure is calculated by one standardized data element that asks, "at the time of discharge, did the facility provide the patient's/resident's current reconciled medication list to the subsequent provider?" It also includes one data element that asks the route of transmission of the reconciled medication list (Appendix A). In order to track discharge to a subsequent provider, the IRF-PAI will be used to track discharge location status. Guidance for what is considered a reconciled medication list is discussed in greater detail in the section below. The measure is conceptualized uniformly across the PAC settings. The measure is calculated using data from the IRF-PAI for IRF patients, the LCDS for LTCH patients, the MDS 3.0 assessment instrument for SNF residents, and the OASIS for HHA patients. Data are collected and calculated separately in each of the four settings using standardized data elements. The collection of this measure and the components tied to the standardized data element used to calculate this measure are described in Appendix A.

The Reconciled Medication List

The Transfer of Health Information measures serve as a check to ensure that a reconciled medication list is provided as the patient changes care settings at discharge. Defining the completeness of that medication list is left to the discretion of the providers and patient who are coordinating this care.

An example of items that could be on a reconciled medication list can be but are not limited to a list of the current prescribed and over-the-counter medications, nutritional supplements, vitamins, and/or homeopathic and herbal products administered by any route at the time of discharge or transfer. A reconciled medication could also include important information about: (1) the patient/resident, including their name, date of birth, active diagnoses, known medication and other allergies, and known drug sensitivities and reactions; and (2) each medication, including the name, strength, dose, route of medication administration, frequency or timing, purpose/indication, and/or any special instructions. However, this information serves as guidance and as stated prior, the completeness of the medication list is left to the discretion of the providers and patient.

Documentation sources for reconciled medication list information include electronic and/or paper records. Some examples of such records are discharge summary records, a Medication Administration Record, an Intravenous Medication Administration Record, a home medication list, and physician orders.

The guidance on what to include in a reconciled medication list is aligned to the provisions in the proposed Discharge Planning for Hospitals, Critical Access Hospital, and HHAs regulation, which outlines discharge planning and the documentation of medications (https://www.federalregister.gov/documents/2015/11/03/2015-27840/medicare-and-medicaid-programs-revisions-to-requirements-for-discharge-planning-for-hospitals). In addition, this guidance follows the requirements finalized in the Reform of Requirements for Long-Term Care Facilities (https://www.federalregister.gov/documents/2016/10/04/2016-23503/medicare-and-medicaid-programs-reform-of-requirements-for-long-term-care-facilities).

Purpose/Rationale for the Quality Measure

In 2013, 22.3 percent of all acute hospital discharges were discharged to PAC settings, including 11 percent who were discharged to home under the care of a home health agency (HHA), and 9 percent who were discharged to SNFs.[1] The proportion of patients being discharged from an acute care hospital to a PAC setting was greater among beneficiaries enrolled in fee-for-service (FFS) Medicare. Among FFS patients discharged from an acute hospital, 42 percent went directly to PAC settings. Of those, 20 percent were discharged to a SNF, 18 percent were discharged to an HHA, 3 percent were discharged to an IRF, and 1 percent were discharged to an LTCH.[2] Of the Medicare FFS beneficiaries with an IRF stay in FYs 2016 and 2017, an estimated 10 percent were discharged or transferred to an acute care hospital, 51 percent were discharged home with home health services, 16 percent were discharged or transferred to a SNF, and 1 percent were discharged or transferred to another PAC setting (for example, another IRF, a hospice, or an LTCH).[3]

The transfer and/or exchange of health information from one provider to another takes several forms, including verbal (e.g., clinician-to-clinician communication by telephone or in-person), paper-based (e.g., faxed or printed copies of records), and electronic communication (e.g., via health information exchange network, using an electronic health/medical record, secure messaging). Health information, such as medication information, that is incomplete or missing increases the likelihood of a patient/resident safety risk, often life-threatening.[4] Poor communication and coordination across health care settings contributes to patient complications, hospital readmissions, emergency department visits, and medication errors.[5] Communication has been cited as the third-most-frequent root cause in sentinel

[1] Tian, W. (2016, May). An all-payer view of hospital discharge to postacute care. Retrieved from https://www.hcup-us.ahrq.gov/reports/statbriefs/sb205-Hospital-Discharge-Postacute-Care.jsp.

[2] Ibid.

[3] RTI International analysis of Medicare claims data for index stays in IRF 2016/2017. (RTI program reference: MM150).

[4] Kwan, J. L., Lo, L., Sampson, M., & Shojania, K. G. (2013). Medication reconciliation during transitions of care as a patient safety strategy: A systematic review. *Annals of Internal Medicine, 158*(5 Pt 2), 397–403. https://doi.org/10.7326/0003-4819-158-5-201303051-00006

Boockvar, K. S., Blum, S., Kugler, A., Livote, E., Mergenhagen, K. A., Nebeker, J. R., . . . Yeh, J. (2011). Effect of admission medication reconciliation on adverse drug events from admission medication changes. *Archives of Internal Medicine, 171*(9), 860–861. https://doi.org/10.1001/archinternmed.2011.163

Bell, C. M., Brener, S. S., Gunraj, N., Huo, C., Bierman, A. S., Scales, D. C., . . . Urbach, D. R. (2011). Association of ICU or hospital admission with unintentional discontinuation of medications for chronic diseases. *Journal of the American Medical Association, 306*(8), 840–847. https://doi.org/10.1001/jama.2011.1206

Basey, A. J., Krska, J., Kennedy, T. D., & Mackridge, A. J. (2014). Prescribing errors on admission to hospital and their potential impact: A mixed-methods study. *BMJ Quality & Safety*, *23*(1), 17–25. https://doi.org/10.1136/bmjqs-2013-001978

Desai, R., Williams, C. E., Greene, S. B., Pierson, S., & Hansen, R. A. (2011). Medication errors during patient transitions into nursing homes: Characteristics and association with patient harm. *The American Journal of Geriatric Pharmacotherapy*, *9*(6), 413–422. https://doi.org/10.1016/j.amjopharm.2011.10.005

Boling, P. A. (2009). Care transitions and home health care. *Clinics in Geriatric Medicine, 25*(1), 135–148. https://doi.org/10.1016/j.cger.2008.11.005

[5] Barnsteiner, J. H. (2005). Medication reconciliation: Transfer of medication information across settings-keeping it free from error. *The American Journal of Nursing*, *105*(3, Suppl), 31–36. https://doi.org/10.1097/00000446-200503001-00007

Arbaje, A. I., Kansagara, D. L., Salanitro, A. H., Englander, H. L., Kripalani, S., Jencks, S. F., & Lindquist, L. A. (2014). Regardless of age: Incorporating principles from geriatric medicine to improve care transitions for patients with complex needs. *Journal of General Internal Medicine*, *29*(6), 932–939. https://doi.org/10.1007/s11606-013-2729-1

Jencks, S. F., Williams, M. V., & Coleman, E. A. (2009). Rehospitalizations among patients in the Medicare fee-for-service program. *The New England Journal of Medicine*, *360*(14), 1418–1428. https://doi.org/10.1056/NEJMsa0803563

Institute of Medicine. (2007). *Preventing Medication Errors.* Washington, DC: The National Academies Press. https://doi.org/10.17226/11623.

Kitson, N. A., Price, M., Lau, F. Y., & Showler, G. (2013). Developing a medication communication framework across continuums of care using the Circle of Care Modeling approach. *BMC Health Services Research*, *13*(1), 418. https://doi.org/10.1186/1472-6963-13-418

Mor, V., Intrator, O., Feng, Z., & Grabowski, D. C. (2010). The revolving door of rehospitalization from skilled nursing facilities. *Health Affairs*, *29*(1), 57–64. https://doi.org/10.1377/hlthaff.2009.0629

events, which The Joint Commission defines as a patient safety event that results in death, permanent harm, or severe temporary harm.[6] Failed or ineffective patient handoffs are estimated to play a role in 20 percent of serious preventable adverse events.[7] When care transitions are enhanced through care coordination activities, such as expedited patient information flow, these activities can reduce duplication of care services and costs of care, resolve conflicting care plans, and prevent medical errors.[8] The rising incidence of preventable adverse events, complications, and hospital readmissions have drawn national attention to the importance of the timely transfer of health information and care preferences at transitions. However, there is limited information about the route or mode (for example, paper-based, verbal, and electronic) of transmission used by PAC providers to transfer health information. PAC provider health information exchange supports the goals of high-quality, personalized, and efficient health care; care coordination and person-centered care; and real-time, data-driven clinical decision making.

PAC patients often have complicated medication regimens and require efficient and effective communication and coordination of care between settings, including transfer of detailed medication information.[9] Individuals in PAC settings may be vulnerable to adverse health outcomes because of insufficient medication information on the part of their health care providers, and their higher likelihood for multiple comorbid chronic conditions, polypharmacy, and complicated transitions between care

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Forster, A. J., Murff, H. J., Peterson, J. F., Gandhi, T. K., & Bates, D. W. (2003). The incidence and severity of adverse events affecting patients after discharge from the hospital. *Annals of Internal Medicine*, *138*(3), 161–167. https://doi.org/10.7326/0003-4819-138-3-200302040-00007

King, B. J., Gilmore-Bykovskyi, A. L., Roiland, R. A., Polnaszek, B. E., Bowers, B. J., & Kind, A. J. (2013). The consequences of poor communication during transitions from hospital to skilled nursing facility: A qualitative study. *Journal of the American Geriatrics Society*, *61*(7), 1095–1102. https://doi.org/10.1111/jgs.12328

[6] The Joint Commission. (2017, June 29). Sentinel event policy and procedures. Retrieved from https://www.jointcommission.org/sentinel_event_policy_and_procedures/

[7] The Joint Commission. (2016, March 2). Sentinel event statistics updated, released through end of 2015Retrieved from https://www.jointcommission.org/assets/1/23/jconline_Mar_2_2016.pdf

[8] Mor, Intrator, Feng, & Grabowski, 2010.

Institute of Medicine, 2007.

Starmer, A. J., Sectish, T. C., Simon, D. W., Keohane, C., McSweeney, M. E., Chung, E. Y., . . . Landrigan, C. P. (2013). Rates of medical errors and preventable adverse events among hospitalized children following implementation of a resident handoff bundle. *Journal of the American Medical Association*, *310*(21), 2262–2270. https://doi.org/10.1001/jama.2013.281961

Pronovost, P., Johns, M. M. E., Palmer, S., Bono, R. C., Fridsma, D. B., Gettinger, A., ... Wang, Y. C. (Eds.). (2018). *Procuring interoperability: Achieving high-quality, connected, and person-centered care.* Washington, DC: National Academy of Medicine. Retrieved from https://nam.edu/wp-content/uploads/2018/10/Procuring-Interoperability_web.pdf

Balaban, R. B., Weissman, J. S., Samuel, P. A., & Woolhandler, S. (2008). Redefining and redesigning hospital discharge to enhance patient care: A randomized controlled study. *Journal of General Internal Medicine*, *23*(8), 1228–1233. https://doi.org/10.1007/s11606-008-0618-9

[9] Starmer, A. J., Spector, N. D., Srivastava, R., West, D. C., Rosenbluth, G., Allen, A. D., . . . Landrigan, C. P., & the I-PASS Study Group. (2014). Changes in medical errors after implementation of a handoff program. *The New England Journal of Medicine*, *371*(19), 1803–1812. https://doi.org/10.1056/NEJMsa1405556

Kruse, C. S., Marquez, G., Nelson, D., & Polomares, O. (2018). The use of health information exchange to augment patient handoff in long-term care: A systematic review. *Applied Clinical Informatics*, *9*(4), 752–771. https://doi.org/10.1055/s-0038-1670651

Brody, A. A., Gibson, B., Tresner-Kirsch, D., Kramer, H., Thraen, I., Coarr, M. E., & Rupper, R. (2016). High prevalence of medication discrepancies between home health referrals and Centers for Medicare and Medicaid Services home health certification and plan of care and their potential to affect safety of vulnerable elderly adults. *Journal of the American Geriatrics Society*, *64*(11), e166–e170. https://doi.org/10.1111/jgs.14457

settings.[10] Preventable adverse drug events (ADEs) occur after hospital discharge in a variety of settings, including PAC.[11]

Patients in PAC settings are often taking multiple medications. Consequently, PAC providers regularly are in the position of starting complex new medication regimens with little knowledge of the patient or their medication history upon admission. Furthermore, inter-facility communication barriers delay resolving medication discrepancies during transitions of care.[12] The transfer of a medication list between providers is necessary for medication reconciliation interventions, which have been shown to be a cost-effective way to avoid ADEs by reducing errors,[13] especially when medications are reviewed by a pharmacist and when it is done in conjunction with the use of electronic medical records.[14]

Denominator

The denominator is the number of IRF Medicare Part A and Medicare Advantage (Part C) patient stays ending in discharge to a short-term general hospital, a SNF, intermediate care, home under care of an organized home health service organization or hospice, hospice in an institutional facility, a swing bed, another IRF, an LTCH, a Medicaid nursing facility, an inpatient psychiatric facility, or a critical access hospital. Discharge to one of these providers is based on response to the discharge location item, 44D, of the IRF-PAI assessment, shown below:

> 44D. Patient's discharge destination/living setting, using codes below: _____
> (answer only if 44C = 1; if 44C = 0, skip to item 46)
> *(01. Home (e.g. private home/apt., board/care, assisted living, group home, transitional living, other residential care arrangements); 02. Short-term General Hospital; 03. Skilled Nursing Facility (SNF); 04. Intermediate care; 06. Home under care of organized home health service organization; 50. Hospice (home); 51. Hospice (medical facility); 61. Swing Bed; 62. Another Inpatient Rehabilitation Facility; 63. Long-Term Care Hospital (LTCH); 64. Medicaid Nursing Facility; 65. Inpatient Psychiatric Facility; 66. Critical Access Hospital (CAH); 99. Not Listed*

Numerator

The numerator is the number of stays for which the IRF-PAI indicated that the following is true:

At the time of discharge, the facility provided a current reconciled medication list to the subsequent provider (A2121 = [1]).

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[10] Chhabra, P. T., Rattinger, G. B., Dutcher, S. K., Hare, M. E., Parsons, K. L., & Zuckerman, I. H. (2012). Medication reconciliation during the transition to and from long-term care settings: A systematic review. *Research in Social & Administrative Pharmacy*, *8*(1), 60–75. https://doi.org/10.1016/j.sapharm.2010.12.002

Levinson, D. R. (2014). *Adverse events in skilled nursing facilities: National incidence among Medicare beneficiaries*. Washington, DC: U.S. Department of Health and Human Services, Office of the Inspector General. Retrieved from https://oig.hhs.gov/oei/reports/oei-06-11-00370.pdf

[11] Battles J., Azam I., Grady M., & Reback K. (2017, August). Advances in patient safety and medical liability. AHRQ Publication No. 17-0017-EF. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from https://www.ahrq.gov/sites/default/files/publications/files/advances-complete_3.pdf

[12] Patterson, M. E., Foust, J. B., Bollinger, S., Coleman, C., & Nguyen, D. (2019). Inter-facility communication barriers delay resolving medication discrepancies during transitions of care. *Research in Social and Administrative Pharmacy*, *15*(4), 366–369. https://dx.doi.org/10.1016/j.sapharm.2018.05.124

[13] Boockvar, et al., 2011.
Kwan, Lo, L., Sampson, & Shojania, 2013.
Chhabra et al., 2012.

[14] Agrawal, A., & Wu, W. Y. (2009). Reducing medication errors and improving systems reliability using an electronic medication reconciliation system. *Joint Commission Journal on Quality and Patient Safety*, *35*(2), 106–114. https://doi.org/10.1016/S1553-7250(09)35014-X

Measure Time Window

The measure will be calculated quarterly. All IRF stays during the quarter will be included in the denominator and are eligible for inclusion in the numerator. For patients with multiple stays during the quarter, each stay is eligible for inclusion in the measure.

Items Included in the Quality Measure

One data element will be included to calculate the measure. One data element will be collected to inform internal measure consistency logic.

Provision of Current Reconciled Medication List to Subsequent Provider at Discharge

A2121. Provision of Current Reconciled Medication List to Subsequent Provider at Discharge At the time of discharge to another provider, did your facility provide the patient's current reconciled medication list to the subsequent provider?	
Enter Code ☐	0. **No** – Current reconciled medication list not provided to the subsequent provider 1. **Yes** – Current reconciled medication list provided to the subsequent provider

Route of Current Medication List Transmission to Subsequent Provider

A2122. Route of Current Reconciled Medication List Transmission to Subsequent Provider Indicate the route(s) of transmission of the current reconciled medication list to the subsequent provider.	
Route of Transmission	**Check all that apply** ↓
A. Electronic Health Record	☐
B. Health Information Exchange Organization	☐
C. Verbal (e.g., in-person, telephone, video conferencing)	☐
D. Paper-based (e.g., fax, copies, printouts)	☐
E. Other Methods (e.g., texting, email, CDs)	☐

Risk Adjustment

This measure is not risk-adjusted or stratified.

Quality Measure Calculation Steps

The following steps are used to calculate the measure:

Step 1. Calculate the denominator count

Calculate the total number of patient stays with discharge to a subsequent provider based on discharge location item 44D.

Step 2. Calculate the numerator count

Calculate the total number of stays where a reconciled medication list was transferred: A2121 = [1]

Step 3. Calculate the facility observed score

Divide the facility's numerator count by its denominator count; in other words, divide the results of Step 2 by the results of Step 1. Multiply by 100.

Quality Measure Coding Steps

The following steps are used to code the measure:

1. **At discharge, code for the patient's discharge location.**

   Identify discharge location with item 44D.

2. **At discharge, code for whether the facility provided the reconciled medication list to the subsequent provider.**

   A valid response for item 44D would trigger the coder to complete item A2121.

3. **At discharge, code for the route of transmission.**

   A valid response for item A2121 [A2121 = 1] would send the coder to item A2122. This item is used for internal measure consistency logic.

Section 3. Cross-Setting Measure: Transfer of Health Information to the Patient–Post-Acute Care Measure

Measure Description

This measure, the Transfer of Health Information to the Patient, assesses for and reports on the timely transfer of health information, specifically transfer of a reconciled medication list. This measure evaluates for the transfer of information when a patient/resident is discharged from their current setting of PAC to a private home/apartment, board and care home, assisted living, group home, transitional living, or home under the care of an organized home health service organization or hospice.

This measure, developed under the IMPACT Act, has been developed conceptually for the IRF, LTCH, SNF, and HHA settings. This measure is calculated by one standardized data element that asks, "at the time of discharge, did the facility provide the patient's/resident's current reconciled medication list to the patient, family, and/or caregiver?" It also includes one data element that asks the route of transmission of the reconciled medication list (Appendix A). The IRF-PAI, which tracks discharge location status, will be used to track discharge to home. The measure is conceptualized uniformly across the PAC settings. The measure is calculated using data from the IRF-PAI for IRF patients, the LCDS for LTCH patients, the MDS 3.0 assessment instrument for SNF residents, and the OASIS for HHA patients. Data are collected and calculated separately in each of the four settings using standardized data elements. The collection of this measure and the components tied to the standardized data element used to calculate this measure are in Appendix A.

The Reconciled Medication List

Discussion related to what is a reconciled medication list is located in Chapter 1, Section 2. The Transfer of Health Information measures serve as a check to ensure that a reconciled medication list is provided as the patient changes care settings at discharge. Defining the completeness of that medication list is left to the discretion of the providers and patient who are coordinating this care.

Purpose/Rationale for the Quality Measure

In 2013, 22.3 percent of all acute hospital discharges were discharged to PAC settings, including 11 percent who were discharged to home under the care of an HHA.[15] Of the Medicare FFS beneficiaries with an IRF stay in FYs 2016 and 2017, an estimated 51 percent were discharged home with home health services, 21 percent were discharged home with self-care, and .5 percent were discharged with home hospice services.[16]

The communication of health information, such as a reconciled medication list, is critical to ensuring safe and effective patient transitions from health care settings to home and other community settings. Incomplete or missing health information, such as medication information, increases the likelihood of a patient safety risk, often life-threatening.[17] Individuals who use PAC settings are particularly vulnerable to adverse health outcomes because of their higher likelihood of multiple comorbid chronic conditions, polypharmacy, and complicated transitions between care settings.[18] Upon discharge to home, individuals in PAC settings may be faced with numerous medication changes, new

[15] Tian, 2016.

[16] RTI International analysis of Medicare claims data for index stays in IRF 2016/2017. (RTI program reference: MM150).

[17] Kwan et al., 2013.
Boockvar et al., 2011.
Bell et al., 2011.
Basey, Krska, Kennedy, & Mackridge, 2014.
Desai, Williams, Greene, Pierson& Hansen, 2011.

[18] Brody et al., 2016.
Chhabra et al., 2012.

medication regimes, and follow-up details.[19] The efficient and effective communication and coordination of medication information may be critical to prevent potentially deadly adverse effects. When care coordination activities enhance care transitions, these activities can reduce duplication of care services and costs of care, resolve conflicting care plans, and prevent medical errors.[20]

The transfer of a patient's medication information to the patient, family, or caregiver is common practice and supported by discharge planning requirements for participation in Medicare and Medicaid programs.[21] However, there is limited information about the route or mode (for example, paper-based, verbal, and electronic) of transmission used by PAC providers to transfer health information. PAC provider health information exchange with patients, families, and caregivers supports the goals of high-quality, personalized, and efficient health care; care coordination and person-centered care; and real-time, data-driven clinical decision making.

Most PAC electronic health record systems generate a discharge medication list. Interventions to promote patient participation in medication management have been shown to be acceptable and potentially useful for improving patient outcomes and reducing costs.[22] Furthermore, provision of a reconciled medication list to patients/residents and their caregivers can improve transitional care.[23]

Some clinical practice guidelines state the importance of medication safety and communicating accurate medication information to the patient. For example, The Joint Commission's National Patient Safety Goals #4 and #5 for Home Care Accreditation (NPSG.03.06.01) are as follows:[24]

4. Provide the patient (or family as needed) with written information on the medications the patient should be taking when leaving the organization's care (for example, name, dose, route, frequency, purpose).
5. Explain the importance of managing medication information to the patient.

The Agency for Healthcare Research and Quality (AHRQ) Project Re-Engineered Discharge (RED) Toolkit includes several medication-related strategies (e.g., active medication reconciliation,

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[19] Brody et al., 2016.
Bell et al., 2011.
Sheehan, O. C., Kharrazi, H., Carl, K. J., Leff, B., Wolff, J. L., Roth, D. L., . . . Boyd, C. M. (2018). Helping older adults improve their medication experience (HOME) by addressing medication regimen complexity in home healthcare. *Home Healthcare Now*, *36*(1), 10–19. https://doi.org/10.1097/NHH.0000000000000632.

[20] Mor et al., 2010.
Starmer et al., 2013.

[21] Director, Survey and Certification Group, CMS. (2013, May 17). Revision to state operations manual (SOM), Hospital Appendix A - Interpretive Guidelines for 42 CFR 482.43, Discharge Planning. Retrieved from https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/Downloads/Survey-and-Cert-Letter-13-32.pdf.
The State Operations Manual Guidance to Surveyors for Long-Term Care Facilities (Guidance §483.21(c)(1) Rev. 11-22-17) for discharge planning. Retrieved from https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap_pp_guidelines_ltcf.pdf.

[22] Greene, J., & Hibbard, J. H. (2012). Why does patient activation matter? An examination of the relationships between patient activation and health-related outcomes. *Journal of General Internal Medicine*, *27*(5), 520–526. https://doi.org/10.1007/s11606-011-1931-2
Phatak, A., Prusi, R., Ward, B., Hansen, L. O., Williams, M. V., Vetter, E., . . . Postelnick, M. (2016). Impact of pharmacist involvement in the transitional care of high-risk patients through medication reconciliation, medication education, and postdischarge call-backs (IPITCH Study). *Journal of Hospital Medicine*, *11*(1), 39–44. https://doi.org/10.1002/jhm.2493

[23] Toles, M., Colón-Emeric, C., Naylor, M. D., Asafu-Adjei, J., & Hanson, L. C. (2017). Connect-home: Transitional care of skilled nursing facility patients and their caregivers. *Journal of the American Geriatric Society*, *65*(10), 2322–2328. https://doi.org/10.1111/jgs.15015

[24] The Joint Commission. (2018). National patient safety goals Effective January 2018: Home Care Accreditation Program. Available at: https://www.jointcommission.org/assets/1/6/NPSG_Chapter_OME_Jan2018.pdf

medication teaching for patients and caregivers, development of medication list for patients and their health care providers).[25]

Denominator

The denominator for this measure is the total number of IRF Medicare Part A and Medicare Advantage (Part C) patient stays ending in discharge to a private home/apartment, board/care, assisted living, group home, transitional living, or home under care of an organized home health service organization or hospice. Discharge to one of these locations is based on response to the discharge location item, 44D, of the IRF-PAI assessment, shown below:

44D. Patient's discharge destination/living setting, using codes below: _____ (answer only if 44C = 1; if 44C = 0, skip to item 46) *(01. Home (e.g. private home/apt., board/care, assisted living, group home, transitional living, other residential care arrangements); 02. Short-term General Hospital; 03. Skilled Nursing Facility (SNF); 04. Intermediate care; 06. Home under care of organized home health service organization; 50. Hospice (home); 51. Hospice (medical facility); 61. Swing Bed; 62. Another Inpatient Rehabilitation Facility; 63. Long-Term Care Hospital (LTCH); 64. Medicaid Nursing Facility; 65. Inpatient Psychiatric Facility; 66. Critical Access Hospital (CAH); 99. Not Listed*

Numerator

The numerator is the number of stays for which the IRF-PAI indicated that the following is true:

At the time of discharge, the facility provided a current reconciled medication list to the patient, family, and/or caregiver (A2123 = [1]).

Measure Time Window

The measure will be calculated quarterly. All IRF stays during the quarter will be included in the denominator and are eligible for inclusion in the numerator. For patients with multiple stays during the quarter, each stay is eligible for inclusion in the measure.

Items Included in the Quality Measure

One data element will be included to calculate the measure. One data element will be collected to inform internal measure consistency logic.

Provision of Current Reconciled Medication List to Patient at Discharge

A2123. Provision of Current Reconciled Medication List to Patient at Discharge At the time of discharge, did your facility provide the patient's current reconciled medication list to the patient, family and/or caregiver?	
Enter Code ☐	0. **No** – Current reconciled medication list not provided to the patient, family and/or caregiver 1. **Yes** – Current reconciled medication list provided to the patient, family and/or caregiver

[25] Jack, B., Paasche-Orlow, M., Mitchell, S., Forsythe, S., Martin, J., & Brach, C. (n.d.). *Re-Engineered Discharge (RED) toolkit*. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from https://www.ahrq.gov/professionals/systems/hospital/red/toolkit/index.html, Last accessed November, 28, 2018.

Route of Current Medication List Transmission to Patient

A2124. Route of Current Reconciled Medication List Transmission to Patient Indicate the route(s) of transmission of the current reconciled medication list to the patient/family/caregiver.	
Route of Transmission	**Check all that apply** ↓
A. Electronic Health Record (e.g., electronic access to patient portal)	☐
B. Health Information Exchange Organization	☐
C. Verbal (e.g., in-person, telephone, video conferencing)	☐
D. Paper-based (e.g., fax, copies, printouts)	☐
E. Other Methods (e.g., texting, email, CDs)	☐

Risk Adjustment

This measure is not risk-adjusted or stratified.

Quality Measure Calculation Steps

The following steps are used to calculate the measure:

Step 1. Calculate the denominator count

Calculate the number of patient stays with discharge to home using discharge location item 44D.

Step 2. Calculate the numerator count

Calculate the number of stays where a reconciled medication list was transferred:

A2123 = [1]

Step 3. Calculate the facility observed score

Divide the facility's numerator count by its denominator count; in other words, divide the results of Step 2 by the results of Step 1. Multiply by 100.

Quality Measure Coding Steps

The following steps are used to code the measure:

1. **At discharge, code for the patient's discharge location.**

   Identify discharge location with item 44D.

2. **At discharge, code for whether the facility provided the reconciled medication list to the patient, family, and/or caregiver.**

   A valid response for item 44D would trigger the coder to complete item A2123.

3. **At discharge, code for the route of transmission.**

   A valid response for item A2123 [A2123 = 1] would send the coder to item A2124. This item is used for internal measure consistency logic.

Section 4. Update to the Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP) Measure

Measure Update

The Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP) measure was adopted for the IRF QRP in the FY 2017 IRF Prospective Payment System (PPS) final rule (81 FR 52095 through 52103) to meet the requirement of the IMPACT Act. Measure specifications were first published in July 2016.[26] These draft specifications include a new measure exclusion for baseline nursing facility (NF) residents; there are no other changes to measure specifications.

Measure Description

This measure assesses successful discharge to the community from a PAC setting, with successful discharge to the community including no unplanned rehospitalizations and no death in the 31 days following discharge. Specifically, this measure reports an IRF's risk-standardized rate of Medicare fee-for-service (FFS) patients who are discharged to the community after an IRF stay, do not have an unplanned readmission to an acute care hospital or LTCH in the 31 days following discharge to community, and remain alive during the 31 days following discharge to community. Community, for this measure, is defined as home/self-care, with or without home health services, based on Patient Discharge Status Codes 01, 06, 81, and 86 on the Medicare FFS claim.[27,28,29]

We adopted four discharge to community measures for IRF, LTCH, SNF, and home health (HH) settings, respectively. These measures are conceptualized uniformly across the PAC settings in terms of the definition of the discharge to community outcome, the approach to risk adjustment, and the measure calculation, with some differences where needed due to setting-specific considerations. It is important to note that each measure is specific to the particular PAC setting (i.e., IRF, LTCH, SNF, or HH); we do not pool PAC patients/residents across settings in the measure development and calculation.

Purpose/Rationale for the Measure

Discharge to a community setting is an important health care outcome for many patients/residents for whom the overall goals of PAC include optimizing functional improvement, returning to a previous level of independence, and avoiding institutionalization. Returning to the community is also an important outcome for many patients/residents who are not expected to make functional improvement during their PAC stay, and for patients/residents who may be expected to decline functionally due to their medical condition. By assessing whether patients remain alive in the community without acute complications for 31 days following discharge, the Discharge to Community–PAC IRF QRP measure is a meaningful patient- and family-centered measure of successful community discharge.

In addition to being an important outcome from a patient/resident and family perspective, patients/residents discharged to community settings, on average, incur lower costs over the recovery

[26] The original measure specifications are available at https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/IRF-Quality-Reporting/Downloads/Measure-Specifications-for-FY17-IRF-QRP-Final-Rule.pdf.

[27] American Hospital Association. (2017). *National Uniform Billing Committee Official UB-04 Data Specifications Manual 2018* (Version 12). Chicago, IL: Author.

[28] Patient discharge status codes 81 and 86 are intended for use on acute care claims only. However, because these codes have sometimes been reported on PAC claims, we include them in our definition of community to credit the PAC provider for discharging the patient to a community setting.

[29] This definition is not intended to suggest that group homes, foster care, or other residential care settings included in the definition of "community" for the purpose of this measure are the most integrated setting for any particular individual or group of individuals under the Americans with Disabilities Act (ADA) and Section 504.

episode, compared with those discharged to institutional settings.[30] Given the high costs of care in institutional settings, encouraging PACs to prepare patients for discharge to community, when clinically appropriate, may have cost-saving implications for the Medicare program.[31] Also, providers have found that successful discharge to community was a major driver of their ability to achieve savings, where capitated payments for PAC were in place.[32] For patients/residents who require long-term care due to persistent disability, discharge to community could result in lower long-term care costs for Medicaid and for patients'/residents' out-of-pocket expenditures.[33]

Analyses conducted by the Medicare Payment Advisory Commission (MedPAC) using 2013 PAC data demonstrate the substantially higher costs of institutional PAC stays compared with HH stays.[34] Average costs of HH stays ranged from $1,790 to $2,699 depending on the position of the HH stay in a sequence of PAC care. Average costs of institutional PAC stays (including IRF, LTCH, and SNF stays) ranged from $13,948 to $17,506, depending on the position of the institutional PAC stay in a sequence of PAC care.[35]

Analyses conducted for the Assistant Secretary for Planning and Evaluation (ASPE) on PAC episodes, using a 5 percent sample of 2006 Medicare claims, revealed that relatively high average, unadjusted Medicare payments are associated with discharge to institutional settings from IRFs, SNFs, LTCHs, or HHAs, as compared with payments associated with discharge to community settings.[36] Average, unadjusted Medicare payments associated with discharge to community settings ranged from $0 to $4,017 for IRF discharges, $0 to $3,544 for SNF discharges, $0 to $4,706 for LTCH discharges, and $0 to $992 for HHA discharges. In contrast, payments associated with discharge to non-community settings were considerably higher, ranging from $11,847 to $25,364 for IRF discharges, $9,305 to $29,118 for SNF discharges, $12,465 to $18,205 for LTCH discharges, and $7,981 to $35,192 for HHA discharges.[37] These expenditure estimates only include Medicare expenditures related to the immediate discharge destination following SNF, LTCH, IRF or HH care, and not expenditures related to any subsequent discharge destinations.

Measuring and comparing facility-level discharge to community rates is expected to help differentiate among facilities with varying performance in this important domain and to help avoid disparities in care across patient/resident groups. Variation in discharge to community rates has been reported within and across post-acute settings; across a variety of facility-level characteristics, such as geographic location (for example, region, urban or rural location), ownership (for example, for-profit or nonprofit), and freestanding or hospital-based units; and across patient-level characteristics, such as race

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[30] Dobrez, D., Heinemann, A. W., Deutsch, A., Manheim, L., & Mallinson, T. (2010). Impact of Medicare's prospective payment system for inpatient rehabilitation facilities on stroke patient outcomes. *American Journal of Physical Medicine & Rehabilitation*, *89*(3), 198–204. https://doi.org/10.1097/PHM.0b013e3181c9fb40

Gage, B., Morley, M., Spain, P., Ingber, M. (2009). *Examining post acute care relationships in an integrated hospital system.* Final Report. Research Triangle Park, NC: RTI International.

[31] Gage, Morley, Spain, & Ingber, 2009.

[32] Doran, J. P., & Zabinski, S. J. (2015). Bundled payment initiatives for Medicare and non-Medicare total joint arthroplasty patients at a community hospital: Bundles in the real world. *The Journal of Arthroplasty*, *30*(3), 353–355. https://doi.org/10.1016/j.arth.2015.01.035

[33] Newcomer, R. J., Ko, M., Kang, T., Harrington, C., Hulett, D., & Bindman, A. B. (2016). Health care expenditures after initiating long-term services and supports in the community versus in a nursing facility. *Medical Care*, *54*(3), 221–228. https://doi.org/10.1097/MLR.0000000000000491

[34] Medicare Payment Advisory Commission. (2018, June). Chapter 4: Paying for sequential stays in a unified prospective payment system for post-acute care. In *June 2018 Report to the Congress: Medicare and the Health Care Delivery System*. Retrieved from http://www.medpac.gov/docs/default-source/reports/jun18_ch4_medpacreport_sec.pdf?sfvrsn=0

[35] Ibid.

[36] Gage et al., 2009.

[37] Ibid.

and gender.[38] Discharge to community rates in the IRF setting have been reported to range from about 60 to 80 percent.[39] Longer-term studies show that rates of discharge to community from IRFs have decreased over time as IRF length of stay has decreased.[40] In the IRF Medicare FFS population, using national unadjusted data from calendar years 2015 and 2016, we found that approximately 64 percent of patients were discharged to the community. Facility-level observed discharges to community ranged from approximately 15 percent to 100 percent, with an interquartile range of 9.3 percentage points. Greater variation in discharge to community rates is seen in the SNF setting, with rates ranging from 31 to 65 percent.[41] A multi-center study of 23 LTCHs demonstrated that 28.8 percent of 1,061 patients who were

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[38] Reistetter, T. A., Karmarkar, A. M., Graham, J. E., Eschbach, K., Kuo, Y. F., Granger, C. V., . . . Ottenbacher, K. J. (2014). Regional variation in stroke rehabilitation outcomes. *Archives of Physical Medicine and Rehabilitation*, *95*(1), 29–38. https://doi.org/10.1016/j.apmr.2013.07.018

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[39] Galloway, R. V., Granger, C. V., Karmarkar, A. M., Graham, J. E., Deutsch, A., Niewczyk, P., . . . Ottenbacher, K. J. (2013). The Uniform Data System for Medical Rehabilitation: Report of patients with debility discharged from inpatient rehabilitation programs in 2000-2010. *American Journal of Physical Medicine & Rehabilitation*, *92*(1), 14–27. https://doi.org/10.1097/PHM.0b013e31827441bc

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[40] Galloway et al., 2013.

Mallinson, T., Deutsch, A., Bateman, J., Tseng, H. Y., Manheim, L., Almagor, O., & Heinemann, A. W. (2014). Comparison of discharge functional status after rehabilitation in skilled nursing, home health, and medical rehabilitation settings for patients after hip fracture repair. *Archives of Physical Medicine and Rehabilitation*, *95*(2), 209–217. https://doi.org/10.1016/j.apmr.2013.05.031

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Hall, R. K., Toles, M., Massing, M., Jackson, E., Peacock-Hinton, S., O'Hare, A. M., & Colón-Emeric, C. (2015). Utilization of acute care among patients with ESRD discharged home from skilled nursing facilities. *Clinical Journal of the American Society of Nephrology (CJASN)*, *10*(3), 428–434. https://doi.org/10.2215/CJN.03510414

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ventilator-dependent on admission were discharged to home.[42] A single-center study found that 31 percent of LTCH hemodialysis patients were discharged to home.[43] One study noted that 64 percent of beneficiaries who were discharged from the HH episode did not use any other acute or post-acute services paid by Medicare in the 30 days after discharge.[44] However, significant numbers of patients were admitted to hospitals (29 percent) and lesser numbers to SNFs (7.6 percent), IRFs (1.5 percent), HHAs (7.2 percent), or hospices (3.3 percent).[45]

Discharge to community is an actionable health care outcome, as targeted interventions have been shown to successfully increase discharge to community rates in a variety of post-acute settings.[46] Many of these interventions involve discharge planning; communication and care coordination; specific rehabilitation strategies, such as addressing discharge barriers and improving medical and functional status; or community-based transitional care services and supports.[47] The effectiveness of these

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[42] Scheinhorn, D. J., Hassenpflug, M. S., Votto, J. J., Chao, D. C., Epstein, S. K., Doig, G. S., . . . Petrak, R. A., & the Ventilation Outcomes Study Group. (2007). Post-ICU mechanical ventilation at 23 long-term care hospitals: A multicenter outcomes study. *Chest*, *131*(1), 85–93. https://doi.org/10.1378/chest.06-1081

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[45] Ibid.

[46] Kushner, Peters, & Johnson-Greene, 2015a.

Wodchis et al., 2005.

Berkowitz, R. E., Jones, R. N., Rieder, R., Bryan, M., Schreiber, R., Verney, S., & Paasche-Orlow, M. K. (2011). Improving disposition outcomes for patients in a geriatric skilled nursing facility. *Journal of the American Geriatrics Society*, *59*(6), 1130–1136. https://doi.org/10.1111/j.1532-5415.2011.03417.x

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[47] Kushner, Peters, & Johnson-Greene2015a.

Wodchis et al., 2005.

Berkowitz et al., 2011.

Kushner, Peters, & Johnson-Greene, 2015b.

Jung, H. Y., Trivedi, A. N., Grabowski, D. C., & Mor, V. (2016). Does more therapy in skilled nursing facilities lead to better outcomes in patients with hip fracture? *Physical Therapy*, *96*(1), 81–89. https://doi.org/10.2522/ptj.20150090

Camicia, M., Wang, H., DiVita, M., Mix, J., & Niewczyk, P. (2016). Length of stay at inpatient rehabilitation facility and stroke patient outcomes. *Rehabilitation Nursing Journal*, *41*(2), 78–90. https://doi.org/10.1002/rnj.218

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Rodakowski, J., Rocco, P. B., Ortiz, M., Folb, B., Schulz, R., Morton, S. C., . . . James, A. E., III. (2017). Caregiver integration during discharge planning for older adults to reduce resource use: A metaanalysis. *Journal of the American Geriatrics Society*, *65*(8), 1748–1755. https://doi.org/10.1111/jgs.14873

interventions suggests that improvement in discharge to community rates among PAC patients/residents is possible through modifying provider-led processes and interventions.

Denominator

The denominator for the discharge to community measure is the risk-adjusted expected number of discharges to community. This estimate includes risk adjustment for patient characteristics with the facility effect removed. The "expected" number of discharges to community is the predicted number of risk-adjusted discharges to community if the same patients were treated at the average facility appropriate to the measure.

The regression model used to calculate the denominator is developed using all non-excluded facility stays in the national data. The denominator is computed in the same way as the numerator, but the facility effect is set at the average. The descriptions of the discharge to community outcome, patient stays included in the measure, and numerator calculation are below.

Numerator

The measure does not have a simple form for the numerator and denominator—that is, the risk adjustment method does not make the *observed* number of community discharges the numerator, and a *predicted* number the denominator. The measure numerator is the *risk-adjusted estimate* of the number of patients who are discharged to the community, do not have an unplanned readmission to an acute care hospital or LTCH in the 31-day post-discharge observation window, and remain alive during the post-discharge observation window. This estimate starts with the observed discharges to community and is risk-adjusted for patient characteristics and a statistical estimate of the facility effect beyond case mix.

The numerator uses a model estimated on full national data specific to the IRF setting; it is applied to the facility's patient stays included in the measure and includes the estimated effect of that facility. The prediction equation is based on a logistic statistical model with a two-level hierarchical structure. The patient stays in the model have an indicator of the facility they are discharged from; the effect of the facility is measured as a positive or negative shift in the intercept term of the equation. The facility effects are modeled as belonging to a normal (Gaussian) distribution centered at 0 and are estimated along with the effects of patient characteristics in the model. Numerator details are provided below.

Numerator details: discharge to community

Discharge to community is based on the Patient Discharge Status Code from the IRF claim. Discharge to community is defined as discharge to home/self-care with or without home health services.[48] Table 1 lists the Patient Discharge Status Codes used to define community.

Table 1
Patient Discharge Status Codes Used to Determine Discharge to a Community Setting

Discharge Status Codes Indicating Discharge to a Community Setting	
01	Discharged to home/self-care (routine discharge)
06	Discharged/transferred to home under care of organized home health service organization
81	Discharged to home or self-care with a planned acute care hospital readmission
86	Discharged/transferred to home under care of organized home health service organization with a planned acute care hospital inpatient readmission

[48] American Hospital Association, 2017.

Patient discharge status codes 81 and 86 are intended for use on acute care claims only. However, because these codes have sometimes been reported on PAC claims, we include them in our definition of community to credit the PAC provider for discharging the patient to a community setting.

Numerator details: unplanned readmissions in the 31-day post-discharge observation window

A patient who is discharged to the community is not considered to have a successful discharge to community outcome for this measure if they have a subsequent unplanned readmission to an acute care hospital or LTCH in the post-discharge observation window, which includes the day of discharge and the 31 days following day of discharge. We only assess the first readmission encountered in the post-discharge window. Our definition of acute care hospital includes hospitals paid under the Inpatient PPS (IPPS), critical access hospitals (CAH), and psychiatric hospitals or units. Using acute care and LTCH claims, we identify unplanned readmissions based on the CMS planned readmissions algorithm[49] used in the following PAC readmission measures, endorsed by the National Quality Forum (NQF) and used in several CMS programs: (1) NQF #2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM); (2) NQF #2502: All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities; (3) NQF #2512: All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Long-Term Care Hospitals; and (4) NQF #2380: Rehospitalization During the First 30 Days of Home Health.[50] These readmission measures are based on the Hospital-Wide All-Cause Readmission Measure (HWR) (CMS/Yale) (NQF #1789),[51] with some additions made for the SNF, IRF, and LTCH setting measures.[52] The CMS planned readmission definition is based on the claim from the readmission having a code for a diagnosis or procedure that is considered planned; however, if a planned procedure is accompanied by a principal diagnosis in a specified list of acute diagnoses, the readmission is reclassified as unplanned. Readmissions to psychiatric hospitals or units are classified as planned readmissions. We use the most current available version of the CMS planned readmission algorithm from the HWR measure specifications for measure calculation and make necessary updates to the additions made for PAC settings to ensure the algorithm corresponds to our measurement period.

This measure was developed with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) procedure and diagnosis codes, and has been transitioned using the ICD-9-CM to ICD-10-CM crosswalk.

Numerator details: death in the 31-day post-discharge observation window

Patients who are discharged to the community are not considered to have a successful discharge to community outcome for this measure if they die in the post-discharge window, which includes the day

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[49] Yale New Haven Health Services Corporation – Center for Outcomes Research & Evaluation (YNHHSC/CORE). (2018, March). Appendix E. Planned Readmission Algorithm. In *2018 All-Cause Hospital Wide Measure Updates and Specifications Report: Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0*. Prepared for the Centers for Medicare & Medicaid Services. Retrieved from https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841

[50] NQF #2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM). www.qualityforum.org/QPS/2510

NQF #2502: All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities. www.qualityforum.org/QPS/2502

NQF #2512: All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Long-Term Care Hospitals. www.qualityforum.org/QPS/2512

NQF #2380: Rehospitalization During the First 30 Days of Home Health. www.qualityforum.org/QPS/2380

[51] NQF #1789: Hospital-Wide All-Cause Readmission Measure (HWR) (CMS/Yale). www.qualityforum.org/QPS/1789

[52] RTI International. (2016, July). *Measure specifications for measures adopted in the FY 2017 IRF QRP Final Rule*. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/IRF-Quality-Reporting/Downloads/Measure-Specifications-for-FY17-IRF-QRP-Final-Rule.pdf.

Note: The ICD-9 codes listed in Table 2-9 were updated with ICD-10-CM codes for data starting October 1, 2015.

of discharge and the 31 days following day of discharge. Death in the post-discharge window is identified using date of death from Medicare eligibility files.

Target Population and Measure Exclusions

The target population for the measure is the group of Medicare FFS patients who are not excluded for the reasons listed below.

Measure exclusions

Exclusions for the discharge to community measure are listed below, along with the rationale and data source for each exclusion. Baseline long-term NF residence is based on data from the Minimum Data Set (MDS). All other measure exclusion criteria are determined by processing Medicare claims and eligibility data to determine whether the individual exclusion criteria are met. Only IRF stays that are preceded by a short-term acute care stay in the 30 days before the IRF admission date are included in the measure. Stays ending in transfers to the same level of care are excluded.

1) *Age under 18 years*

   Rationale:

   a. There is limited literature on discharge destination outcomes in this age group.

   b. Patients in this age group represent a different cohort, likely living with their parents, and may be expected to have higher discharge to community rates than the rest of the Medicare population.

   c. Patients in this age group represent a small proportion of the post-acute Medicare FFS population.

   Data source: Birth date and IRF admission date from Inpatient Standard Analytic File (SAF).

2) *No short-term acute care stay within the 30 days preceding IRF admission*

   Rationale: Acute care claims from the 30 days before IRF admission provide the principal diagnosis and other important patient data for risk adjustment. Patients without a short-term acute care discharge within the 30 days before PAC admission are excluded from the measure, because important risk adjustment data are missing.

   Data source: Hospital discharge date in Inpatient SAF acute care claims in the 30 days before IRF admission.

3) *Discharges to psychiatric hospital*

   Rationale: Patients discharged to psychiatric hospital are excluded from the measure because community living at the time of discharge may be potentially inappropriate or unsafe for them because of their mental health or psychiatric condition.

   Data source: Patient discharge status code from Inpatient SAF IRF claim.

4) *Discharges against medical advice*

   Rationale: Patients who discharge themselves against medical advice are excluded because their care plan may not have been fully implemented, and the discharge destination may not reflect the facility's discharge recommendation. Additionally, patients discharged against medical advice may be at higher risk of post-discharge readmissions or death, depending on their medical condition or because of potential non-adherence or non-compliance with care recommendations.

   Data source: Patient discharge status code from Inpatient SAF IRF claim.

5) *Discharges to disaster alternative care sites or federal hospitals*

Rationale: Patients discharged to disaster alternative care sites are excluded because these discharges are likely influenced by external emergency conditions and may not represent discretionary discharges by the IRF provider. Discharges to federal hospitals are also excluded.

Data source: Patient discharge status code from Inpatient SAF IRF claim.

6) *Discharges to court/law enforcement*

Rationale: Patients who are discharged to court or law enforcement are likely ineligible for discharge to the community because of legal restrictions.

Data source: Patient discharge status code from Inpatient SAF IRF claim.

7) *Patients discharged to hospice or those with a hospice benefit in the 31-day post-discharge window*

Rationale:

a. Patients discharged to hospice care and those with a hospice benefit in the post-discharge observation window are terminally ill and have very different goals of care than non-hospice patients. For non-hospice patients, the primary goal of PAC is to return to baseline, independent living in the community; death is an undesirable outcome in the non-hospice population. For patients on hospice, the goal is to give them the opportunity to die comfortably, at home or in a facility.

b. A large proportion of patients on hospice care die in the 31-day window following discharge from the post-acute setting.

c. The hospice agency, not the PAC setting, makes the final decision of discharge to hospice-home or hospice-facility.

Data source: Discharge to hospice is based on the Inpatient SAF IRF claim. Post-discharge hospice benefit is based on hospice enrollment dates (start and termination dates) in the Enrollment Database (EDB).

8) *Patients not continuously enrolled in Part A FFS Medicare for the 12 months before IRF admission date, and at least 31 days after IRF discharge date*

Rationale: Patients not continuously enrolled in Part A FFS Medicare for the 12 months before the IRF admission date are excluded because risk adjustment for certain comorbidities requires information on acute inpatient bills for one year before IRF admission. Patients not continuously enrolled in Part A FFS Medicare for at least 31 days after IRF discharge are excluded because readmissions and death must be observable in the 31-day post-discharge period. Patients without Part A coverage or those who are enrolled in Medicare Advantage plans will not have complete inpatient claims in the system.

Data source: EDB and Denominator Files.

9) *Patients whose prior short-term acute care stay was for non-surgical treatment of cancer*

Rationale: Patients whose prior short-term acute care stay was for non-surgical treatment of cancer are excluded because they have a different trajectory for recovery after discharge, with a high

mortality rate.[53] Exclusion of these patients is consistent with the HWR and PAC readmission measures.

Data source: Diagnosis codes from the Inpatient SAF prior acute claim.

10) *IRF stays that end in transfer to the same level of care*

Rationale: IRF stays that end in transfer to the same level of care are excluded because their IRF episode has not ended. For an IRF episode that involves transfer to the same level of care, only the final IRF provider is included in the measure.

Data source: Patient discharge status code from Inpatient SAF IRF claim.

11) *IRF stays with claims data that are problematic (e.g., anomalous records for stays that overlap wholly or in part, or are otherwise erroneous or contradictory; stays not matched to the denominator or EDB files; claims not paid)*

Rationale: This measure requires accurate information from the IRF stay and prior short-term acute care stay in the elements used for risk adjustment. No-pay IRF stays involving exhaustion of Part A benefits are also excluded.

Data source: Inpatient SAF claims, EDB and denominator files.

12) *Planned discharges to an acute or LTCH setting*

Rationale: Planned discharges to an acute care hospital or LTCH are excluded because these patients had a planned return to higher level of care, and discharge to community is not appropriate for these patients.

Data source: The planned readmission algorithm is applied to diagnosis and procedure codes found on the first acute care or LTCH claim, if any, on the day of or day after index IRF discharge.

13) *Medicare Part A benefits exhausted*

Rationale: Patients who have exhausted their Medicare Part A coverage during the IRF stay are excluded because the discharge destination decision may be related to exhaustion of benefits.

Data source: Inpatient SAF IRF claim.

14) *Patients who received care from a facility located outside of the United States, Puerto Rico, or a U.S. territory*

Rationale: Patients who received care from foreign facilities may not have complete inpatient claims in the system, and these facilities may not be subject to policy decisions related to this quality measure.

Data source: CMS Certification Number from the Inpatient SAF IRF claim.

15) ***New exclusion:*** *Patients who had a long-term NF stay in the 180 days preceding their hospitalization and IRF stay, with no intervening community discharge between the long-term NF stay and qualifying hospitalization for measure inclusion (i.e., baseline NF residents)*

[53] NQF #1789: Hospital-Wide All-Cause Readmission Measure (HWR) (CMS/Yale). www.qualityforum.org/QPS/1789

Rationale: Baseline long-term NF residents did not live in the community before their IRF stay, and discharge to a community setting may not be a safe or expected outcome for these residents.

Data source: We examine historical MDS data in the 180 days preceding the qualifying prior acute care admission and index IRF stay. Presence of an Omnibus Budget Reconciliation Act (OBRA)-only assessment (i.e., a non-SNF PPS assessment) with no intervening community discharge between the OBRA assessment and acute care admission date flags the index IRF stay as a baseline long-term NF resident.

Data Sources

This measure is based on Medicare FFS administrative claims and uses data in the Medicare eligibility files, inpatient claims, and MDS. The eligibility files provide information such as date of birth, date of death, sex, reasons for Medicare eligibility, periods of Part A coverage, and periods in the Medicare FFS program. The data elements from the Medicare FFS claims are those basic to the operation of the Medicare payment systems and include data such as date of admission, date of discharge, diagnoses, procedures, indicators for use of dialysis services, and indicators of whether the Part A benefit was exhausted. The inpatient claims data files contain patient-level PAC and other hospital records. Historical MDS data are used to identify baseline NF residents. No data beyond those submitted in the normal course of business are required from IRF providers for the calculation of this measure.

The following are the specific files used for measure calculation with links to their documentation:

- *Medicare Inpatient Claims (SAF), Index PAC Claims*: Documentation for the Medicare claims data is provided online by Research Data Assistance Center (ResDAC). The following web page includes data dictionaries for the Inpatient SAF (Inpatient Research Identifiable File (RIF)): http://www.resdac.org/cms-data/files/ip-rif/data-documentation
- *Medicare Enrollment Database*: Information about the EDB may be found at http://aspe.hhs.gov/datacncl/datadir/cms.htm
- *Medicare Denominator File*: Information and documentation are available at https://aspe.hhs.gov/report/data-health-and-well-being-american-indians-alaska-natives-and-other-native-americans-data-catalog/medicare-denominator-file and ftp://ftp.cdc.gov/pub/health_statistics/nchs/datalinkage/Denominator%20(edited).pdf.
- *MDS*: Documentation available at https://www.resdac.org/cms-data/files/mds-3.0

Measure Time Window

The measure is calculated using two years of data. All IRF stays during the two-year time window, except those that meet the exclusion criteria, are included in the measure. For patients with multiple stays during the two-year time window, each stay is eligible for inclusion in the measure. Data from calendar year (CY) 2012–2013 were used to develop this measure. The analyses in this document are based on CY 2015–2016 data.

Statistical Risk Model and Risk Adjustment Covariates

We used a hierarchical logistic regression method to predict the probability of discharge to community. Patient characteristics related to discharge and a marker for the specific discharging facility are included in the equation. The equation is hierarchical in that both individual patient characteristics are accounted for, as well as the clustering of patient characteristics by facility. The statistical model estimates both the average predictive effect of the patient characteristics across all facilities, and the degree to which each facility has an effect on discharge to community that differs from that of the average facility. The facility effects are assumed to be randomly distributed around the average (according to a normal distribution). When computing the facility effect, hierarchical modeling accounts for the known

predictors of discharge to community, on average, such as patient characteristics, the observed facility rate, and the number of facility stays eligible for inclusion in the measure. The estimated facility effect is determined mostly by the facility's own data if the number of patient discharges is relatively large (as the estimate would be relatively precise), but is adjusted toward the average if the number of patient discharges is small (as that would yield a less precise estimate).

We used the following model:

Let Y_{ij}, denote the outcome (equal to 1 if patient *i* is discharged to community, 0 otherwise) for a patient *i* at facility *j*; Z_{ij} denotes a set of risk adjustment variables. We assume the outcome is related to the risk adjusters via a logit function with dispersion:

$$\text{logit}(\text{Prob}(Y_{ij} = 1)) = \alpha_j + \beta * Z_{ij} + \varepsilon_{ij} \quad (1)$$
$$\alpha_j = \mu + \omega_j; \ \omega_j \sim N(0, \tau^2)$$

where $Z_{ij} = (Z_1, Z_2, \ldots Z_k)$ is a set of *k* patient-level risk adjustment variables; α_j represents the facility-specific intercept; μ is the adjusted average outcome across all facilities; τ^2 is the between-facility variance component; and $\varepsilon \sim N(0,\sigma^2)$ is the error term. The hierarchical logistic regression model is estimated using SAS software (PROC GLIMMIX: SAS/STAT User's Guide, SAS Institute Inc.).

The estimated equation is used twice in the measure. The sum of the probabilities of discharge to community of all patients in the facility measure, including both the effects of patient characteristics and the facility, is the "predicted number" of discharges to community after adjusting for the facility's case mix. The same equation is used without the facility effect to compute the expected number of discharges to community for the same patients at the average facility. The ratio of the predicted-to-expected number of discharges to community is a measure of the degree to which discharges to community are higher or lower than what would otherwise be expected. This standardized risk ratio (SRR) is then multiplied by the mean discharge to community rate for all facility stays for the measure, yielding the risk-standardized discharge to community rate for each facility. Please note that the estimation procedure is recalculated for each measurement period. Re-estimating the models for each measurement period allows the estimated effects of the patient characteristics to vary over time as patient case-mix and medical treatment patterns change.

Risk adjustment variable descriptions are below. See Appendix B, Table B-1, for the full list of variables in the risk adjustment models.

1. Age and sex groups.
2. End stage renal disease (ESRD) or disability as original reason for entitlement.
3. Principal diagnosis (Clinical Classifications Software (CCS) groups) from the prior acute stay in the past 30 days. The principal diagnosis codes from the prior acute claim are grouped clinically using the CCS groupings developed by the Agency for Healthcare Research and Quality (AHRQ).[54]
4. IRF case-mix groups.
5. Surgical procedure categories (if present) based on the prior acute stay in the past 30 days. The procedures are grouped using the CCS groupings of procedures developed by AHRQ.[55]
6. Indicator for ESRD status.

[54] Documentation of the AHRQ Clinical Classifications Software groupings of ICD-9 codes is available at http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp.
Documentation of the AHRQ Clinical Classifications Software groupings of ICD-10 codes is available at https://www.hcup-us.ahrq.gov/toolssoftware/ccs10/ccs10.jsp.

[55] Ibid.

7. Dialysis in prior acute stay where ESRD not indicated.
8. Length of prior acute hospital stay in days for patients whose prior acute stay was in a non-psychiatric hospital (categorical variables are used to account for nonlinearity); indicator of prior psychiatric hospital stay for patients whose prior acute stay was in a psychiatric hospital.
9. Comorbidities based on prior acute stay in the past 30 days or based on a one-year look-back, depending on the specific comorbidity. Comorbidities are clustered using the Hierarchical Condition Categories (HCC) groups used by CMS.[56]
10. Number of prior acute hospital discharges in the past year, not including the hospitalization in the 30 days before the IRF stay.

Measure Calculation Algorithm

The following steps describe the calculation algorithm/measure logic for the discharge to community measures:

Step 1: Identify patients meeting the criteria for the target population, after applying measure exclusions.

Step 2: Identify patients meeting the numerator criteria (i.e., discharge to community, no unplanned readmissions on the day of discharge or in the 31 days following discharge, and no death on the day of discharge or in the 31 days following discharge).

Step 3: Identify presence or absence of risk adjustment variables for each patient.

Step 4: Calculate the predicted and expected number of discharges to community for each facility using the hierarchical logistic regression model.

The predicted number of discharges to community for each facility is calculated as the sum of the predicted probability of discharge to community for each patient discharged from the facility and included in the measure, including the facility-specific effect.

To calculate the predicted number of discharges to community, $pred_j$, for index facility stays at $facility_j$, we used the following equation:

$$pred_j = \Sigma logit^{-1}(\mu + \omega_i + \beta * Z_{ij}) \quad (2)$$

where the sum is over all stays in $facility_j$, and ω_i is the random intercept.

To calculate the expected number, exp_j, we used the following equation:

$$exp_j = \Sigma logit^{-1}(\mu + \beta * Z_{ij}) \quad (3)$$

Step 5: Calculate the SRR for each facility as the ratio of the predicted to expected number of discharges to community.

To calculate the facility-wide SRR, SRR_j, we used the following equation:

[56] CMS-HCC Mappings of ICD-9 and ICD-10 Codes are included in the software at the following website: http://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors.html.

$$SRR_j = pred_j/exp_j \quad (4)$$

Step 6: Calculate the risk-standardized discharge to community rate for each facility.

To aid interpretation, the facility-wide SRR_j, obtained from equation (4), is then multiplied by the overall national raw discharge to community rate for all facility stays, $\bar{Y}$, to produce the facility-wide risk-standardized discharge to community rate (RSR_j).

To calculate the risk-standardized discharge to community rate for each facility, we used the following equation:

$$RSR_j = SRR_j * \bar{Y} \quad (5)$$

NOTE: Because the statistic described in Step 6 is a complex function of parameter estimates, re-sampling using bootstrapping may be necessary to derive a confidence interval estimate for the final risk-standardized rate to characterize the uncertainty of the estimate.

See **Appendix B** for risk adjustment model results and providers' observed and risk-standardized score distributions.

Chapter 2 Standardized Patient Assessment Data Elements

Section 1: Introduction

The Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act) requires CMS to develop, implement, and maintain standardized patient assessment data elements (SPADEs) for PAC settings. The four PAC settings specified in the IMPACT Act are HHAs, IRFs, LTCHs, and SNFs. The goals of implementing cross-setting SPADEs are to facilitate care coordination and interoperability and to improve Medicare beneficiary outcomes.

Existing PAC assessment instruments (i.e., OASIS for HHAs, IRF-PAI for IRFs, LCDS for LTCHs, and the MDS for SNFs) often collect data elements pertaining to similar concepts, but the individual data elements—questions and response options—vary by assessment instrument. With a few exceptions, the data elements collected in these assessment instruments are not currently standardized or interoperable; therefore, patient responses across the assessment instruments cannot be compared easily.

The IMPACT Act further requires that the assessment instruments described above be modified to include core data elements on health assessment categories and that such data be standardized and interoperable. Implementation of a core set of standardized assessment items across PAC settings has important implications for Medicare beneficiaries, families, providers, and policymakers. CMS is adopting SPADEs for five categories specified in the IMPACT Act:

1. Cognitive function (e.g., able to express ideas and to understand normal speech) and mental status (e.g., depression and dementia)
2. Special services, treatments, and interventions (e.g., need for ventilator, dialysis, chemotherapy, and total parenteral nutrition)
3. Medical conditions and comorbidities (e.g., diabetes, heart failure, and pressure ulcers)
4. Impairments (e.g., incontinence; impaired ability to hear, see, or swallow)
5. Other categories as deemed necessary by the Secretary

Background

In the following sections, we present additional information on the SPADEs finalized in the FY 2020 IRF PPS final rule. We outline how each SPADE is relevant to the care of patients in the IRF, review its current use in existing PAC assessment item sets, and summarize any prior testing of the data elements. For SPADEs that were included in the National Beta Test, which was conducted by RAND between November 2017 and August 2018, we present detailed information on data element performance.

Evidence supporting these SPADEs comes from several sources, including the Post-Acute Care Payment Reform Demonstration (PAC PRD), MDS 3.0 testing, and the National Beta Test. The most relevant metrics for evaluation of SPADE performance (i.e., feasibility and reliability) include the amount of missing data, time to administer the data element, and interrater reliability (IRR). IRR is the level of agreement between two raters; that is, the extent to which two different individuals would code the same response when presented with the same information. Typically, percent agreement and the kappa statistic—or weighted kappas, for ordinal data—are used to represent IRR. The kappa statistic is preferred in most cases because there are agreed-upon conventions for its interpretation and it corrects for chance agreement between raters. However, kappa is sensitive to prevalence rates; when prevalence rates are

extremely high or low, the resulting kappa statistic does not accurately convey the level of agreement.[57] In those cases, percent agreement is preferred. The evidence offered for the SPADEs in the sections below follow standard conventions in reporting both percent agreement and kappas or weighted kappas to describe IRR.

Post-Acute Care Payment Reform Demonstration (PAC PRD)

Some prior evidence for these SPADEs comes from the PAC PRD. The PAC PRD was mandated by the Deficit Reduction Act of 2005 to examine the relative costliness and outcomes of similar types of Medicare beneficiaries discharged to different PAC settings (i.e., HHAs, IRFs, LTCHs, and SNFs). To meet these aims, the study collected standardized assessment data, using the Continuity Assessment Record and Evaluation (CARE) across PAC settings to measure patient severity and case mix across settings at more than 200 providers in 11 geographically diverse markets. The standardized assessment data allowed cross-setting comparisons of the factors associated with costs and outcomes, as well as service substitution among post-acute providers, all else being equal about the patient. Further information on the design and methods of the PAC PRD can be found at https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Reports/Research-Reports-Items/PAC_Payment_Reform_Demo_Final.html.

Testing of the Minimum Data Set 3.0 (MDS 3.0)

Additional testing information comes from the national testing of the MDS 3.0.[58] During a 6-year period starting in 2003, CMS engaged in a national project to create an improved version of the MDS 2.0. A joint RAND/Harvard team employed an iterative development process that culminated in the national testing of the MDS 3.0 in 2006 and 2007. The national validation and evaluation testing of the MDS 3.0 included 71 community nursing homes (3,822 residents) and 19 Veterans Health Administration nursing homes (764 residents), distributed throughout the regions of the United States. The evaluation was designed to test and analyze IRR, validity of key items, response rates for interview items, feedback on changes from participating nurses, and time to complete the MDS assessment. In addition, the national test design allowed comparison of item distributions between MDS 3.0 and MDS 2.0. Further information on the design and methods of MDS 3.0 testing can be found at https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/downloads/MDS30FinalReport.pdf.

National Beta Test

Purpose and goals

The National Beta Test was conducted to evaluate the reliability and validity of candidate SPADEs and to support the identification of data elements for standardization across PAC settings, in accordance with the mandates of the IMPACT Act. To test SPADE performance within each setting, sufficient numbers of patients/residents needed to be included in each of the four settings to enable setting-specific performance estimates. Further, the participating patients/residents needed to represent adequate coverage of the clinical range of patients/residents receiving care nationally in each of the four

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[57] Cicchetti, D. V., & Feinstein, A. R. (1990). High agreement but low kappa: II. Resolving the paradoxes. *Journal of Clinical Epidemiology*, *43*(6), 551–558. https://doi.org/10.1016/0895-4356(90)90159-M

Xu, S., & Lorber, M. F. (2014). Interrater agreement statistics with skewed data: Evaluation of alternatives to Cohen's kappa. *Journal of Consulting and Clinical Psychology*, *82*(6), 1219–1227. https://doi.org/10.1037/a0037489

Byrt, T., Bishop, J., & Carlin, J. B. (1993). Bias, prevalence and kappa. *Journal of Clinical Epidemiology*, *46*(5), 423–429. https://doi.org/10.1016/0895-4356(93)90018-V

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia Medica*, *22*(3), 276–282. https://doi.org/10.11613/BM.2012.031

[58] Saliba, D., & Buchanan, J. (2008a). *Development and validation of a revised nursing home assessment tool: MDS 3.0*. Santa Monica, CA: RAND Corporation. Retrieved from https://www.cms.hhs.gov/NursingHomeQualityInits/Downloads/MDS30FinalReport.pdf

PAC settings. To evaluate the suitability of the SPADEs for cross-setting use, sufficient numbers of facilities/agencies of each setting type needed to be included in the test. These facilities/agencies needed to reflect a reasonable range of geographic diversity relative to PAC settings nationally.

Many large national studies of patients and health conditions are designed to generate estimates and make comparisons of rates of conditions or severity of patients on one or more clinical characteristics (e.g., cognitive status). To do this, these studies seek to recruit a proportionally balanced representative sample, and employ case-mix models and/or sampling weights to the data. In contrast, the National Beta Test was designed to generate valid and robust national SPADE performance estimates (i.e., time to complete and IRR), which fundamentally requires acceptable geographic diversity, sufficient sample size, and reasonable coverage of the range of clinical characteristics. To meet these requirements, the National Beta Test was carefully designed so data could be collected from a wide range of environments, allowing for thorough evaluation of candidate SPADE performance in all PAC settings. These analyses included extensive checks on the sampling design (e.g., generating results by market and by urbanicity) to identify possible limitations to the generalizability of results. Results of these sensitivity analyses are not included in this document, but will be described in detail in the forthcoming volumes of the National Beta Test Final Report (see https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/IMPACT-Act-of-2014/IMPACT-Act-Downloads-and-Videos.html).

To help readers interpret evidence from the National Beta Test that is included for some SPADEs, we include an abridged description of the National Beta Test design and methods below. An in-depth technical discussion of the design and methods of the National Beta Test can be found in the document titled "Development and Evaluation Candidate Standardized Patient Assessment Data Elements: Findings from the National Beta Test (Volume 2)," available at https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/IMPACT-Act-of-2014/IMPACT-Act-Downloads-and-Videos.html.

Design and sampling

The National Beta Test included PAC providers in 14 geographic/metropolitan areas, or "markets," across the country. This number was chosen to be similar to the design used for the PAC PRD. A multistage stratified random sampling plan was used to obtain the sample of 14markets in the United States, and then a sample of eligible PAC facilities was compiled from those markets. To be eligible for selection, markets had to meet the following criteria:

- Sampled markets would yield a predefined number of PAC facilities/agencies of each type for the sample (12 SNFs, 10 HHAs, at least four LTCHs *or* IRFs, *and* at least one LTCH)
- The predefined number of facilities/agencies within the markets were expected to have flow rates large enough to obtain the targeted number of assessments per facility
- The predefined number of facilities/agencies had to be located within 2 hours of one another to facilitate completion of assessments in a timely manner

Of 306 markets in the United States, 64 were deemed eligible. The random sampling of the 14 markets was stratified by U.S. Census division to enhance geographic representation, yielding the following 14 markets: Boston, MA; Chicago, IL; Dallas, TX; Durham, NC; Fort Lauderdale, FL; Harrisburg, VA; Houston, TX; Kansas City, MO; Los Angeles, CA; Nashville, TN; Philadelphia, PA; Phoenix, AZ; St. Louis, MO; and San Diego, CA. Because these markets are a random sample, they are expected to be representative of the set of 64 eligible facilities and findings are therefore generalizable to the set of eligible facilities.

The target numbers of providers by setting within these 14 markets were 28 IRFs, 28 LTCHs, 84 SNFs, and 70 HHAs, totaling 210 PAC providers. The number of settings was determined based on

standard sample size calculations, which included the numbers of facilities and patients rather than the proportions of the populations they represented. The power calculations indicated that 28 providers per setting type (two in each market) would yield enough admissions during the field period to obtain robust estimates of candidate SPADE performance. This minimum number was adopted as the recruitment target for IRFs and LTCHs; additional SNFs and HHAs were targeted to enhance sample diversity in light of the larger proportion of these setting types nationally. A total of 143 PAC facilities (35 HHAs, 22 IRFs, 26 LTCHs, 60 SNFs) were successfully recruited across 14 U.S. markets to participate in the National Beta Test. Although this number falls short of targets both overall and by setting, this shortfall was offset by extending the field period, allowing for the accrual of more eligible patient/resident admissions and discharges.

Eligibility

The National Beta Test SPADEs included in this rule were evaluated for performance among a sample of communicative patients/residents (who could make themselves understood through any means). All communicative patients/residents who were admitted to a participating provider site during the field period and were Medicare beneficiaries covered under one of the PAC PPSs were eligible for the admission assessment, and all those who completed an admission assessment and were discharged during the field period were eligible for the discharge assessment. National Beta Test enrollment of non-communicative patients/residents was not tied to an admission date so as to ensure availability of sufficient numbers within the field period for evaluation of three data elements developed specifically for non-communicative patients/residents (observational assessments of cognitive status, mood, and pain). Although this ensured availability of sufficient numbers of non-communicative patients/residents for testing of the non-communicative data elements, it precluded assessing these patients/residents with non-interview SPADEs at admission. The three data elements developed specifically for non-communicative patients/residents are not included in this rule; thus, the non-communicative sample from the National Beta Test is not described further here.

Section 1557 of the Patient Protection and Affordable Care Act states that facilities that deliver PAC services under Medicare are required to provide qualified interpreters to their patients/residents with limited English proficiency.[59] Facilities have discretion in how they furnish qualified interpreters, including the use of remote interpreters (i.e., high-quality telephone or video services). As described above, the focus of the National Beta Test was to establish the feasibility and validity of the data elements within and across PAC settings. Including limited English proficiency patients/residents in the sample would have required the National Beta Test facilities to engage or involve translators during the test assessments. In planning the National Beta Test, we anticipated that this would have added undue complexity to what facilities/agencies were being asked to do, and would have undermined the ability of facility/agency staff to complete the requested number of assessments within the assessment window (e.g., Admission Days 3–7) and within the study field period. In light of the strong existing evidence for the feasibility of all patient/resident interview SPADEs included in this rule (Brief Interview for Mental Status [BIMS], Pain Interference, Patient Health Questionnaire [PHQ]) when administered in other languages, either through standard PAC workflow (e.g., as tested and currently collected in the MDS 3.0) and/or through rigorous translation and testing (e.g., PHQ), the performance of translated versions of these patient/resident interview SPADEs did not need to be further evaluated. In addition, because their exclusion did not threaten our ability to achieve acceptable geographic diversity, sufficient sample size, and reasonable coverage of the range of PAC patient/resident clinical characteristics, the exclusion of limited English proficiency patients/residents was not considered a limitation to interpretation of the National Beta Test results.

[59] For more information, see https://www.hhs.gov/civil-rights/for-individuals/section-1557/index.html

Data collection

Admission assessments were completed between admission days 3–7; discharge assessments could be completed from 2 days before discharge through the discharge date. Trained research nurses and staff at participating PAC facilities/agencies administered all assessments. A subset of the admission assessments was completed by research nurse/facility staff assessor pairs to allow for evaluation of IRR. Power analyses indicated that reliability estimates required a minimum of 194 paired assessments, time to complete estimates could be compared across settings for detection of small effect sizes with a minimum of 274 assessments per setting, and as few as 460 assessments would be sufficient to evaluate aspects of validity (e.g., group differences, associations with other clinical variables, etc.) with small to moderate effect sizes. Therefore, average assessment contributions per participating facility/agency were calculated for each of these goals (i.e., paired assessments, assessments completed by facility/agency staff, total admission assessments) and communicated throughout the study period to guide the data collection and track progress. These minimums were more easily attainable in SNFs and HHAs because of the larger number of participating facilities/agencies. However, participating LTCHs and IRFs also were able to collectively meet these targets by the end of the field period. The total number of admission assessments is shown in Appendix C, Table 1.1. This table also shows the number of assessments from which completion times were estimated, and the number of assessments that were conducted by paired raters and contributed to evaluation of IRR. In addition to meeting the minimum sample size requirements, the data collection yielded very small rates of missing data, speaking to the overall feasibility of the SPADEs. Table 1.2 in Appendix C shows completion rates by National Beta Test protocol module. Module completion rates ranged from 93.8 to 98.2 percent, and nearly 90 percent of the communicative admission sample completed all assessment modules. More information on the design and methods of the National Beta Test can be found in the document "Development and Evaluation Candidate Standardized Patient Assessment Data Elements: Findings from the National Beta Test (Volume 2)," available at https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/IMPACT-Act-of-2014/IMPACT-Act-Downloads-and-Videos.html.

Section 2: Cognitive Function

Impairments in cognitive function can result from many underlying conditions, including dementia, Alzheimer's Disease, stroke, brain injury, side effects of medication, metabolic and endocrine imbalances, and delirium.[60] Cognitive impairments may affect a patient or resident's ability to recover from illness or injury, or they may be a sign of an acute condition (e.g., hypoxia) that requires immediate intervention. Cognitive impairment that manifests with behavioral symptoms—or that impairs a patient's ability to communicate, prompting behavioral disturbances—may put the patient or resident or others in the care setting at risk for injury or assault, or may signal unmet patient or resident needs (e.g., pain management). Screening for the presence of impairment can help ensure appropriate and timely intervention.

A substantial proportion of PAC patients and residents experience cognitive impairment, delirium, communication impairment, or behavioral distress. Testing from the PAC PRD found that about one-third of patients and residents in PAC settings were classified as having moderately or severely impaired cognitive function.[61] About one-third exhibited disorganized thinking and altered level of consciousness, and about one-half exhibited inattention. Fewer than 7 percent of patients and residents exhibited signs and symptoms of behavioral distress in the PAC PRD.

Therapeutic interventions can improve patient outcomes, and evidence suggests that treatment (e.g., drugs, physical activity) can stabilize or delay symptom progression in some patients, thereby improving quality of life.[62,] In addition, assessments help PAC providers better understand the needs of their patients by establishing a baseline for identifying changes in cognitive function and mental status (e.g., delirium), elucidating the patient's ability to understand and participate in treatments during their stay, highlighting safety needs (e.g., to prevent falls), and identifying appropriate support needs at the time of discharge. The standardized assessment of patient or resident cognition supports clinical decision making, early clinical intervention, person-centered care, and improved care continuity and coordination. The use of valid and reliable standardized assessments can aid in the communication of information within and across providers, enabling the transfer of accurate health information.

CMS has identified several data elements as applicable for cross-setting use in standardized assessment of cognitive impairment.

1. The BIMS
2. The Confusion Assessment Method (CAM)

The data elements involve different aspects of cognition (e.g., short-term memory, comprehension) and types of data (e.g., interview, performance-based). They are collected by various modes (e.g., clinician assessed, patient reported).

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60 National Institute on Aging. (2013). Assessing cognitive impairment in older patients. Retrieved from https://www.nia.nih.gov/health/assessing-cognitive-impairment-older-patients

61 This estimate is based on responses to the BIMS in a study of patient/residents in the PAC PRD: Gage, B., Morley, M., Smith, L., Ingber, M. J., Deutsch, A., Kline, T., ... & Kelleher, C. (2012). Post-acute care payment reform demonstration: Final report (Vol 4). Research Triangle Park, NC: RTI International. Retrieved from https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Reports/Research-Reports-Items/PAC_Payment_Reform_Demo_Final.html.

62 Casey, D. A., Antimisiaris, D., & O'Brien, J. (2010). Drugs for Alzheimer's disease: Are they effective? P&T, 35(4), 208–211.

Bherer, L., Erickson, K. I., & Liu-Ambrose, T. (2013). A review of the effects of physical activity and exercise on cognitive and brain functions in older adults. Journal of Aging Research, 2013, 657508. https://doi.org/10.1155/2013/657508

Langa, K. M., & Levine, D. A. (2014). The diagnosis and management of mild cognitive impairment: A clinical review. Journal of the American Medical Association, 312(23), 2551–2561. https://doi.org/10.1001/jama.2014.13806

Brief Interview for Mental Status (BIMS)

The BIMS is a performance-based cognitive assessment developed to be a brief cognition screener with a focus on learning and memory. The BIMS evaluates repetition, recall with and without prompting, and temporal orientation.

Relevance to IRFs

The BIMS is currently included in the IRF-PAI assessment on admission. Assessing cognitive functioning is critical in IRF settings, as cognitive impairments are common among IRF patients. Although more comprehensive cognitive assessment is commonplace in IRFs (e.g., instruments incorporated in speech therapy or administered by neuropsychologists), standardized assessment tools can provide comparable baseline information if uniformly administered to all patients and standardized across provider types. An estimated 22.2 percent of IRF patients are moderately impaired, and 11.6 percent are severely impaired, as assessed by the BIMS in the PAC PRD.[63] Patients with brain injury and stroke are commonly transferred to IRFs for intensive PAC: approximately 21 percent of IRF patients have a primary diagnosis of stroke, and approximately 8 percent have a primary diagnosis of brain injury.[64] In addition, cognitive impairments are associated with engagement in rehabilitation therapies,[65] and individuals with severe cognitive impairment as measured by BIMS at IRF admission are more likely to be readmitted after discharge.[66] Cognitive impairment has significant implications for patient resource utilization, ability to participate in rehabilitation therapies, and care planning in IRFs. The standardized assessment of cognitive function using the BIMS would provide important information for care planning, care transitions, patient safety, and resource use in IRFs.

Data Elements for the Assessment of Cognitive Function: The BIMS

C0100. Should Brief Interview for Mental Status (C0200-C0500) be Conducted? (3-day assessment period) Attempt to conduct interview with all patients.	
Enter Code ☐	0. **No** (patient is rarely/never understood) → *Skip to XXXX* 1. **Yes** → *Continue to C0200, Repetition of Three Words*

[63] Gage, Morley, et al., 2012.

[64] Medicare Payment Advisory Commission. (2016). Chapter 9: Inpatient rehabilitation facility services (pp. 235–269). In *March 2016 Report to the Congress: Medicare Payment Policy*. City, ST: Author. Retrieved from http://www.medpac.gov/docs/default-source/reports/chapter-9-inpatient-rehabilitation-facility-services-march-2016-report-.pdf?sfvrsn=0

[65] Lenze, E. J., Munin, M. C., Dew, M. A., Rogers, J. C., Seligman, K., Mulsant, B. H., & Reynolds, C. F., III. (2004). Adverse effects of depression and cognitive impairment on rehabilitation participation and recovery from hip fracture. *International Journal of Geriatric Psychiatry*, *19*(5), 472–478. https://doi.org/10.1002/gps.1116

[66] Gage et al., 2012.

Brief Interview for Mental Status (BIMS)	
C0200. Repetition of Three Words	
Enter Code ☐	Ask patient: *"I am going to say three words for you to remember. Please repeat the words after I have said all three. The words are:* ***sock, blue and bed****. Now tell me the three words."* **Number of words repeated after first attempt** 3. **Three** 2. **Two** 1. **One** 0. **None** After the patient's first attempt, repeat the words using cues ("*sock, something to wear; blue, a color; bed, a piece of furniture").* You may repeat the words up to two more times.
C0300. Temporal Orientation (orientation to year, month, and day)	
Enter Code ☐	Ask patient: *"Please tell me what year it is right now."* **A. Able to report correct year** 3. **Correct** 2. **Missed by 1 year** 1. **Missed by 2 - 5 years** 0. **Missed by > 5 years** or no answer
Enter Code ☐	Ask patient: *"What month are we in right now?"* **B. Able to report correct month** 2. **Accurate within 5 days** 1. **Missed by 6 days to 1 month** 0. **Missed by > 1 month** or no answer
Enter Code ☐	Ask patient: *"What day of the week is today?"* **C. Able to report correct day of the week** 1. **Correct** 0. **Incorrect** or no answer
C0400. Recall	
Enter Code ☐	Ask patient: *"Let's go back to an earlier question. What were those three words that I asked you to repeat?"* If unable to remember a word, give cue (something to wear; a color; a piece of furniture) for that word. **A. Able to recall "sock"** 2. **Yes, no cue required** 1. **Yes, after cueing** ("something to wear") 0. **No** - could not recall
Enter Code ☐	**B. Able to recall "blue"** 2. **Yes, no cue required** 1. **Yes, after cueing** ("a color") 0. **No** - could not recall
Enter Code ☐	**C. Able to recall "bed"** 2. **Yes, no cue required** 1. **Yes, after cueing** ("a piece of furniture") 0. **No** - could not recall

C0500. BIMS Summary Score	
Enter Score ☐☐	**Add scores** for questions C0200-C0400 and fill in total score (00-15) **Enter 99 if the patient was unable to complete the interview**

Current use

The BIMS data elements are currently used in the MDS and the IRF-PAI.

Prior evidence supporting use of the BIMS

The BIMS data elements were tested in the PAC PRD, where they showed substantial to almost perfect reliability of 0.71 to 0.91 (weighted kappas) when used across all four PAC settings. The lowest agreement was on the "repetition of three words" memory data element, with a kappa of 0.71, which still falls within the range of substantial agreement. PAC PRD testing also demonstrated the feasibility of the BIMS for use in IRFs and found evidence of strong reliability of the BIMS data elements in the IRF setting. In addition, the BIMS data elements were found to be predictive of higher patient cost.[67] The BIMS data elements were also included in the national MDS 3.0 test in nursing homes and showed almost perfect reliability.[68] Agreement ranged from 0.86 to 0.99 (standard kappa). The BIMS data elements were found to be highly correlated (0.906) with a gold-standard measure of cognitive function, the Modified Mini-Mental Status (3MS) exam.[69]

Evidence supporting use of the BIMS from the National Beta Test

Assessing impairment: In the National Beta Test, the BIMS was administered at admission to 646 patients/residents in HHAs, 786 in IRFs, 496 in LTCHs, and 1,134 in SNFs (n = 3,062 overall). Overall, 5 percent of patients/residents met criteria for being severely impaired, 18 percent for being moderately impaired, and 76 percent for being intact. In the IRF setting, 3 percent were severely impaired, 15 percent were moderately impaired, and 82 percent were intact. Patients in the IRF setting showed similar impairment levels to those in an HHA and somewhat lower impairment than those in an LTCH or SNF. Setting-specific admission frequencies for BIMS data elements and the overall impairment category at admission are shown in Appendix C, Table 2.1.1.

Missing data: In general, there were low rates of missing data for BIMS items. Item-level missing data ranged from 0.4 to 1.7 percent overall and ranged from 0.3 to 0.9 percent in the IRF setting. For all settings, missing data rates were slightly higher for recall of current day of the week. In general, the low rate of missing data indicates feasibility of administration.

Time to complete: To assess feasibility of administration, the length of time to administer the BIMS was assessed among 445 patients/residents in HHAs, 537 in IRFs, 332 in LTCHs, and 494 in SNFs (n = 1,808 overall). Overall mean time to complete the BIMS was 2.2 minutes (standard deviation [SD] = 1.2 minutes). Time to complete in the IRF setting was 1.8 minutes (SD = 0.9 minutes).

Interrater reliability: The IRR was excellent for the BIMS, as measured by kappa and percent agreement of paired raters (n = 966 paired assessments across settings; n = 259 paired assessments in IRFs). Across all settings, the kappa for the BIMS Impairment Category classification (based on the BIMS total score) was 0.91; in the IRF setting, the kappa was 0.85. The kappas for individual items

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[67] Gage, Morley, et al., 2012.

[68] Saliba, D., & Buchanan, J. (2008). *Development and validation of a revised nursing home assessment tool: MDS 3.0: Appendices.* Santa Monica, CA: RAND Corporation. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/downloads/MDS30FinalReportAppendix.pdf.

[69] Saliba, D., Buchanan, J., Edelen, M. O., Streim, J., Ouslander, J., Berlowitz, D., & Chodosh, J. (2012). MDS 3.0: Brief interview for mental status. *Journal of the American Medical Directors Association, 13*(7), 611–617. https://doi.org/10.1016/j.jamda.2012.06.004

within the BIMS ranged from 0.83 to 0.93 across all settings and ranged from 0.81 to 0.91 in the IRF setting. Overall kappa values were not estimated for two items within the BIMS because the proportion of patients across settings with correct responses was out of range for a stable kappa estimate. Similarly, in the IRF setting, kappa was not estimated for three BIMS items. Percent agreement for the BIMS Impairment Category classification was 96 percent across all settings and 95 percent in the IRF setting. Percent agreement for the individual items ranged from 94 to 98 percent across settings and from 94 to 99 percent in IRFs. Please refer to Table 2.1.2 in Appendix C for kappa and percent agreement statistics for all BIMS items.

Confusion Assessment Method (CAM©)

The CAM is a widely used delirium screening tool.[70] Delirium, when undetected or untreated, can increase the likelihood of complications, rehospitalization, and death relative to patients/residents without delirium.[71]

Although multiple versions of the CAM have been developed, CMS finalized that the short version be adopted for SPADEs. The Short CAM contains only four items (i.e., items 1 to 4) from the original CAM (Long CAM). These items focus on an acute change in mental status, inattention, disorganized thinking, and altered level of consciousness.

Relevance to IRFs

The IRF-PAI does not include items to assess signs and symptoms of delirium, although delirium is common among IRF populations. In PAC PRD testing using the CAM, high proportions of IRF patients demonstrated signs and symptoms of delirium: 57.3 percent showed inattention, 44.1 percent showed disorganized thinking, and 21.4 percent showed an altered level of consciousness.[72] Delirium may also interfere with functional recovery and a patient's ability to actively participate in intensive rehabilitation therapies,[73] which is required by IRFs. In addition, presence of delirium has implications for administering and interpreting cognitive assessments,[74] which in turn has implications for assessing recovery and anticipated benefits of cognitive rehabilitation for IRF patients. As such, assessing IRF patients for signs and symptoms of delirium is critical for care planning and decision making in IRF settings, and for ensuring that IRF patients can maximally benefit from rehabilitation therapies.

The standardized assessment of delirium and reversible confusion using the Short CAM would provide important information for care planning, care transitions, patient safety, and resource use in IRFs.

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[70] De, J., & Wand, A. P. (2015). Delirium screening: A systematic review of delirium screening tools in hospitalized patients. *The Gerontologist*, *55*(6), 1079–1099. https://doi.org/10.1093/geront/gnv100

[71] Marcantonio, E. R., Kiely, D. K., Simon, S. E., John Orav, E., Jones, R. N., Murphy, K. M., & Bergmann, M. A. (2005). Outcomes of older people admitted to postacute facilities with delirium. *Journal of the American Geriatrics Society*, *53*(6), 963–969. https://doi.org/10.1111/j.1532-5415.2005.53305.x

[72] Unpublished data from the PAC PRD Public Comments sample, 2008–2010.

[73] Marcantonio, E. R., Simon, S. E., Bergmann, M. A., Jones, R. N., Murphy, K. M., & Morris, J. N. (2003). Delirium symptoms in post-acute care: Prevalent, persistent, and associated with poor functional recovery. *Journal of the American Geriatrics Society*, *51*(1), 4–9. https://doi.org/10.1034/j.1601-5215.2002.51002.x

Kiely, D. K., Jones, R. N., Bergmann, M. A., Murphy, K. M., Orav, E. J., & Marcantonio, E. R. (2006). Association between delirium resolution and functional recovery among newly admitted postacute facility patients. *The Journals of Gerontology. Series A, Biological Sciences and Medical Sciences*, *61*(2), 204–208. https://doi.org/10.1093/gerona/61.2.204

[74] Landi, F., Liperoti, R., & Bernabei, R. (2011). Postacute rehabilitation in cognitively impaired patients: Comprehensive assessment and tailored interventions. *Journal of the American Medical Directors Association*, *12*(6), 395–397.

McCusker, J., Cole, M., Dendukuri, N., Belzile, E., & Primeau, F. (2001). Delirium in older medical inpatients and subsequent cognitive and functional status: A prospective study. *Canadian Medical Association Journal (CMAJ)*, *165*(5), 575–583.

Data Elements for the Assessment of Cognitive Function: CAM

C1310. Signs and Symptoms of Delirium (from CAM©)		
Code **after completing** Brief Interview for Mental Status or Staff Assessment and reviewing medical record.		
A. Acute Onset Mental Status Change		
Enter Code ☐	**Is there evidence of an acute change in mental status** from the patient's baseline? 0. **No** 1. **Yes**	
Coding: 0. **Behavior not present** 1. **Behavior continuously present, does not fluctuate** 2. **Behavior present, fluctuates** (comes and goes, changes in severity)	↓	**Enter Code in Boxes**
	☐	**B. Inattention -** Did the patient have difficulty focusing attention, for example, being easily distractible or having difficulty keeping track of what was being said?
	☐	**C. Disorganized thinking -** Was the patient's thinking disorganized or incoherent (rambling or irrelevant conversation, unclear or illogical flow of ideas, or unpredictable switching from subject to subject)?
	☐	**D. Altered level of consciousness -** Did the patient have altered level of consciousness as indicated by any of the following criteria? ▪ **vigilant** - startled easily to any sound or touch ▪ **lethargic** - repeatedly dozed off when being asked questions, but responded to voice or touch ▪ **stuporous** - very difficult to arouse and keep aroused for the interview ▪ **comatose** - could not be aroused
Confusion Assessment Method. © 1988, 2003, Hospital Elder Life Program. All rights reserved. Adapted from: Inouye SK et al. Ann Intern Med. 1990; 113:941-8. Used with permission.		

Current use

The Short CAM data elements are currently collected in the MDS and the LCDS, and the scoring is based on staff observations of signs and symptoms of delirium. Although the Short CAM data elements are used in both assessment tools, the response options currently differ. The current version of the LCDS includes two response options (yes/no, indicating that the behavior is present or not present), whereas the MDS offers three response options (behavior continuously present, does not fluctuate; behavior present, fluctuates; behavior not present). The LCDS and MDS versions of the CAM also differ slightly in wording and criteria for the "Altered Level of Consciousness" item.

Prior evidence supporting use of the CAM

A version of the CAM with an item added to assess psychomotor retardation was tested in the national MDS 3.0 test in nursing homes. Reliabilities were substantial or almost perfect. Overall average kappa ranged from 0.85 to 0.89, and items ranged from 0.78 to 0.90 (standard kappa).[75] Based on a meta-analysis of diagnostic accuracy in nine studies, the CAM demonstrated moderate sensitivity (82 percent, 95 percent confidence interval: 69–91 percent) and high specificity (99 percent, 95 percent confidence

[75] Saliba & Buchanan, 2008b.

interval: 87–100 percent), respectively, using a delirium diagnosis (Diagnostic and Statistical Manual of Mental Disorders IV) as the standard.[76]

Evidence supporting use of the CAM from the National Beta Test

Assessing impairment: In the National Beta Test, we administered the version of the CAM that is currently collected in the MDS 3.0, that is, the version with three response options. The CAM was administered at admission to 630 patients/residents in HHA, 771 in IRF, 471 in LTCH, and 1,101 in SNF (n = 2,973 overall). Overall, 5 percent of patients/residents had evidence of mental status change from baseline, 12 percent had difficulty focusing (3 percent continuously), 6 percent had disorganized thinking (1 percent continuously), and 4 percent had altered consciousness (1 percent continuously). In the IRF setting specifically, 6 percent of patients/residents had evidence of mental status change from baseline, 14 percent had difficulty focusing (3 percent continuously), 7 percent had disorganized thinking (2 percent continuously), and 4 percent had altered consciousness (1 percent continuously). Setting-specific frequencies for CAM data elements at admission are shown in Appendix C, Table 2.2.1.

Missing data: Overall, there were very low rates of missing data for the CAM. Across all settings, item-level missing data did not exceed 0.4 percent for any of the four CAM items. Similarly, in the IRF setting, item-level missing data did not exceed 0.4 percent. For all settings, missing data rates were slightly higher for the change in mental status from baseline item (0.4 percent missing). In general, the low rate of missing data indicates feasibility of administration.

Time to complete: To assess feasibility of administration, time to complete was assessed for 375 patients/residents in HHAs, 472 in IRFs, 284 in LTCHs, and 405 in SNFs (n = 1,536 overall). Overall the mean time to complete the CAM was 1.4 minutes (SD = 0.7 minutes). In the IRF setting, the mean time to complete the CAM was 1.3 minutes (SD = 0.6 minutes).

Interrater reliability: The IRR was good for the CAM, as measured by kappa and percent agreement of paired raters (n = 914 paired assessments across settings; n = 245 paired assessments in IRFs). The kappa for the focusing attention item was good across settings (0.66) and moderate in the IRF setting (0.55). Across all settings, kappa was not estimated for the other three items within the CAM because the proportion of patients across settings with correct responses was out of range for a stable kappa estimate. In IRFs, however, the evidence of change in mental status from baseline item did yield a kappa of 0.60, reflecting moderate IRR. Percent agreement for the CAM across settings was high for all four CAM items: evidence of change of mental status from baseline (96 percent) and whether the patient had difficulty focusing attention (91 percent), had disorganized thinking (94 percent), and had altered consciousness (96 percent). Percent agreement in the IRF setting was similarly high for the four CAM items (93 percent, 89 percent, 93 percent, and 97 percent, respectively). Please refer to Table 2.2.2 in Appendix C for kappa and percent agreement statistics for all CAM items.

Mental Status (Depressed Mood)

Depression is the most common mental health condition in older adults, yet underrecognized and thus undertreated. Existing data show that depressed mood is relatively common in patients and residents receiving PAC services. The PAC PRD found that about 9 percent of individuals in PAC were classified as likely to have depression.[77] The prevalence varied from a low of 7 percent of beneficiaries in SNFs to a

[76] Shi, Q., Warren, L., Saposnik, G., & Macdermid, J. C. (2013). Confusion assessment method: A systematic review and meta-analysis of diagnostic accuracy. *Neuropsychiatric Disease and Treatment, 9*, 1359–1370. https://doi.org/10.2147/NDT.S49520

[77] This estimate is based on patient responses to a question about being sad in the two weeks before the assessment interview in a study of patient/residents in the PAC PRD (Gage, Morley et al., 2012). If they responded "often" or "always," they were considered to have depression.

high of 11 percent of patients in IRFs.[78] Almost half of nursing home residents in the United States with an active diagnosis of depression at the time of admission are not receiving psychiatric treatment (medication or psychological therapy) for the condition.[79]

Older adults with depression may exhibit different symptoms than younger adults, including fatigue, insomnia, irritable mood, confusion, and lack of focus.[80] Some medications and medical conditions, such as heart disease, stroke, or cancer, may also cause depressive symptoms in older adults.[26] Diagnosis and treatment of depression can lead to significant improvement of symptoms, as measured on depression assessment scales. Depressive symptoms improve in 60 to 80 percent of elderly patients taking an antidepressant medication.[81] Psychosocial treatments of depression in older adults have been shown to be more effective than no treatment, according to self-rated and clinician-rated measures of depression.[82]

Assessments of the signs and symptoms of depression help PAC providers better understand the needs of their patients and residents by prompting further evaluation (i.e., to establish a diagnosis of depression); elucidating the patient's or resident's ability to participate in therapies for conditions other than depression during their stay; and identifying appropriate ongoing treatment and support needs at the time of discharge. The standardized assessment of depression among PAC patients and residents supports clinical decision making, early clinical intervention, person-centered care, and improved care continuity and coordination. The use of valid and reliable standardized assessments can aid in the communication of information within and across providers, further enabling the transfer of accurate health information.

Standardized Data Elements to Assess Depressed Mood

CMS has identified the Patient Health Questionnaire-2 to 9 (PHQ-2 to 9) data elements for standardized assessment of depressed mood.

Patient Health Questionnaire-2 to 9 (PHQ-2 to 9)

The PHQ-2 to 9 data elements use a summed-item scoring approach to first screen for signs and symptoms of depressed mood in patients and residents by assessing the two cardinal criteria for depression: depressed mood and anhedonia (inability to feel pleasure).[83] At least one of the two must be present for a determination of probable depression, which signals the need for continued assessment of the additional seven PHQ symptoms. The interview is concluded if a respondent screens negative for the first two symptoms.

Relevance to IRFs

The PHQ-2 to 9 would provide valuable patient information for use in IRFs. The IRF-PAI does not currently assess the signs and symptoms of depression, though depression is common among IRF patients. In PAC PRD, 11.3 percent of IRF patients screened positive for depressive symptoms as

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[78] Gage, Morley, et al., 2012.

[79] Ulbricht, C. M., Rothschild, A. J., Hunnicutt, J. N., & Lapane, K. L. (2017). Depression and cognitive impairment among newly admitted nursing home residents in the USA. *International Journal of Geriatric Psychiatry*, *32*(11), 1172–1181. https://doi.org/10.1002/gps.4723

[80] National Institute on Aging. (2011). *Depression and older adults*. Retrieved from https://www.nia.nih.gov/health/depression-and-older-adults

[81] Lebowitz, B. D., Pearson, J. L., Schneider, L. S., Reynolds, C. F., III, Alexopoulos, G. S., Bruce, M. L., . . . Parmelee, P. (1997). Diagnosis and treatment of depression in late life. Consensus statement update. *Journal of the American Medical Association*, *278*(14), 1186–1190. https://doi.org/10.1001/jama.1997.03550140078045

[82] Scogin, F., & McElreath, L. (1994). Efficacy of psychosocial treatments for geriatric depression: A quantitative review. *Journal of Consulting and Clinical Psychology*, *62*(1), 69–74. https://doi.org/10.1037/0022-006X.62.1.69

Wei, W., Sambamoorthi, U., Olfson, M., Walkup, J. T., & Crystal, S. (2005). Use of psychotherapy for depression in older adults. *The American Journal of Psychiatry*, *162*(4), 711–717. https://doi.org/10.1176/appi.ajp.162.4.711

[83] American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: American Psychiatric Association.

assessed by the PHQ-2, more than the other three PAC settings.[84] This highlights the importance of screening for depressed mood among patients in IRF settings. Depressed mood may influence patient participation in rehabilitation therapies and may affect the validity of cognitive assessments,[85] and therefore has significant implications for monitoring and supporting progress toward rehabilitation goals among IRF patients. The PHQ-2 demonstrated high reliability in IRF settings in PAC PRD testing.[86]

The standardized assessment of the signs and symptoms of depression using the PHQ-2 to 9 would provide important information for care planning, care transitions, and resource use in IRFs.

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[84] Gage, Morley. et al., (2012).

[85] Lenze et al., 2004.

Lequerica, A. H., & Kortte, K. (2010). Therapeutic engagement: A proposed model of engagement in medical rehabilitation. *American Journal of Physical Medicine & Rehabilitation*, *89*(5), 415–422. https://doi.org/10.1097/PHM.0b013e3181d8ceb2

[86] Gage, B, Smith, L, Ross, J, Coots, L, Kline, T, Shamsuddin, K, … Gage-Croll, Z (2012). The development and testing of the Continuity Assessment Record and Evaluation (CARE) item set: final report on reliability testing. Volume 2 of 3. Research Triangle Park, NC: RTI International. Available at: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/Downloads/The-Development-and-Testing-of-the-Continuity-Assessment-Record-and-Evaluation-CARE-Item-Set-Final-Report-on-Reliability-Testing-Volume-2-of-3.pdf

Data Elements for the Assessment of Cognitive Function: PHQ-2 to 9

D0150. Patient Mood Interview (PHQ-2 to 9)			
Say to patient: ***"Over the last 2 weeks, have you been bothered by any of the following problems?"*** If symptom is present, enter 1 (yes) in column 1, Symptom Presence. If yes in column 1, then ask the patient: "*About* ***how often*** *have you been bothered by this*?" Read and show the patient a card with the symptom frequency choices. Indicate response in column 2, Symptom Frequency.			
1. Symptom Presence 0. **No** (enter 0 in column 2) 1. **Yes** (enter 0-3 in column 2) 9. **No response** (leave column 2 blank)	**2. Symptom Frequency** 0. **Never or 1 day** 1. **2-6 days** (several days) 2. **7-11 days** (half or more of the days) 3. **12-14 days** (nearly every day)	**1. Symptom Presence**	**2. Symptom Frequency**
		↓ Enter Scores in Boxes ↓	
A. ***Little interest or pleasure in doing things***		☐	☐
B. ***Feeling down, depressed, or hopeless***		☐	☐
If either D0150A2 or D0150B2 is coded 2 or 3, CONTINUE asking the questions below. If not, END the PHQ interview.			
C. ***Trouble falling or staying asleep, or sleeping too much***		☐	☐
D. ***Feeling tired or having little energy***		☐	☐
E. ***Poor appetite or overeating***		☐	☐
F. ***Feeling bad about yourself – or that you are a failure or have let yourself or your family down***		☐	☐
G. ***Trouble concentrating on things, such as reading the newspaper or watching television***		☐	☐
H. ***Moving or speaking so slowly that other people could have noticed. Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual***		☐	☐
I. ***Thoughts that you would be better off dead, or of hurting yourself in some way***		☐	☐
D0160. Total Severity Score			
Enter Score ☐☐	**Add scores for all frequency responses in column 2**, Symptom Frequency. Total score must be between 02 and 27. Enter 99 if unable to complete interview (i.e., Symptom Frequency is blank for 3 or more required items)		

Current use

The PHQ-2 data elements are currently in use in the OASIS. The PHQ-9 data elements, which include the two questions used in the PHQ-2 plus additional items, are in use in MDS.

Prior evidence supporting use of PHQ-2 and PHQ-9

The PHQ-2 is a brief, reliable screening tool for assessing signs and symptoms of depression. Among studies conducted in primary care centers with large samples of adults, the PHQ-2 has performed well as both a screening tool for identifying depression and an assessment of depression severity. [87] It has also been shown to be sensitive to changes in a patient's mood. Across 15 studies that assessed the diagnostic accuracy of the PHQ-2 against a recognized gold-standard instrument for the diagnosis of major depression in adults, sensitivity estimates (based on the summed-item approach to scoring and a cutoff score of 3) have varied, ranging between 39 percent and 97 percent (median value = 77 percent); specificity estimates (based on the summed-item approach to scoring and a cutoff score of 3) have been higher and more stable, ranging between 74 percent and 97 percent (median value = 90 percent).[88] [89] [90] [91] [92] [93] [94] [95] [96] [97] [98] [99] [100] [101] [102]It is thus a viable option for standardization, with the benefits of the shorter assessment counterbalancing the limitation of the lower sensitivity.

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[95] Inagaki, M., Ohtsuki, T., Yonemoto, N., Kawashima, Y., Saitoh, A., Oikawa, Y., ... & Yamada, M. (2013). Validity of the PHQ-9 and PHQ-2 in general internal medicine primary care at a Japanese rural hospital: a cross-sectional study. *General Hospital Psychiatry* 35(6): 592-597.

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[98] Phelan, E., Williams, B., Meeker, K., Bonn, K., Frederick, J., LoGerfo, J., & Snowden, M. (2010). A study of the diagnostic accuracy of the PHQ-9 in primary care elderly. *BMC Family Practice* 11(1): 63.

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[102] Zuithoff, N. P., Vergouwe, Y., King, M., Nazareth, I., van Wezep, M. J., Moons, K. G., & Geerlings, M. I. (2010). The PHQ-9 for detection of major depressive disorder in primary care: consequences of current thresholds in a cross-sectional study. *BMC Family Practice* 11(1): 98.

The PHQ-9 was also tested in the national MDS 3.0 test in nursing homes. For the two presence items in the PHQ-2 (little interest in doing things; feeling down, depressed, or hopeless), kappa statistics were almost perfect and ranged from 0.98 to 0.99.[103] The PHQ-9 was also found to have agreement with the Modified Schedule for Affective Disorders and Schizophrenia (m-SADS), a gold-standard measure for mood disorder, in residents without severe cognitive impairment (weighted kappa = 0.69) and with the Cornell Depression Scale, a gold-standard measure for mood disorder, in residents with severe cognitive impairment (correlation = 0.63).[104] In addition, the Staff Time and Resource Intensity Verification (STRIVE) study, conducted in a national sample of nursing homes by CMS, concluded that the PHQ-9 used in the MDS 3.0 was the "best measure" for identifying individuals with higher wage-weighted staff time, defined as the time that nursing home staff spent caring for residents.[105]

Evidence supporting use of PHQ-2 to 9 from the National Beta Test

Assessing depressed mood: The PHQ-2 to 9 was administered to assess depressed mood in the National Beta Test. As a hybrid measure, the PHQ-2 to 9 uses the first two elements (PHQ-2) as a gateway item for the longer PHQ-9. The assessor only administers the full PHQ-9 if the initial score on the PHQ-2 passes a threshold indicating possible depression. A patient/resident who did not show signs of depression in the PHQ-2 would not receive the seven additional elements contained in the PHQ-9. In the National Beta Test, the PHQ-2 to 9 was administered to 646 patients/residents in HHAs, 786 in IRFs, 496 in LTCHs, and 1,134 in SNFs (n = 3,062 overall).

Across settings, 38 percent of patients/residents reported having little interest in doing things and 43 percent reported feeling down, depressed, or hopeless at some point in the last 14 days. Among IRF patients, 39 percent reported having little interest in doing things, and 43 percent reported feeling down, depressed, or hopeless. About 1 in 10 IRF patients experienced little interest in doing things, and 1 in 12 IRF patients experienced feeling down, depressed, or hopeless nearly every day over the past 2 weeks. Similarly, about 1 in 10 IRF patients experienced these symptoms on half or more of the days.

More than one in four patients/residents (28 percent) across settings passed the PHQ-2 to 9 threshold based on one or both of these symptoms, and continued to complete the remaining seven data elements. This positive screen rate was similar in the IRF setting (27 percent). Detailed symptom endorsement and frequency for the PHQ-2 to 9 is shown in Appendix C, Table 3.1.1. The average PHQ-2 only score was 2.4 across settings (SD = 1.7) and 2.3 (SD = 1.7) in the IRF setting. The average full PHQ-9 score across settings was 11.9 (SD = 5.3), and the average score in the IRF setting was 11.8 (SD = 5.3). The PHQ-9 has thresholds to indicate the severity of probable depression.[106] Both across settings and in IRFs, the largest group of patients/residents screening positive on the PHQ-2 and continuing on to complete the full PHQ-9 was the mild (31 percent and 36 percent in IRF) or moderate (32 percent and 32 percent in IRF) severity group. The mean scores and severity threshold proportions are shown in Table 3.1.1 of Appendix C.

Missing data: Overall, there were low rates of missing data for the PHQ-2 to 9. Across all settings, item-level missing data did not exceed 5.2 percent for any of the items. Similarly, in the IRF setting, item-level missing data did not exceed 4.8 percent for any of the items. Missing data rates, overall and in IRFs, were greatest for the moving and speaking slowly item. In general, the low rate of missing data indicates feasibility of administration.

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[103] Saliba & Buchanan, 2008b.

[104] Ibid.

[105] Centers for Medicare & Medicaid Services. (2013). *Analyses of data collected in CMS national nursing home time study used to establish RUG-IV model.* Retrieved from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/SNFPPS/TimeStudy.html

[106] Kroenke, K., Spitzer, R., & Williams, J. (2001). The PHQ-9 validity of a brief depression severity measure. *Journal of General Internal Medicine, 16,* 606–613. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1495268/.

Time to complete: Time to complete was examined among 428 assessments in HHAs, 515 in IRFs, 305 in LTCHs, and 479 in SNFs (n = 1,727 overall). Among patients/residents who only received the PHQ-2, time to complete was an average of 1.7 minutes (SD = 1.1). The average time to complete the PHQ-2 in the IRF setting was 1.5 minutes (SD = 0.9). Among patients receiving the full PHQ-9, the time to complete was an average of 4.0 minutes (SD = 1.2). In the IRF setting, the time to complete the PHQ-9 was 3.7 minutes on average (SD = 1.2). Without regard for PHQ-2 versus PHQ-9 stratification, the mood data elements took an average of 2.3 minutes (SD = 1.5) to complete across settings, and 2.0 minutes (SD = 1.3) in the IRF setting.

Interrater reliability: IRR was assessed for 196 patients/residents in HHAs, 254 in IRFs, 231 in LTCHs, and 267 in SNFs (n = 948 overall). IRR for all symptom presence and frequency items was excellent: kappas ranged from 0.95 to 1.00 for the four settings combined and from 0.87 to 1.00 in IRFs. IRR regarding eligibility for the full PHQ-9 based on PHQ-2 responses was nearly perfect: kappa for whether to continue from the PHQ-2 to the full PHQ-9 was 0.98 across settings and in IRFs. Finally, for patients/residents who received the full PHQ-9, the IRR for sum of symptom frequencies was nearly perfect (0.96 overall and 0.95 in IRFs).

Percent agreement was also nearly perfect, ranging from 97 percent to 100 percent overall and 93 percent to 100 percent in IRFs. For eligibility to complete the full PHQ-9, percent agreement was 99 percent across settings and in IRFs. For the sum of symptom frequencies, percent agreement was 95 percent across settings and 94 percent in IRFs. Please refer to Table 3.1.2 in Appendix C for kappa and percent agreement statistics for all PHQ items.

Section 3: Special Services, Treatments, and Interventions (Including Nutritional Approaches)

Some medical conditions require complex clinical care, consisting of special services, treatments, and interventions. The implementation of these interventions typically indicates conditions of a more serious nature and can be life-sustaining. Patients and residents who need them may have few clinical alternatives. Conditions requiring the use of special services, treatments, and interventions can have a profound effect on an individual's health status, self-image, and quality of life. Providers should be aware of the patient or resident's clinical needs to plan the provision of these important therapies, ensure the continued appropriateness of care, and support care transitions. The assessment of special services, treatments, and interventions may also help identify resource use intensity by capturing the medical complexity of patients/residents.

Standardized Data Elements to Assess for Special Services, Treatments, and Interventions

CMS has identified data elements for cross-setting standardization of assessment for special services, treatments, and interventions in the areas of cancer, respiratory, and other treatments, as well as nutritional approaches and high-risk medications.

1. Chemotherapy (IV, Oral, Other)
2. Radiation
3. Oxygen therapy (Intermittent, Continuous, High-concentration oxygen delivery system)
4. Suctioning (Scheduled, As needed)
5. Tracheostomy Care
6. Non-invasive mechanical ventilator (bilevel positive airway pressure [BiPAP]; continuous positive airway pressure [CPAP])
7. Invasive mechanical ventilator
8. IV medications (antibiotics, anticoagulation, vasoactive medications, other)
9. Transfusions
10. Dialysis (hemodialysis, peritoneal dialysis)
11. IV access (peripheral IV, midline, central line)
12. Parenteral/IV feeding
13. Feeding tube
14. Mechanically altered diet
15. Therapeutic diet
16. High-risk drug classes: use and indication

Chemotherapy (IV, Oral, Other)

Chemotherapy is a type of cancer treatment that uses medications to destroy cancer cells. Receipt of this treatment indicates that a patient has a malignancy (cancer) and therefore has a serious, often life-threatening or life-limiting condition. Both IV and oral chemotherapy have serious side effects, including nausea/vomiting, extreme fatigue, risk of infection (due to a suppressed immune system), anemia, and an increased risk of bleeding (due to low platelet counts). Oral chemotherapy can be as potent as chemotherapy given by IV but can be significantly more convenient and less resource intensive to administer. Because of the toxicity of these agents, special care must be exercised in handling and transporting chemotherapy drugs. IV chemotherapy may be given by peripheral IV but is more commonly

given via an indwelling central line, which raises the risk of bloodstream infections. The need for chemotherapy predicts resource intensity, both because of the complexity of administering these potent, because of toxic drug combinations following specific protocols, and because of what the need for chemotherapy signals about the patient's underlying medical condition. Furthermore, the resource intensity of IV chemotherapy is higher than for oral chemotherapy, as the protocols for administration and the care of the central line (if present) require significant resources.

Relevance to IRFs

Chemotherapy (either in general or specific routes of administration) is currently not assessed in the IRF-PAI. Patients in the rehabilitation setting who are receiving chemotherapy may be different than other patients in terms of their rehabilitation stay requirements, their potential for rehabilitation functional gains, and their risk of return to the acute care setting. In addition, these patients may require more intensive medical care and monitoring (e.g., lab work, nursing care) than some other populations of patients. Individuals impaired by cancer or chemotherapy treatments have been shown to make functional gains in the IRF setting.[107] Some cancer patients can benefit from 3 hours of therapy per day and benefit from multimodal types of therapy to address heterogeneous needs that can include neurologic issues, orthopedic problems, general conditioning, pain management, and lymphedema management.[108] However, cancer patients in an inpatient rehabilitation unit are at risk of transfer back to the acute care setting at rates ranging from 17 percent to 35 percent.[109] Receipt of chemotherapy has implications for care planning, assessing functional gains, and estimating patient length of stay and resource use in the IRF setting.

Given the resource intensity of administering chemotherapy and the side effects and potential complications of these highly toxic medications, assessing whether the patient is receiving chemotherapy would provide important information for care planning, clinical decision making, and resource use in IRFs.

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[107] Marciniak, C. M., Sliwa, J. A., Spill, G., Heinemann, A. W., & Semik, P. E. (1996). Functional outcome following rehabilitation of the cancer patient. *Archives of Physical Medicine and Rehabilitation*, *77*(1), 54–57. https://doi.org/10.1016/S0003-9993(96)90220-8

McKinley, W. O., Huang, M. E., & Tewksbury, M. A. (2000). Neoplastic vs. traumatic spinal cord injury: An inpatient rehabilitation comparison. *American Journal of Physical Medicine & Rehabilitation*, *79*(2), 138–144. https://doi.org/10.1097/00002060-200003000-00005

[108] Fialka-Moser, V., Crevenna, R., Korpan, M., & Quittan, M. (2003). Cancer rehabilitation: Particularly with aspects on physical impairments. *Journal of Rehabilitation Medicine*, *35*(4), 153–162. https://doi.org/10.1080/16501970306129

Hewitt, M., Maxwell, S., & Vargo, M. M. (2007). Policy issues related to the rehabilitation of the surgical cancer patient. *Journal of Surgical Oncology*, *95*(5), 370–385. https://doi.org/10.1002/jso.20777

[109] Guo, Y., Persyn, L., Palmer, J. L., & Bruera, E. (2008). Incidence of and risk factors for transferring cancer patients from rehabilitation to acute care units. *American Journal of Physical Medicine & Rehabilitation*, *87*(8), 647–653. https://doi.org/10.1097/PHM.0b013e31817fb94e

Asher, A., Roberts, P. S., Bresee, C., Zabel, G., Riggs, R. V., & Rogatko, A. (2014). Transferring inpatient rehabilitation facility cancer patients back to acute care (TRIPBAC). *PM&R*, *6*(9), 808–813. https://doi.org/10.1016/j.pmrj.2014.01.009

Data Elements for the Assessment of Special Services, Treatments, and Interventions: Chemotherapy

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission**
	Check all that apply ↓
Cancer Treatments	
A1. Chemotherapy	☐
A2. IV **A3. Oral** **A10. Other**	☐ ☐ ☐

Current use

Chemotherapy is currently assessed in the MDS. It first assesses whether the resident received chemotherapy while not a resident of the assessing facility and within the last 14 days, and then whether the resident has received chemotherapy while a resident and within the last 14 days while a resident. The MDS data element does not assess the route of chemotherapy.

Prior evidence supporting use of Chemotherapy (IV, Oral, Other)

An IV Chemotherapy data element was found to be feasible for cross-setting use in the PAC PRD.[110] In nursing homes, a checkbox for chemotherapy during the last 5 days was shown to have perfect agreement (100 percent) among rater pairs in the national MDS 3.0 test.[111]

Evidence supporting use of Chemotherapy (IV, Oral, Other) from the National Beta Test

Assessing Chemotherapy: One item assessed whether chemotherapy was performed during the assessment period. If indicated, three follow-up items assessed whether the chemotherapy was administered intravenously, orally, or by another route. In the National Beta Test, the data elements were administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, the overwhelming majority of patients/residents (99 percent) did not receive chemotherapy. In the IRF setting, specifically, only 3 percent of patients had chemotherapy treatment noted. More-detailed rates of chemotherapy implementation across settings are shown in Appendix C, Table 4.1.1.

Missing data: Overall, rates of missing responses for the Chemotherapy items were very low. Across all settings, missingness did not exceed 0.7 percent for each of the four items. In the IRF setting, missingness was 0.5 percent for each of the four items. The low rate of missing data indicates feasibility of administration.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554 overall). The average time to complete the Chemotherapy items was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

[110] Gage, Constantine, et al., 2012.

[111] Saliba & Buchanan, 2008b.

Interrater reliability: The IRR was excellent for the Chemotherapy data element as measured by percent agreement of paired raters (n = 882 paired assessments across settings; n = 236 paired assessments in IRF). Kappas were not estimated for the Chemotherapy sub-elements because the proportion of patients and residents receiving chemotherapy was out of range for stable kappa estimates. Percent agreement was perfect (100 percent) for all four Chemotherapy items across settings and in the IRF setting. Please refer to Table 4.1.2 in Appendix C for percent agreement statistics for the Chemotherapy items.

Radiation

Radiation is a type of cancer treatment that uses high-energy radiation to shrink tumors and kill cancer cells by damaging their DNA. However, it can also damage normal cells, leading to side effects such as fatigue, skin irritation or damage, hair loss, nausea, and delayed side effects such as fibrosis (scar tissue formation), damage to the bowels if radiation was delivered to the abdominal region, memory loss, and, infrequently, a second cancer due to radiation exposure. Radiation is a mainstay of cancer treatment; about half to two-thirds of all patients with cancer receive radiation therapy at some point in their treatment course.[112] The indications range from early-stage cancer treated with curative intent to palliative radiation therapy, such as to treat metastatic cancer; tumors that are pressing on the spine or growing within bones, causing severe pain; or shrinking a tumor near the esophagus, which can inhibit swallowing. There are many types of radiation, such as external-beam radiation therapy, internal radiation therapy (brachytherapy that is delivered from sources placed inside or on the body), and systemic radiation therapy (in which the patient swallows or receives an injection of a radioactive substance).

Relevance to IRFs

As noted above, individuals impaired by cancer or its treatments, including chemotherapy or radiation, have been shown to make functional gains in the IRF setting, and cancer patients can benefit from intensive rehabilitation therapies. In particular, patients with brain tumors who are receiving concurrent radiation during an IRF stay make greater functional gains than those who are not.[113] However, cancer patients in an inpatient rehabilitation unit are at risk of transfer back to the acute care setting, at rates ranging from 17 percent to 35 percent.[114] Receipt of radiation therapy has implications for care planning, assessing functional gains, and estimating patient length of stay and resource use in the IRF setting.

Therefore, assessing whether the patient is receiving radiation would provide important information for care planning, clinical decision making, and resource use in IRFs.

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[112] Yamada, Y. (2009). Principles of radiotherapy (pp. 73–80). In Stubblefield, Michael D. & O'Dell, Michael W. (Eds.), *Cancer rehabilitation: principles and practice*. New York, NY: Demos Medical Publishing.

National Cancer Institute. (2010). *Radiation therapy to treat cancer*. Retrieved from https://www.cancer.gov/about-cancer/treatment/types/radiation-therapy

[113] Marciniak, C. M., Sliwa, J. A., Heinemann, A. W., & Semik, P. E. (2001). Functional outcomes of persons with brain tumors after inpatient rehabilitation. *Archives of Physical Medicine and Rehabilitation, 82*(4), 457–463. https://doi.org/10.1053/apmr.2001.21862

McKinley, Huang, & Tewksbury, 2000

[114] Guo, Persyn, Palmer, & Bruera, 2008

Asher et al., 2014.

Data Element for the Assessment of Special Services, Treatments, and Interventions: Radiation

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission**
	Check all that apply ↓
Cancer Treatments	
B1. Radiation	☐

Current use

Radiation is currently assessed in the MDS. It first assesses whether the resident received radiation while not a resident of the assessing facility and within the last 14 days, and then whether the resident received radiation while a resident and within the last 14 days.

Prior evidence supporting use of Radiation

In nursing homes, a checkbox for radiation during the last 5 days was shown to have perfect agreement (100 percent) among rater pairs in the national MDS 3.0 test.[115]

Evidence supporting use of Radiation from the National Beta Test

Assessing Radiation: One item assessed whether radiation was performed during the assessment period. In the National Beta Test, the data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, only three patients/residents (one in SNF, two in HHA; 0 percent after rounding) received radiation. Detailed radiation data are shown in Appendix C, Table 4.2.1.

Missing data: Overall, there were very low rates of missing responses for the Radiation item. Across all settings, missingness was 0.7 percent. Similarly, in the IRF setting, missingness was 0.5 percent. The low rate of missing data indicates feasibility of administration.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554, overall). The average time to complete the Radiation item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). Kappas are not reported for the Radiation data element because its proportion was out of range for a stable kappa estimate. Percent agreement for the Radiation data element was perfect, both across settings and in the IRF specifically. Please refer to Table 4.2.2 in Appendix C for percent agreement statistics for the Radiation items.

Oxygen Therapy (Intermittent, Continuous, High-Concentration Oxygen Delivery System)

Oxygen therapy provides a patient/resident with supplemental oxygen when medical conditions (e.g., chronic obstructive pulmonary disease [COPD], pneumonia, severe asthma) prevent the patient or resident from adequately oxygenating their bloodstream. Oxygen administration is a resource-intensive intervention, as it requires specialized equipment: a reliable source of oxygen, various delivery systems (e.g., oxygen concentrator, liquid oxygen containers, and high-pressure systems), and the patient interface

[115] Saliba & Buchanan, 2008b.

(e.g., nasal cannula, various types of masks). Accessories are also required (regulators, filters, tubing, etc.). The equipment is generally the same for both sub-elements of this data element (continuous vs. intermittent). The main differences between delivering oxygen intermittently versus continuously are the severity of the underlying illness (which often requires more hours per day of oxygen therapy) and the bedside nursing care to set up the oxygen delivery system if the patient is unable (whether physically or cognitively) to do so independently.

Relevance to IRFs

There are currently no items in IRF-PAI addressing oxygen use in the IRF setting. Use of oxygen is a marker of clinical complexity and medical risk, potential for functional gains, and resource use in the IRF setting. Stroke, spinal cord injury, brain injury, and other neurologic conditions are commonly addressed conditions in the IRFs. A subset of patients with these conditions is at risk of dysphagia and inability to handle oral secretions, which could result in aspiration pneumonia and may require supplemental oxygen use. When pneumonia is present as a comorbidity among IRF patients, it can be associated with longer length of stay, lower discharge functional status ratings, and lower odds of home discharge.[116] In addition, patients with cardiac conditions (some of whom may require oxygen therapy) represent approximately 5 percent of IRF cases.[117] Patients' use of oxygen therapy has important implications for their ability to participate in intensive rehabilitation therapies (3 hours per day, 5 days per week) and their ability to make functional gains over the course of rehabilitation. These factors in turn may affect their length of stay. Assessing whether a patient is receiving oxygen therapy would provide important information for care planning, clinical decision making, care transitions, and resource use in IRFs.

Data Element for the Assessment of Special Services, Treatments, and Interventions: Oxygen Therapy

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission** **Check all that apply** ↓
Respiratory Therapies	
C1. Oxygen Therapy	☐
C2. Continuous **C3. Intermittent** **C4. High-concentration**	☐ ☐ ☐

Current use

Oxygen therapy is currently assessed in the MDS. It first assesses whether the resident received oxygen therapy while not a resident of the assessing facility and within the last 14 days, and then whether

[116] Ahmed, I., Graham, J. E., Karmarkar, A. M., Granger, C. V., & Ottenbacher, K. J. (2013). In-patient rehabilitation outcomes following lower extremity fracture in patients with pneumonia. *Respiratory Care*, *58*(4), 601–606. Retrieved from http://rc.rcjournal.com/content/58/4/601.short

[117] Medicare Payment Advisory Commission, 2016.

the resident has received oxygen therapy while a resident and within the last 14 days. The MDS data element does not assess the type of oxygen therapy.

Prior evidence supporting use of Oxygen Therapy (Continuous, Intermittent, High-Concentration Oxygen Delivery System)

A related data element on high-concentration oxygen use (FiO2 > 40 percent) was used and found feasible for cross-setting use in the PAC PRD.[118] In nursing homes, a checkbox for oxygen therapy during the last 5 days was shown to have reliability ranging from 0.93 to 0.96 (kappas) in the national MDS 3.0 test.[119]

Evidence supporting use of Oxygen Therapy from the National Beta Test

Assessing Oxygen Therapy: One item assessed whether oxygen therapy was performed during the assessment period. If indicated, three follow-up items assessed therapy type: intermittent, continuous, and use of a high-concentration delivery system. In the National Beta Test, the data element Oxygen Therapy (Intermittent, Continuous, High-Concentration Delivery System) was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, one in five patients/residents (20 percent), received oxygen therapy, whereas in the IRF setting, 17 percent received oxygen therapy.

Across settings, the most common type of oxygen therapy was intermittent therapy (14 percent). Only 6 percent of patients/residents had continuous therapy, and 1 percent of patients/residents had a high-concentration delivery system. This pattern was similar in the IRF setting, where intermittent therapy was the most common (11 percent). Continuous therapy (8 percent) and high-concentration delivery (1 percent) were less common. Detailed oxygen therapy implementation data are shown in Appendix C, Table 4.3.1.

Missing data: Overall, there were very low rates of missing responses for the Oxygen Therapy items. Across all settings, missingness was less than 0.9 percent. In the IRF setting specifically, missingness was less than 0.4 percent. The low rate of missing data indicates feasibility of administration.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554, overall). The average time to complete the Oxygen Therapy data element was 0.22 minutes overall (SD = 0.1). The average time to complete the data element in the IRF setting was 0.25 minutes (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). The kappa for implementation of oxygen therapy was substantial/good both overall (0.82) and in the IRF setting (0.80). The kappa for the intermittent therapy sub-element was 0.81 overall and 0.76 in the IRF setting, and the kappa for the continuous therapy sub-element was 0.55 overall and 0.68 in the IRF setting. Kappas are not reported for the high-concentration therapy sub-element because its proportions were out of range for a stable kappa estimate. Percent agreement for the data elements was excellent/almost perfect. Across settings, percent agreement ranged from 93 to 99 percent. Percent agreement in the IRF setting was also excellent/almost perfect, ranging from 94 to 100 percent. Please refer to Table 4.3.2 in Appendix C for kappa and percent agreement statistics for all oxygen therapy items.

Suctioning (Scheduled, As Needed)

Suctioning is used to clear secretions from the airway when a person cannot clear those secretions on his or her own for a variety of reasons, including excess production of secretions from a pulmonary

[118] Gage, Constantine, et al., 2012.

[119] Saliba & Buchanan, 2008b.

infectious process or neurological deficits that inhibit the ability to cough, swallow, and so on. Suction is done by aspirating secretions through a catheter connected to a suction source.

Types of suctioning include oropharyngeal and nasopharyngeal suctioning; nasotracheal suctioning; and suctioning through an artificial airway, such as a tracheostomy tube. Oropharyngeal and nasopharyngeal suctioning are a key part of many patients' care plans, both to prevent the accumulation of secretions that can lead to aspiration pneumonias (a common condition in patients with inadequate gag reflexes) and to relieve obstructions from mucus plugging during an acute or chronic respiratory infection, which often lead to desaturations and increased respiratory effort. Suctioning can be done on a scheduled basis, if the patient is judged to clinically benefit from regular interventions, or can be done as needed, such as when secretions become so prominent that gurgling or choking is noted, or a sudden desaturation occurs from a mucus plug. As suctioning is generally performed by a care provider rather than independently, this intervention can be quite resource intensive if it occurs every hour, for example, rather than once a shift. It also signifies an underlying medical condition that prevents patients from clearing their secretions effectively, which also means they need increased nursing care more generally (such as after a stroke or during an acute respiratory infection).

Relevance to IRFs

Pneumonia and dysphagia are two conditions that may occur in the IRF setting that may necessitate the use of suctioning of secretions. Stroke, spinal cord injury, brain injury, and other neurologic conditions are commonly treated conditions and qualifying conditions for IRFs; a subset of patients with these conditions are at risk of dysphagia and inability to handle oral secretions, which could result in aspiration pneumonia and may require suctioning. Pneumonia, a comorbidity that may occur among lower extremity fracture patients in the IRF setting, is associated with longer length of stay, lower discharge functional status ratings, and lower odds of home discharge.[120] Additionally, pneumonia is a common reason for interruptions in rehabilitation programs and for short-stay transfers to an acute care setting among several classes of IRF patients (e.g., bacterial pneumonia caused 26.4 percent of preventable short-stay transfers to an acute care setting among IRF patients with traumatic brain injury and 66.7 percent of preventable short-stay transfers to an acute setting among IRF patients with spinal cord injury).[121] The need for suctioning may affect patients' ability to fully participate in the intensive rehabilitation program (3 hours per day, 5 days per week) in the IRF setting. Assessing whether suctioning is being performed for a patient would provide important information for care planning, clinical decision making, care transitions, and resource use in IRFs.

[120] Ahmed, Graham, Karmarkar, Granger, & Ottenbacher, 2013

[121] Middleton, A., Graham, J. E., Krishnan, S., & Ottenbacher, K. J. (2016). Program interruptions and short-stay transfers represent potential targets for inpatient rehabilitation care-improvement efforts. *American Journal of Physical Medicine & Rehabilitation*, *95*(11), 850–861. https://doi.org/10.1097/PHM.0000000000000629

Data Element for the Assessment of Special Services, Treatments, and Interventions: Suctioning

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission** **Check all that apply** ↓
Respiratory Therapies	
D1. Suctioning	☐
D2. Scheduled **D3. As Needed**	☐ ☐

Current use

Suctioning is currently assessed in the MDS. It first assesses whether the resident received suctioning while not a resident of the assessing facility and within the last 14 days, and then whether the resident received suctioning while a resident and within the last 14 days. The MDS data element does not assess whether the suctioning is scheduled or as needed.

Prior evidence supporting use of Suctioning (Scheduled, As Needed)

In the PAC PRD, suctioning was assessed as part of the Trach Tube with Suctioning data element, which evaluated whether patients or residents had a tracheostomy tube or needed suctioning. This related data element was found feasible for cross-setting use in the PAC PRD.[122] In nursing homes, a checkbox for suctioning during the last 5 days was shown to have perfect agreement (100 percent) among rater pairs in the national MDS 3.0 test.[123]

Evidence supporting use of Suctioning (Scheduled, As Needed) from the National Beta Test

Assessing Suctioning: One item assessed whether suctioning was provided during the assessment period. If indicated, two follow-up items assessed therapy type: scheduled or as needed. In National Beta Test, the data element Suctioning (Scheduled, As Needed) was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087s in SNFs (n = 2,926 overall).

Across settings, most patients/residents (99 percent) did not have suctioning noted, and those that did noted "as needed" suctioning (1 percent). In the IRF setting, only 1 percent of patients/residents had suctioning indicated, all of which were noted "as needed." Detailed suctioning findings are shown in Appendix C, Table 4.4.1.

Missing data: Overall, there were very low rates of missing responses for the Suctioning items. Across all settings, missingness was less than 0.9 percent. In the IRF setting specifically, missingness for any Suctioning item was less than 0.4 percent. The low rate of missing data indicates feasibility of administration.

[122] Gage, Constantine, et al., 2012.
[123] Saliba & Buchanan, 2008b.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554 overall). The average time to complete the Suctioning items was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). The IRR was excellent for the Suctioning data element, as measured by percent agreement of paired raters. Kappas were not estimated for the Suctioning data element because the proportion of patients and residents receiving suctioning was out of range for stable kappa estimates. Percent agreement for the data elements ranged from 98 to 99 percent across settings and 99 to 100 percent in the IRF setting. Please refer to Table 4.4.2 in Appendix C for kappa and percent agreement statistics for all suctioning items.

Tracheostomy Care

A tracheotomy is a surgical procedure that consists of making a direct airway opening (tracheostomy) into the trachea (windpipe). Tracheostomies are created primarily to bypass an obstructed upper airway; in chronic cases, to enable the removal of secretions from the airway; and to deliver oxygen to the patient's lungs. For example, some indications for tracheostomy include a need for long-term ventilation (such as those in a persistent vegetative state or those who require long-term ventilator weaning but are alert and oriented); tumors of the upper airway; severe neck, mouth, or chest wall injuries; degenerative neuromuscular diseases such as amyotrophic lateral sclerosis (ALS); spinal cord injuries; and airway burns. Generally, suctioning is necessary to ensure that the tracheostomy is clear of secretions, which can inhibit successful oxygenation. Often, individuals with tracheostomies also receive supplemental oxygenation. The presence of a tracheostomy, permanent or temporary, warrants careful monitoring and immediate intervention if the tracheostomy becomes occluded or, in the case of a temporary tracheostomy, if the devices used become dislodged.

For patients with a tracheostomy, tracheostomy care, which primarily consists of cleaning, dressing changes, and replacement of the tracheostomy cannula (tube), is a critical part of their care plans. Regular cleaning is important to prevent infection, such as pneumonia, and to prevent any occlusions, which create the risk of inadequate oxygenation. Although in rare cases, the presence of a tracheostomy is not associated with increased care demands (and in some of those instances, the care of the tracheostomy is performed by the patient), in general, the presence of such a device is associated with increased patient risk, and clinical care services will necessarily include close monitoring to ensure that no life-threatening events occur because of the tracheostomy.

Relevance to IRFs

Patients with deficits in respiratory drive or in respiratory muscle strength may need prolonged mechanical ventilation that would require a tracheostomy; such deficits may be present in patients with stroke, traumatic brain injury, spinal cord injury, or other neurologic conditions that serve as IRF qualifying conditions. In addition, the presence of a tracheostomy tube itself may be a marker of resource use and functional gains among key populations of IRF patients. For example, stroke patients admitted to IRFs with medical tubes, including tracheostomies, have been found to have longer lengths of stay, lower admission and discharge Functional Independence Measure (FIM) scores, and more medical complications.[124] Tracheostomy care may also affect a patient's capacity to participate in intensive rehabilitation therapies. As such, it is important to assess tracheostomy care in IRF settings for purposes of care planning and determining resource use. Assessing whether tracheostomy care is being performed for a patient would provide important information for care planning, clinical decision making, care transitions, and resource use in IRFs.

[124] Roth, E. J., Lovell, L., Harvey, R. L., Bode, R. K., & Heinemann, A. W. (2002). Stroke rehabilitation: indwelling urinary catheters, enteral feeding tubes, and tracheostomies are associated with resource use and functional outcomes. *Stroke, 33*(7), 1845–1850. https://doi.org/10.1161/01.STR.0000020122.30516.FF

Data Element for the Assessment of Special Services, Treatments, and Interventions: Tracheostomy Care

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission**
	Check all that apply ↓
Respiratory Therapies	
E1. Tracheostomy Care	☐

Current use

Tracheostomy care is currently assessed in the MDS. The data element first assesses whether the resident received tracheostomy care while not a resident of the assessing facility and within the last 14 days, and then assesses whether the resident received tracheostomy care while a resident and within the last 14 days.

Prior evidence supporting use of Tracheostomy Care

In nursing homes, a checkbox for tracheostomy care during the last 5 days was shown to have perfect agreement (100 percent) among rater pairs in the national MDS 3.0 test.[125]

Evidence supporting use of Tracheostomy Care from the National Beta Test

Assessing Tracheostomy Care: One item assessed whether tracheostomy care was performed during the assessment period. In the National Beta Test, the data element was administered to 629 patients/residents in HHA settings, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, 1 percent of patients received tracheostomy care. In the IRF setting specifically, 1 percent had tracheostomy care noted. Detailed tracheostomy care findings across settings are shown in Appendix C, Table 4.5.1.

Missing data: Overall, there were very low rates of missing responses for the Tracheostomy Care item. Across all settings, missingness was 1.2 percent. Similarly, in the IRF setting, missingness was 0.5 percent. The low rate of missing data indicates feasibility of administration.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554 overall). The average time to complete the Tracheostomy Care item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). The IRR was excellent for the Tracheostomy Care data element, as measured by percent agreement of paired raters. The kappa was not estimated for the Tracheostomy Care data element because the proportion of patients and residents receiving tracheostomy care was out of range for a stable kappa estimate. Percent agreement for the data element was 100 percent across settings and in the IRF setting. Please refer to Table 4.5.2 in Appendix C for percent agreement statistics for the Tracheostomy Care item.

[125] Saliba, & Buchanan, 2008b.

Non-invasive Mechanical Ventilation (Bilevel Positive Airway Pressure [BiPAP], Continuous Positive Airway Pressure [CPAP])

BiPAP and CPAP are respiratory support devices that prevent the airways from closing by delivering slightly pressurized air through a mask continuously or via electronic cycling throughout the breathing cycle. A BiPAP/CPAP mask supports breathing by providing positive airway pressure that prevents airways from collapsing during the respiratory cycle. Non-invasive mechanical ventilation differs from invasive mechanical ventilation because the interface with the patient is a mask rather than an endotracheal tube in the windpipe. BiPAP and CPAP have a variety of clinical indications, from obstructive sleep apnea, to acute respiratory infections, to progressive neuromuscular decline leading to respiratory failure. The key difference between BiPAP and CPAP is that BiPAP, as the name implies, delivers two different pressure levels (a higher pressure to support inhalation and a lower pressure to prevent the airways from collapsing during exhalation), whereas CPAP delivers the same amount of positive airway pressure throughout the breathing cycle. These interventions signify underlying medical conditions in the patient who requires their use.

Relevance to IRFs

BiPAP and CPAP use are not currently assessed in IRF-PAI. Many populations of patients admitted to IRFs are at increased risk of sleep-disordered breathing that could require use of CPAP or BiPAP, including stroke patients (about 21 percent of IRF patients), individuals with neurological conditions (about 20 percent of IRF patients), and cardiac patients (about 5 percent of IRF patients).[126] For example, sleep-disordered breathing has been identified as common in stroke patients and is a risk factor for stroke itself and stroke recurrence; treatment of stroke patients with obstructive sleep apnea with CPAP has been associated with improved functional motor outcomes.[127] In addition, neurological conditions and spinal cord injuries, which are qualifying conditions for admission to an IRF, can be associated with respiratory muscle weakness, which could require non-invasive mechanical ventilation. Noninvasive mechanical ventilation may improve outcomes in patients admitted to IRFs for cardiac or pulmonary rehabilitation, and may improve pulmonary rehabilitation outcomes in patients with interstitial lung disease and COPD patients.[128] Use of noninvasive mechanical ventilation may also have implications for daytime energy and patient motivation to actively participate in intensive rehabilitation therapies in the IRF setting. Furthermore, use may indicate clinical complexity and resource use. As such, use of noninvasive mechanical ventilation is important to assess in IRF settings for purposes of care planning and resource use.

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[126] Medicare Payment Advisory Commission, (2016).

[127] Brooks, D., Davis, L., Vujovic-Zotovic, N., Boulias, C., Ismail, F., Richardson, D., & Goldstein, R. S. (2010). Sleep-disordered breathing in patients enrolled in an inpatient stroke rehabilitation program. *Archives of Physical Medicine and Rehabilitation*, *91*(4), 659–662. https://doi.org/10.1016/j.apmr.2009.12.019

Brown, D. L. (2006). Sleep disorders and stroke. *Seminars in Neurology*, *26*(1), 117–122. https://doi.org/10.1055/s-2006-933315

Davis, A. P., Billings, M. E., Longstreth, W. T., Jr., & Khot, S. P. (2013). Early diagnosis and treatment of obstructive sleep apnea after stroke: Are we neglecting a modifiable stroke risk factor? *Neurology. Clinical Practice*, *3*(3), 192–201. https://doi.org/10.1212/CPJ.0b013e318296f274

Ryan, C. M., Bayley, M., Green, R., Murray, B. J., & Bradley, T. D. (2011). Influence of continuous positive airway pressure on outcomes of rehabilitation in stroke patients with obstructive sleep apnea. *Stroke*, *42*(4), 1062–1067. https://doi.org/10.1161/STROKEAHA.110.597468

[128] Köhnlein, T., Schönheit-Kenn, U., Winterkamp, S., Welte, T., & Kenn, K. (2009). Noninvasive ventilation in pulmonary rehabilitation of COPD patients. *Respiratory Medicine*, *103*(9), 1329–1336. https://doi.org/10.1016/j.rmed.2009.03.016

Dreher, M., Ekkernkamp, E., Schmoor, C., Schoenheit-Kenn, U., Winterkamp, S., & Kenn, K. (2015). Pulmonary rehabilitation and noninvasive ventilation in patients with hypercapnic interstitial lung disease. *Respiration*, *89*(3), 208–213. https://doi.org/10.1159/000369862

Data Element for the Assessment of Special Services, Treatments, and Interventions: Non-invasive Mechanical Ventilation

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission**
	Check all that apply ↓
Respiratory Therapies	
G1. Non-invasive Mechanical Ventilator	☐
G2. BiPAP	☐
G3. CPAP	☐

Current use

Non-invasive mechanical ventilation is currently assessed in the LCDS and the MDS. The LCDS uses a checklist format, including an item asking whether the patient has non-invasive ventilator (BiPAP, CPAP) treatment at admission. The MDS first assesses whether the resident received non-invasive mechanical ventilation while not a resident of the assessing facility and within the last 14 days, and then whether the resident received non-invasive mechanical ventilation while a resident and within the last 14 days. The LCDS and MDS data elements do not assess whether the non-invasive mechanical ventilation is BiPAP or CPAP.

Prior evidence supporting use of Non-invasive Mechanical Ventilation (BiPAP, CPAP)

A checkbox item for non-invasive ventilation (CPAP) was tested in the PAC PRD and was found to be feasible for cross-setting use.[129]

Evidence supporting use of Non-invasive Mechanical Ventilation (BiPAP, CPAP) from the National Beta Test

Assessing Non-invasive Mechanical Ventilation: One item assessed whether a non-invasive mechanical ventilator was noted during the assessment period. If indicated, two follow-up items assessed whether this non-invasive mechanical ventilator was BiPAP or CPAP. In the National Beta Test, the data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings overall, 5 percent of assessments noted use of a non-invasive mechanical ventilator. In the IRF setting specifically, 6 percent noted a non-invasive mechanical ventilator. With regard to specific non-invasive mechanical ventilator, 2 percent of assessments across settings noted BiPAP and 3 percent noted CPAP. In IRF, CPAP (6 percent) was more common than BiPAP (1 percent). Detailed findings regarding non-invasive mechanical ventilators are shown in Appendix C, Table 4.7.1.

Missing data: Overall, there were very low rates of missing responses for the Non-invasive Mechanical Ventilator items. Across all settings, missingness was less than 1.2 percent. In the IRF setting specifically, missingness was 0.5 percent or less. The low rate of missing data indicates feasibility of administration.

[129] Gage, Constantine, et al., 2012.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554 overall). The average time to complete the Non-invasive Mechanical Ventilator items was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). Kappas for the Non-invasive Mechanical Ventilator items are not reported because their proportions were out of range for stable kappa estimates. Percent agreement for the data elements ranged from 97 to 98 percent across settings and from 98 to 100 percent in the IRF setting. Please refer to Table 4.7.2 in Appendix C for percent agreement statistics for all Non-invasive Mechanical Ventilator items across settings.

Invasive Mechanical Ventilator

Invasive mechanical ventilator includes any type of electrically or pneumatically powered closed-system mechanical support devices to ensure adequate ventilation of patients who are unable to support their own respiration. Patients receiving closed-system ventilation include those receiving ventilation via a tracheostomy and patients with an endotracheal tube (e.g., nasally or orally intubated). Depending on the patient's underlying diagnosis, clinical condition, and prognosis, the patient may not be a candidate for weaning off the ventilator. For instance, certain medical conditions such as lung infections are expected to improve or resolve to a point where patients can support their own respiration, whereas chronic neurodegenerative diseases are likely to progress over time and therefore preclude patients from weaning and eventually having the tube removed.

Ventilation in this manner is a resource-intensive therapy associated with life-threatening conditions in which the patient would not survive without invasive ventilation. However, ventilator use has inherent risks requiring close monitoring, and failure to adequately care for ventilator-dependent patients can lead to death, pneumonia, sepsis, and other iatrogenic events. Mechanical ventilation further signifies the complexity of the patient's underlying medical and/or surgical condition.

Relevance to IRFs

Although the frequency of patients receiving invasive mechanical ventilation varies widely across IRF settings, IRF patients who are ventilator dependent can participate and benefit from intensive rehabilitation programs,[130] and early initiation of rehabilitation for such patients may be associated with improved outcomes. Invasive mechanical ventilation is associated with high daily and aggregate costs. In a national study of mechanical ventilation use in the United States, the estimated aggregated costs were $27 billion, 12 percent of all hospital costs.[131] Assessment of whether the patient is on invasive mechanical ventilation would provide important information for care planning, clinical decision making, care transitions, and resource use in IRFs.

[130] Make, B., Gilmartin, M., Brody, J. S., & Snider, G. L. (1984). Rehabilitation of ventilator-dependent subjects with lung diseases. The concept and initial experience. *Chest*, *86*(3), 358–365. https://doi.org/10.1378/chest.86.3.358

[131] Wunsch, H., Linde-Zwirble, W. T., Angus, D. C., Hartman, M. E., Milbrandt, E. B., & Kahn, J. M. (2010). The epidemiology of mechanical ventilation use in the United States. *Critical Care Medicine*, *38*(10), 1947–1953. https://doi.org/10.1097/CCM.0b013e3181ef4460

Data Element for the Assessment of Special Services, Treatments, and Interventions: Invasive Mechanical Ventilator

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission**
	Check all that apply ↓
Respiratory Therapies	
F1. Invasive Mechanical Ventilator (ventilator or respirator)	☐

Current use

Invasive mechanical ventilator use is currently assessed in the LCDS and MDS. The MDS first assesses whether the resident received invasive mechanical ventilation while not a resident of the assessing facility and within the last 14 days, and then whether the resident received invasive mechanical ventilation while a resident and within the last 14 days. The LCDS includes an item that assesses use and type of invasive mechanical ventilator support (e.g., weaning or non-weaning).

Prior evidence supporting use of Invasive Mechanical Ventilator

Checkbox items for ventilator (weaning and non-weaning) were tested in the PAC PRD and were found to be feasible for cross-setting use.[132] A version of the item was tested in the MDS 3.0 National Evaluation Study and had perfect agreement (100 percent).[133]

Evidence supporting use of Invasive Mechanical Ventilator from the National Beta Test

Assessing Invasive Mechanical Ventilator: One item assessed whether an invasive mechanical ventilator was noted during the assessment period. In the National Beta Test, the data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings overall, only 13 assessments (0 percent after rounding) noted use of an invasive mechanical ventilator. One of these 13 patients was in the IRF setting (12 were in an LTCH). Detailed invasive mechanical ventilator findings across settings are shown in Appendix C, Table 4.6.1.

Missing data: Overall, there were very low rates of missing responses for the Invasive Mechanical Ventilator item. Across all settings, missingness was 1.2 percent for the item. In the IRF setting specifically, missingness was 0.5 percent. The low rate of missing data indicates feasibility of administration.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554 overall). The average time to complete the Invasive Mechanical Ventilator item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). The IRR was excellent for the Invasive Mechanical Ventilator data element, as measured by percent agreement of paired raters. The kappa was not estimated for the Invasive Mechanical Ventilator data element because the proportion was out of range for a stable kappa

[132] Gage, Constantine, et al., 2012.
[133] Saliba, & Buchanan, 2008b.

estimate. Percent agreement for the data element was 100 percent across settings and in the IRF setting. Please refer to Table 4.6.2 in Appendix C for percent agreement statistics for the Invasive Mechanical Ventilator item across all settings.

IV Medications (Antibiotics, Anticoagulation, Vasoactive Medications, Other)

IV medications are drugs or biologics that are administered via intravenous push (bolus), single, intermittent, or continuous infusion through a tube placed into the vein, including one that allows the fluids to enter the circulation through one of the larger heart vessels or more peripherally through a vein, e.g., commonly referred to as central midline, or peripheral ports.

This data element is important to collect, as IV medications are more resource intensive to administer than oral medications and signify a higher patient complexity (and often higher severity of illness). The clinical indications for each of the subtypes of IV medications (antibiotics, anticoagulants, vasoactive, and other) are very different. IV antibiotics are used for severe infections when (1) the bioavailability of the oral form of the medication would be inadequate to kill the pathogen, (2) an oral form of the medication does not exist, or (3) the patient is unable to take the medication by mouth. Because of growing concern about antimicrobial resistance, antibiotic stewardship initiatives are aimed at increasing evidence-based antibiotic prescribing and decreasing antibiotic overuse. Although data on which antibiotics are used would not be collected, collecting data on the use of IV antibiotics overall in the four PAC settings would assist with monitoring the implementation of evidence-based prescribing guidelines moving forward.

IV anticoagulants refer to anti-clotting medications ("blood thinners") often used for the prevention and treatment of deep vein thrombosis and other thromboembolic complications. IV anticoagulants are commonly used in patients with limited mobility (either chronically or acutely, in the post-operative setting), who are therefore at risk of deep vein thrombosis, or patients with certain cardiac arrhythmias, such as atrial fibrillation. When a patient is on an IV anticoagulant, they require frequent monitoring of laboratory values to ensure appropriate anticoagulation status.

Vasoactive medications affect blood pressure and/or heart rate by causing dilation or constricting of the blood vessels. Vasoactive medications are used to treat septic shock, cardiac arrest, and other cardiac function issues. Continuous infusions of vasoactive medications require close observation of the patient, including constant monitoring of blood pressure and heart rate, in order to respond quickly to any changes.

Relevance to IRFs

IRF-PAI does not currently assess delivery of IV medications or subtypes thereof. Several classes of patients with IRF qualifying conditions are at risk of infections that could require IV antibiotics (e.g., post-operative infections in patients admitted after a lower extremity fracture or joint replacement; urinary tract infections among catheterized patients or those with urinary retention, which is common among those with neurological conditions, stroke, debility, brain injury, or spinal cord injury; aspiration pneumonia among the same population of patients with neurological or debility-related conditions that could impair ability to swallow). Several groups of patients with IRF qualifying conditions are at increased risk of venous thromboembolism (i.e., deep venous thrombosis or pulmonary embolism) that could require initiation of IV anticoagulation. Patient groups at risk include those admitted after lower extremity fracture, lower extremity joint replacement, major multiple trauma, or spinal cord injury; traumatic brain injury patients; stroke patients; and other patients whose mobility has been limited by other neurologic conditions. For example, incidence of deep vein thrombosis varies from 16.4 percent to 100 percent among stroke, spinal cord injury, and traumatic brain injury patients not receiving prophylaxis, and incidence remains high when prophylactic measures (e.g., pneumatic compression,

compression stockings, mobilization, medication) are used.[134] In addition, use of IV antibiotics could represent a medical complication or comorbidity that places key classes of IRF patients at risk of a program interruption or transfer to an acute care setting. Of preventable program interruptions among IRF patients, among the most frequent included urinary tract infections among patients with stroke and traumatic brain injury (28.2 percent and 42.9 percent of preventable program interruptions, respectively). Infection is among the most common admitting diagnosis for short-stay transfers from IRFs to acute care setting for patients with stroke, traumatic brain injury, and spinal cord injury. Thus, given the increased risk for IV medication use among patients with IRF qualifying conditions and its association with the interruption of rehabilitation therapies, and the fact that it is a marker of clinical complexity and resource use, it is important to assess IV medication use in IRFs. The standardized assessment of IV medications, including the type of medications, would provide important information for care planning, clinical decision making, patient safety, care transitions, and resource use in IRFs.

Data Element for the Assessment of Special Services, Treatments, and Interventions: IV Medications

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission** **Check all that apply** ↓
Other	
H1. IV Medications	☐
H2. Vasoactive medications **H3. Antibiotics** **H4. Anticoagulation** **H10. Other**	☐ ☐ ☐ ☐

Current use

The item IV Medications is currently assessed in the LCDS and MDS. The LCDS uses a checklist format, including an item at admission asking whether the patient is receiving any IV medications. The MDS first assesses whether the resident received IV medications while not a resident of the assessing facility and within the last 14 days, and then whether the resident received IV medications while a resident and within the last 14 days. The MDS data element does not assess the type of IV medications.

Prior evidence supporting use of IV Medications

A similar but more focused data element, IV Vasoactive Medications, was tested in the PAC PRD and found to be feasible across PAC settings. This data element was specific to the IV administration of vasoactive drugs (e.g., pressors, dilators, continuous medication for pulmonary edema) that increase or decrease blood pressure and/or heart rate.

[134] Akman, M. N., Cetin, N., Bayramoglu, M., Isiklar, I., & Kilinc, S. (2004). Value of the D-dimer test in diagnosing deep vein thrombosis in rehabilitation inpatients. *Archives of Physical Medicine and Rehabilitation*, *85*(7), 1091–1094. https://doi.org/10.1016/j.apmr.2003.10.023

In nursing homes, a checkbox for IV medications during the last 5 days was shown to have reliability of 0.95 (kappa) in the national MDS 3.0 test.[135]

Evidence supporting use of IV Medications from the National Beta Test

Assessing IV Medications: One item assessed whether IV medications were noted during the assessment period. If indicated, three follow-up items assessed specific types of IV medications (antibiotics, anticoagulation, or other). In the National Beta Test, the data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall).

Across settings, one in four assessments (25 percent) had IV medications noted. For specific types of IV medication, 16 percent had antibiotics noted, 8 percent had anticoagulation noted, and 7 percent had other IV medications noted. In IRF, 17 percent noted IV medications. For the specific types of IV medication, 8 percent had antibiotics noted, 6 percent had anticoagulation noted, and 5 percent had other IV medications noted. Detailed IV medications findings across settings are shown in Appendix C, Table 4.8.1.

Missing data: Overall, there were very low rates of missing responses for the IV Medications items. Across all settings, that is, when looking across respondents from all PAC providers, missingness was less than 0.9 percent. In the IRF setting, missingness for the IV Medication items also did not exceed 0.9 percent. The low rate of missing data indicates feasibility of administration.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554, overall). The average time to complete the IV Medications items was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). With the exception of the anticoagulation sub-element, the IRRs were fair to good for the IV Medications data element, as measured by kappa and percent agreement of paired raters. The kappa for the overarching IV Medications data element was 0.70 across settings and 0.61 in the IRF setting. The kappa for the Antibiotics sub-element was 0.88 across settings. The kappa for the Anticoagulation sub-element was 0.13 across settings, placing it in the "slight/poor" range. Consultation with assessors suggested that this low kappa was likely caused by inconsistent interpretation of the coding instructions, which will be improved in the future with more-comprehensive guidance. The kappa for the Other sub-element was 0.46 across settings. In the IRF setting, kappa was not estimated for the sub-elements because the proportions were out of range for stable kappa estimates. Percent agreement for the data element ranged from 88 to 96 percent across settings and from 91 to 98 percent in the IRF setting. Please refer to Table 4.8.2 in Appendix C for IRR statistics for all IV Medications items.

Transfusions

Transfusions are the administration of blood or blood products (e.g., platelets, synthetic blood products) into the bloodstream. Blood transfusions are highly protocolized, with multiple safety checks and monitoring required during and after the infusion to avoid adverse events. Coordination with the facility's blood bank is necessary, as well as documentation by clinical staff to ensure compliance with regulatory requirements. In addition, the need for transfusions signifies underlying patient complexity that is likely to require additional nursing staff and care coordination, and affects planning for transitions of care, as transfusions are not performed in all PAC settings. Receipt of transfusions is also important to assess for case mix adjustment because of the need for added resources and to the extent that receipt of transfusions indicates a more medically complex patient.

[135] Saliba, & Buchanan, 2008b.

Relevance to IRFs

Data regarding blood transfusions are not currently collected in the IRF-PAI. Key populations of IRF patients may benefit from blood transfusions during their rehabilitation stay. For example, patients with fractures of the lower extremity and major joint replacements of the lower extremity are IRF qualifying conditions and represent approximately 12 percent and approximately 8 percent of IRF cases annually, respectively.[136] As in other settings, blood transfusions are resource intensive, requiring laboratory testing, coordination with the blood bank, and intensive bedside nursing care and monitoring. Blood transfusions also can be associated with adverse reactions. Because need for and receipt of a blood transfusion can be a marker of clinical complexity and resource use, assessment of receipt of transfusions is warranted in the IRF setting. The standardized assessment of patients' receipt of transfusions would provide important information for care planning, clinical decision making, patient safety, care transitions, and resource use in IRFs.

Data Element for the Assessment of Special Services, Treatments, and Interventions: Transfusions

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission**
	Check all that apply ↓
Other	
I1. Transfusions	☐

Current use

Transfusions are currently assessed in the MDS. It first assesses whether the resident received transfusions while not a resident of the assessing facility and within the last 14 days, and then whether the resident received transfusions while a resident and within the last 14 days.

Prior evidence supporting use of Transfusions

In nursing homes, a checkbox for transfusions in the past 5 days was shown to have reliability of 0.67 (kappa) in the national MDS 3.0 test.[137]

Evidence supporting use of Transfusions from the National Beta Test

Assessing Transfusions: One item assessed whether transfusions were performed during the assessment period. In the National Beta Test, the data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, only 14 patient/resident assessments (0 percent after rounding) noted transfusions. Five of these 14 patients (1 percent) were in the IRF setting specifically. Detailed transfusion findings across settings are shown in Appendix C, Table 4.9.1.

Missing data: Overall, there were very low rates of missing responses for the Transfusions item. Across all settings, missingness was 1.0 percent for the item. In the IRF setting specifically, missingness was 0.9 percent. The low rate of missing data indicates feasibility of administration.

[136] Medicare Payment Advisory Commission, 2016.

[137] Saliba, & Buchanan, 2008b.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554, overall). The average time to complete the Transfusion item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). Kappas are not reported for the Transfusions data element because the proportion was out of range for a stable kappa estimate. Percent agreement for the Transfusions data element was perfect overall (100 percent) and nearly perfect in the IRF (99 percent). Please refer to Table 4.9.2 in Appendix C for setting-specific percent agreement statistics for the Transfusion item.

Dialysis (Hemodialysis, Peritoneal dialysis)

Dialysis is used primarily in the case of end-stage kidney failure. It is a process by which waste, salt, and excess water are removed from the body and key electrolytes such as sodium, potassium, and bicarbonate are maintained at a safe level. Hemodialysis is conducted using an artificial kidney, an external hemodialyzer, which filters the blood. During peritoneal dialysis, the dialysate is injected into the peritoneal (abdominal) cavity, excess fluid and waste products are drawn out of the blood and into the dialysate, and the fluid is then drained. Hemodialysis sessions are typically performed three times a week and last up to 4 hours each. Peritoneal dialysis can be performed continuously overnight or intermittently during the day.

Both forms of dialysis (hemodialysis and peritoneal dialysis) are resource intensive, not only during the actual dialysis process but before, during, and after. Patients who need and undergo dialysis procedures are at high risk for physiologic and hemodynamic instability from fluid shifts and electrolyte disturbances, as well as infections that can lead to sepsis. Further, patients receiving hemodialysis are often transported to a different facility, or, at a minimum, to a different part of the facility if the IRF is adjacent to a dialysis center or provides dialysis services on site. Close monitoring for fluid shifts, blood pressure abnormalities, and other adverse effects is required before, during, and after each dialysis session. Nursing staff typically perform peritoneal dialysis at the bedside, and, as with hemodialysis, close monitoring is required.

Relevance to IRFs

IRF-PAI does not presently collect data regarding receipt of dialysis or the type thereof. In PAC PRD, 2.1 percent of IRF patients received hemodialysis.[138] There is a paucity of information about the impact of end-stage renal disease (ESRD) and receipt of dialysis in the IRF setting. However, some studies have found dialysis patients in IRFs to have longer lengths of stay[139] and poorer function performance outcomes.[140] ESRD and receipt of dialysis has been found to be related to functional outcomes in geriatric patients. For example, routine dialysis can lead to fatigue on non-dialysis days, which may result in decreased physical activity and impede participation in therapies for some patients.[141] Finally, ESRD patients are at increased risk of amputations, which is a qualifying condition among Medicare IRF patients (3 to 4 percent of IRF cases).[142] Dialysis is a time-intensive service that requires coordination with specialists and close monitoring of vital signs and laboratory studies. Dialysis also carries risks of complications and infections. Accordingly, it may affect patients' ability to participate in

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[138] Gage, Morley, et al., 2012

[139] Forrest, G. P. (2004). Inpatient rehabilitation of patients requiring hemodialysis. *Archives of Physical Medicine and Rehabilitation*, *85*(1), 51–53. https://doi.org/10.1016/S0003-9993(03)00366-6

[140] Cowen, T. D., Huang, C. T., Lebow, J., DeVivo, M. J., & Hawkins, L. N. (1995). Functional outcomes after inpatient rehabilitation of patients with end-stage renal disease. *Archives of Physical Medicine and Rehabilitation*, *76*(4), 355–359. https://doi.org/10.1016/S0003-9993(95)80661-X

[141] Farragher, J., & Jassal, S. V., & the Blackwell Publishing Ltd. (2012). Rehabilitation of the geriatric dialysis patient. *Seminars in Dialysis*, *25*(6), 649–656. https://doi.org/10.1111/sdi.12014

[142] Medicare Payment Advisory Commission, 2016.

an intensive rehabilitation program, resource use, and functional gains. Assessment of receipt of dialysis services in the IRF setting is warranted for resource use and care planning purposes. Assessing Dialysis (Hemodialysis, Peritoneal dialysis) would provide important information for care planning, clinical decision making, patient safety, care transitions, and resource use in IRFs.

Data Element for the Assessment of Special Services, Treatments, and Interventions: Dialysis

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission** **Check all that apply** ↓
Other	
J1. Dialysis	☐
J2. Hemodialysis	☐
J3. Peritoneal dialysis	☐

Current use

The data element Dialysis is currently assessed in the LCDS and MDS. The LCDS uses a checklist format, including an item asking whether the patient receives dialysis as part of the patient's treatment plan. The MDS first assesses whether the resident received dialysis while not a resident of the assessing facility and within the last 14 days, and then whether the resident received dialysis while a resident and within the last 14 days. The LCDS and MDS data elements do not assess the type of dialysis.

Prior evidence supporting use of Dialysis (Hemodialysis, Peritoneal dialysis)

In nursing homes, a data element assessing dialysis in the past 5 days was tested in the national MDS 3.0 test and shown to have almost perfect reliability (kappas of 0.91 to 0.93).[143]

Evidence supporting use of Dialysis (Hemodialysis, Peritoneal dialysis) from the National Beta Test

Assessing Dialysis: One item assessed whether dialysis was noted during the assessment period. If indicated, two follow-up items assessed whether the dialysis was hemodialysis or peritoneal dialysis. In the National Beta Test, the data element was administered to 629 patients/residents in HHAs setting, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings overall, 5 percent of assessments noted use of dialysis. In the IRF setting specifically, dialysis was noted for 5 percent of patients. With regard to specific forms of dialysis, the vast majority of noted dialysis was hemodialysis. Only seven assessments overall and three in IRF (both 0 percent after rounding) indicated peritoneal dialysis. Detailed findings regarding dialysis are shown in Appendix C, Table 4.10.1.

Missing data: Overall, there were very low rates of missing responses for the Dialysis items. Across all settings, missingness was less than 1 percent. In the IRF setting specifically, missingness did not exceed 0.9 percent. The low rate of missing data indicates feasibility of administration.

[143] Saliba, & Buchanan, 2008b.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554 overall). The average time to complete the Dialysis item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). Most kappas are not reported for the Dialysis data element because the proportions both overall and for each setting were out of range for a stable kappa estimate. Percent agreement for dialysis was nearly perfect overall and in the IRF specifically (98 percent). The same was true for the two types of dialysis across settings (98 percent and 100 percent, respectively) and in the IRF (98 percent and 100 percent, respectively). Please refer to Table 4.10.2 in Appendix C for percent agreement statistics for all Dialysis items.

IV Access (Peripheral IV, Midline, Central line)

IV access refers to a catheter inserted into a vein for a variety of clinical reasons, including long-term medication treatment; hemodialysis; large volumes of blood or fluid; frequent access for blood samples; IV fluid administration; total parenteral nutrition; or, in some instances, the measurement of central venous pressure.

The sub-elements associated with IV access distinguish between peripheral access and central access. In addition, different types of central access are specified. The rationale for distinguishing between a peripheral IV and central IV access is that central lines confer higher risks associated with life-threatening events such as pulmonary embolism, infection, and bleeding. Patients with central lines, including those peripherally inserted or who have subcutaneous central line "port" access, always require vigilant nursing care to ensure patency of the lines and, importantly, to ensure that such invasive lines are free from any potentially life-threatening events such as infection, air embolism, and bleeding from an open lumen.

Relevance to IRFs

The presence of IV access is not currently assessed in IRF-PAI, nor are specific subtypes of IV access. The need for IV access in IRFs is common: in PAC PRD, 7.2 percent of IRF patients received central line management.[144] Presence of IV access and type is a marker of clinical complexity (i.e., need for a medication that can be administered through the IV route and nursing care need), and accordingly represents a marker of resource use and an important consideration for care planning. Assessing IV access would provide important information for care planning, clinical decision making, patient safety, care transitions, and resource use in IRFs.

[144] Gage, Morley, et al., 2012.

Data Element for the Assessment of Special Services, Treatments, and Interventions: IV Access

O0110. Special Treatments, Procedures, and Programs Check all of the following treatments, procedures, and programs that apply on admission.	
	a. **On Admission** **Check all that apply** ↓
Other	
O1. IV Access	☐
O2. Peripheral **O3. Midline** **O4. Central** (e.g., PICC, tunneled, port)	☐ ☐ ☐

Current use

The IV Access data element is not currently included in any of the PAC assessments.

Prior evidence supporting use of IV Access

The IV Access data element was not tested in the PAC PRD, but that study did test a related data element, Central Line Management, which was found feasible for cross-setting use.

Evidence supporting use of IV Access from the National Beta Test

Assessing IV Access: One item assessed whether IV access was noted during the assessment period. If indicated, four follow-up items assessed whether the IV was a peripheral line, midline catheter, central line, or other form of IV. In the National Beta Test, the data elements were administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, 24 percent of assessments noted use of IV access. The rate in the IRF setting was 22 percent. For the specific type of IV access noted, a central line was most common across settings (13 percent), followed closely by peripheral IV (11 percent). Midline catheter (2 percent) and other (1 percent) were less common. In the IRF setting, a peripheral IV was most common (14 percent), followed by a central line (6 percent), other IV (2 percent), and midline catheter (1 percent). Detailed findings regarding IV access are shown in Appendix C, Table 4.11.1.

Missing data: Overall, there were very low rates of missing responses for the IV Access items. Across all settings, missingness was less than 1.4 percent. In the IRF setting specifically, missingness was less than 0.8 percent. The low rates of missing data indicate feasibility of administration.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554, overall). The average time to complete the IV Access item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in IRFs (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). IRR was excellent across settings for the IV Access item (kappa = 0.90) and the peripheral and central types of access (kappa = 0.81 and kappa = 0.85, respectively). Similarly, IRR was substantial/good in the IRF specifically for the IV Access item (0.81) and Peripheral sub-element (kappa = 0.81). Percent agreement for the data element was almost perfect. Across settings, percent agreement was 96 percent for IV Access generally and the types of IV access (96 to 98 percent). In the IRF specifically, percent agreement was 94 percent for the general IV Access item,

and the subsequent types were also excellent or almost perfect (96 to 99 percent). Please refer to Table 4.11.2 in Appendix C for kappa and percent agreement statistics for all IV Access items.

Parenteral/IV Feeding

Patients can be fed parenterally (i.e., intravenously) to bypass the usual process of eating and digestion. The person receives nutritional formulas containing salts, glucose, amino acids, lipids, and added vitamins. Parenteral/IV feeding is often used after surgery, when feeding by mouth or digestive system is not possible, when a patient's digestive system cannot absorb nutrients because of chronic disease, or if a patient's nutritional requirement cannot be met by tube feeding and supplementation. The need for parenteral/IV feeding indicates a clinical complexity that prevents the patient from meeting nutritional needs enterally. Overall, parenteral/IV feeding is a form of nutritional support that can be used to prevent or address malnutrition.[145] Without treatment, malnutrition can lead to a host of negative consequences, including a decline in health, poorer physical and cognitive function, increased use of health care services, earlier institutionalization, and increased risk of death.[146]

Malnutrition is prevalent among older adults, a population commonly served in PAC settings. A study showed that 58.3 percent of hospitalized patients diagnosed with malnutrition in the U.S. in 2010 were more than 65 years of age.[147] Additionally, as mentioned above, parenteral/IV feeding is often used to provide nutrition for patients with specific diseases. For example, parenteral/IV feeding can be used for individuals with inflammatory bowel disease, a condition that is common in older adults.[148]

Parenteral/IV feeding is more resource intensive than other forms of nutrition, as it often involves monitoring of blood chemistries and maintenance of a central line. Therefore, assessing a patient's need for parenteral feeding is important for care planning and case mix adjustment. In addition to the risks associated with central and peripheral IV access, parenteral/IV feeding is associated with significant risks, such as embolism and sepsis.

Relevance to IRFs

Parenteral feeding is jointly assessed with tube feeding at present in the IRF-PAI and is also assessed separately. As in other settings, parenteral nutrition indicates clinical complexity and resource use requiring frequent blood work, central venous access, risk of infection, and more-intensive nursing care. Parenteral feeding and tube feeding are important in the IRF setting for resource use and care planning. Need for parenteral or IV feeding also indicates the nutritional status of the patient, and accordingly could be an important marker for potential resource use and functional gains, particularly among key classes of IRF patients. For example, patients with severe malnutrition are at higher risk for a

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[145] National Collaborating Centre for Acute Care (UK). (2006). *Nutrition support for adults: oral nutrition support, enteral tube feeding and parenteral nutrition. Methods, Evidence & Guidance.* London, UK: National Collaborating Centre for Acute Care. Retrieved from https://www.nice.org.uk/guidance/cg32/evidence/full-guideline-194889853

[146] Evans, C. (2005). Malnutrition in the elderly: A multifactorial failure to thrive. *The Permanente Journal*, *9*(3), 38–41. https://doi.org/10.7812/TPP/05-056

[147] Corkins, M. R., Guenter, P., DiMaria-Ghalili, R. A., Jensen, G. L., Malone, A., Miller, S., . . . Resnick, H. E., & the American Society for Parenteral and Enteral Nutrition. (2014). Malnutrition diagnoses in hospitalized patients: United States, 2010. *Journal of Parenteral and Enteral Nutrition*, *38*(2), 186–195. https://doi.org/10.1177/0148607113512154

[148] Semrad, C. E. (2012). Use of parenteral nutrition in patients with inflammatory bowel disease. *Gastroenterology & Hepatology*, *8*(6), 393–395.

Mullady, D. K., & O'Keefe, S. J. (2006). Treatment of intestinal failure: Home parenteral nutrition. *Nature Reviews. Gastroenterology & Hepatology*, *3*(9), 492–504. https://doi.org/10.1038/ncpgasthep0580

Taleban, S., Colombel, J. F., Mohler, M. J., & Fain, M. J. (2015). Inflammatory bowel disease and the elderly: A review. *Journal of Crohn's and Colitis*, *9*(6), 507–515. https://doi.org/10.1093/ecco-jcc/jjv059

variety of complications.[149] Among IRF patients with stroke, an IRF qualifying condition, malnutrition (which may or may not require parenteral/IV feeding), has been associated with poorer rehabilitation outcomes, longer length of stay, and worse functional outcomes among stroke patients in some IRFs.[150] As parenteral/IV feeding and nutritional state can be indicative of clinical complexity, resource use, potential ability to participate in an intensive rehabilitation program, and potential for functional gains, the standardized assessment Parenteral/IV Feeding would provide important information for IRFs.

Data Element for the Assessment of Special Services, Treatments, and Interventions: Parenteral/IV Feeding

K0520. Nutritional Approaches Check all of the following nutritional approaches that apply on admission.	
	1. **On Admission** **Check all that apply** ↓
A. Parenteral/IV feeding	☐

Current use

Different versions of the Parenteral/IV Feeding data element are currently collected in the OASIS, IRF-PAI, LCDS, and MDS. The OASIS data element assesses whether the patient is receiving parenteral nutrition at home. The IRF-PAI includes a checkbox data element to assess total parenteral nutrition with a 3-day look-back period. The LCDS includes a checklist to assess whether the patient receives total parenteral nutrition at admission. The MDS first assesses whether the patient received parenteral/IV feeding while not a resident of the assessing facility and within the last 7 days, and then whether the patient received parenteral/IV feeding while a resident and within the last 7 days.

Prior evidence supporting use of Parenteral/IV Feeding

A similar data element, Total Parenteral Nutrition, was tested in the PAC PRD and found to be feasible across PAC settings. Parenteral/IV feeding in the last 5 days was shown to have almost perfect reliability (kappa of 0.95) in the national MDS 3.0 test in nursing homes.[151]

Evidence supporting use of Parenteral/IV Feeding from the National Beta Test

Assessing Parenteral/IV Feeding: The Parenteral/IV Feeding data element was included in the National Beta Test. This data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, only 1 percent of assessments indicated parenteral/IV feeding. In the IRF setting, 1 percent of assessments noted parenteral/IV feeding. Detailed parenteral/IV feeding implementation is shown in Appendix C, Table 5.1.1, for all four settings.

[149] Dempsey, D. T., Mullen, J. L., & Buzby, G. P. (1988). The link between nutritional status and clinical outcome: Can nutritional intervention modify it? *The American Journal of Clinical Nutrition*, *47*(2, Suppl), 352–356. https://doi.org/10.1093/ajcn/47.2.352

[150] Finestone, H. M., Greene-Finestone, L. S., Wilson, E. S., & Teasell, R. W. (1996). Prolonged length of stay and reduced functional improvement rate in malnourished stroke rehabilitation patients. *Archives of Physical Medicine and Rehabilitation*, *77*(4), 340–345. https://doi.org/10.1016/S0003-9993(96)90081-7

[151] Saliba, & Buchanan, 2008b.

Missing data: Overall, there were very low rates of missing responses for the Parenteral/IV Feeding data element. Across all settings, missingness was 1.3 percent. In the IRF setting specifically, missingness was 0.8 percent. The low rates of missing data indicate feasibility of administering this data element across PAC provider settings.

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554, overall). The average time to complete the Parenteral/IV Feeding item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). Kappas are not reported for the parenteral/IV feeding data element because its proportion was too low for a stable kappa estimate. Percent agreement was perfect at 100 percent for the Parenteral/IV feeding data element in the four settings combined and in the IRF setting specifically. Please refer to Table 5.1.2 in Appendix C for setting-specific percent agreement statistics for the Parenteral/IV Feeding item.

Feeding Tube

The Feeding Tube data element refers to enteral nutrition, which is the delivery of a nutritionally complete diet containing protein, carbohydrate, fat, water, minerals, and vitamins directly into the stomach, duodenum, or jejunum. It is typically used for patients/residents who have a functional gastrointestinal tract but are unable to maintain an adequate or safe oral intake. This data element assesses whether the patient/resident received enteral nutrition during the assessment period.

Enteral nutrition is a form of nutritional support that can be used to prevent or address malnutrition.[152] Without treatment, malnutrition can lead to a host of negative consequences, including a decline in health, poorer physical and cognitive function, increased use of health care services, earlier institutionalization, and increased risk of death.[153]

Malnutrition is prevalent among older adults, a population commonly served in PAC settings. A study showed that 58.3 percent of hospitalized patients diagnosed with malnutrition in the U.S. in 2010 were over 65 years of age.[154] Additionally, enteral nutrition can be used to provide nutrition for patients with specific diseases. For example, tube feeding can be used for individuals with stroke[155] and those with head and neck cancer,[156] conditions that are common in older adults.[157]

Assessing use of a feeding tube can inform resource use, care planning, and care transitions.

Relevance to IRFs

At present, tube feeding is jointly assessed in a single item with parenteral nutrition in IRF-PAI. Administration of tube feeding implies nutritional needs that cannot be met by standard oral feeds, either

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[152] National Alliance for Infusion Therapy and the American Society for Parenteral and Enteral Nutrition Public Policy Committee and Board of Directors. (2010). Disease-related malnutrition and enteral nutrition therapy: A significant problem with a cost-effective solution. *Nutrition in Clinical Practice*, *25*(5), 548–554. https://doi.org/10.1177/0884533610378524

[153] Evans, 2005.

[154] Corkins et al., 2014.

[155] Corrigan, M. L., Escuro, A. A., Celestin, J., & Kirby, D. F. (2011). Nutrition in the stroke patient. *Nutrition in Clinical Practice*, *26*(3), 242–252. https://doi.org/10.1177/0884533611405795

[156] Raykher, A., Russo, L., Schattner, M., Schwartz, L., Scott, B., & Shike, M. (2007). Enteral nutrition support of head and neck cancer patients. *Nutrition in Clinical Practice*, *22*(1), 68–73. https://doi.org/10.1177/011542650702200168

[157] Centers for Disease Control and Prevention (CDC). (2012). Prevalence of stroke—United States, 2006-2010. *MMWR. Morbidity and Mortality Weekly Report*, *61*(20), 379–382.

VanderWalde, N. A., Fleming, M., Weiss, J., & Chera, B. S. (2013). Treatment of older patients with head and neck cancer: A review. *The Oncologist*, *18*(5), 568–578. https://doi.org/10.1634/theoncologist.2012-0427

because of poor oral intake and inability to meet nutritional goals or because of aspiration risk. For IRF patients, tube feeding can imply risk of aspiration and aspiration-related complications such as pneumonia, as well as additional equipment and nursing resources. There are specific groups of IRF patients for whom tube feeding can serve as a proxy for risk of dysphagia, ability to fully participate in an intensive rehabilitation program, clinical complexity, and nutritional status. As mentioned above, malnutrition, which may require tube feeding, has been associated with poorer rehabilitation outcomes among geriatric stroke patients and length of stay and functional outcomes among stroke patients in some IRFs.[158] Feeding tubes themselves also appear to have important implications. Stroke patients admitted to IRFs with medical tubes, including feeding tubes, have been found to have longer lengths of stay, lower admission and discharge FIM scores, and more medical complications. [159] In addition, feeding tubes have been associated with greater functional improvements over the course of IRF stays for severe stroke patients.[160] Because it can be indicative of clinical complexity, resource use, and potential functional gains, assessment of tube feeding in the IRF setting would provide important information for care planning, care transitions, and resource use in IRFs.[161]

Data Element for the Assessment of Special Services, Treatments, and Interventions: Feeding Tube

K0520. Nutritional Approaches Check all of the following nutritional approaches that apply on admission.	
	1. **On Admission**
	Check all that apply ↓
B. Feeding tube (e.g., nasogastric or abdominal (PEG))	☐

Current use

A version of the Feeding Tube data element is currently assessed in three existing PAC assessments. The data element Enteral Nutrition is currently collected in the OASIS, with a question asking whether the patient is receiving enteral nutrition at home. In the IRF-PAI, a Swallowing Status data element captures some information related to enteral nutrition through the response option "Tube/Parenteral Feeding." The MDS data element, Feeding Tube – Nasogastric or Abdominal (PEG), first assesses whether a resident used a feeding tube while not a resident of the assessing facility and within the last 7 days and then whether the resident used a feeding tube while a resident and within the last 7 days.

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[158] Finestone, Greene-Finestone, Wilson, & Teasell, 1996.

Aptaker, R. L., Roth, E. J., Reichhardt, G., Duerden, M. E., & Levy, C. E. (1994). Serum albumin level as a predictor of geriatric stroke rehabilitation outcome. *Archives of Physical Medicine and Rehabilitation*, *75*(1), 80–84. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/8291969

[159] James, R., Gines, D., Menlove, A., Horn, S. D., Gassaway, J., & Smout, R. J. (2005). Nutrition support (tube feeding) as a rehabilitation intervention. *Archives of Physical Medicine and Rehabilitation*, *86*(12, Suppl 2), 82–92. https://doi.org/10.1016/j.apmr.2005.07.314

[160] James, R., Gines, D., Menlove, A., Horn, S. D., Gassaway, J., & Smout, R. J. (2005).

Roth, Lovell, Harvey, Bode, & Heinemann, 2002.

[161] Dempsey, Mullen, & Buzby, 1988.

Prior evidence supporting use of Feeding Tube

In the national MDS 3.0 test in nursing homes, the Feeding Tube data element, collected for the last 5 days, was shown to have almost perfect reliability (kappa of 0.89). [162]

Evidence supporting use of Feeding Tube from the National Beta Test

Assessing Feeding Tube: The Feeding Tube data element was included in the National Beta Test. This data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, 3 percent of assessments indicated use of a feeding tube. In the IRF setting, 3 percent of assessments noted use of a feeding tube. Detailed feeding tube implementation is shown in Appendix C, Table 5.2.1, for all four settings.

Missing data: There were very low rates of missing data for the Feeding Tube data element both overall (1.3 percent) and in the IRF setting (0.8 percent).

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554 overall). The average time to complete the Feeding Tube item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). Kappas are not reported for the Feeding Tube data element because its proportion was too low for a stable kappa estimate. Percent agreement was 100 percent across settings and in the IRF setting. Please refer to Table 5.2.2 in Appendix C for setting-specific percent agreement statistics for the Feeding Tube item.

Mechanically Altered Diet

A mechanically altered diet is one that is specifically prepared to alter the texture or consistency of food to facilitate oral intake. Examples include soft solids, pureed foods, ground meat, and thickened liquids. A mechanically altered diet should not automatically be considered a therapeutic diet.

The provision of a mechanically altered diet is resource intensive, as it signifies difficulty swallowing/eating safely (dysphagia). Often, nurses are required to slowly feed patients meals consisting of a mechanically altered diet rather than having them eat independently. Dysphagia is frequently associated with various health conditions, including nervous system–related diseases (e.g., cerebral palsy and Parkinson's disease); stroke; head injury; head, neck, and esophagus cancers; head, neck, and chest injuries; and dementia.[163] In the absence of treatment, swallowing disorders can lead to malnutrition, dehydration, aspiration pneumonia, poor overall health, chronic lung disease, choking, and death.[164] Other consequences can include lack of interest and enjoyment related to eating or drinking, and embarrassment or isolation tied to social situations involving eating.[165]

Dysphagia is highly prevalent in older adults, a population commonly served in PAC settings. A study of a geriatric population living independently found that the lifetime prevalence of a swallowing disorder was 38 percent, and current prevalence of a swallowing disorder was 33 percent.[166] Additionally, increasing age has been shown to be associated with a higher likelihood of swallowing problems in the

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[162] Saliba, & Buchanan, 2008b.

[163] National Institute on Deafness and Other Communication Disorders. (2017). *Dysphagia*. Retrieved from https://www.nidcd.nih.gov/health/dysphagia

[164] American Speech-Language-Hearing Association. (n.d.). Adult dysphagia. Retrieved from https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589942550&section=Overview

[165] Ibid.

[166] Roy, N., Stemple, J., Merrill, R. M., & Thomas, L. (2007). Dysphagia in the elderly: Preliminary evidence of prevalence, risk factors, and socioemotional effects. *The Annals of Otology, Rhinology, and Laryngology*, *116*(11), 858–865. https://doi.org/10.1177/000348940711601112

previous year.[167] Beyond general aging effects on swallowing physiology, age-related disease is the main risk factor for dysphagia in older adults.[168] Stroke and dementia are examples of common conditions among the elderly that may contribute to issues with swallowing.[169]

Furthermore, discharge to a PAC setting is more likely among those with dysphagia. A study examining burden among inpatients diagnosed with dysphagia found that individuals with dysphagia had a 33.2 percent higher likelihood of being discharged to a PAC facility than patients without dysphagia.[170]

Assessing whether a patient requires a mechanically altered diet is important in ensuring patient safety and can inform care planning, care transitions, and resource utilization.

Relevance to IRFs

Patients with severe malnutrition are at higher risk for a variety of complications.[171] Use of a mechanically altered diet or supervision is currently assessed in the IRF-PAI. Mechanically altered diets are particularly relevant for many common populations of IRF patients, including those with strokes, neurologic conditions, and brain injuries (which are IRF qualifying conditions). These conditions accounted for 19.5 percent, 13.1 percent, and 8.7 percent, respectively, of patients in IRFs in 2014.[172] Because of neurological changes, these patients may be at risk of aspiration and related complications, and as such many benefit from the use of a mechanically altered diet with thickened liquids or pureed solids. As mechanically altered diets are a marker of dysphagia, they are a marker of clinical complexity, complication risk, and resource use among key groups of IRF patients. Dysphagia commonly affects stroke patients. Rates vary widely in the literature, from 37 percent to 78 percent of stroke patients, depending upon the setting and screening instrument used.[173] Dysphagia also is a risk for malnutrition, which has been found to be common among stroke patients and associated with worse functional outcomes and more complications.[174] Dysphagia is also common among patients with traumatic brain injury, with an incidence as high as 93 percent among traumatic brain injury patients admitted to rehabilitation.[175] Many other neurologic disorders, for which patients may be admitted to an IRF, may feature dysphagia that may benefit from a mechanically altered diet.[176] Because a mechanically altered diet can be a marker of clinical complexity and resource use, and because it can be related to the potential for functional rehabilitation gains, assessing whether an IRF patient requires a mechanically altered diet would provide important information for care planning, care transitions, patient safety, and resource use in IRF.

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[167] Bhattacharyya, N. (2014). The prevalence of dysphagia among adults in the United States. *Otolaryngology—Head and Neck Surgery*, *151*(5), 765–769. https://doi.org/10.1177/0194599814549156

[168] Sura, L., Madhavan, A., Carnaby, G., & Crary, M. A. (2012). Dysphagia in the elderly: Management and nutritional considerations. *Clinical Interventions in Aging*, *7*, 287–298.

[169] Ibid.

[170] Patel, D. A., Krishnaswami, S., Steger, E., Conover, E., Vaezi, M. F., Ciucci, M. R., & Francis, D. O. (2018). Economic and survival burden of dysphagia among inpatients in the United States. *Diseases of the Esophagus*, *31*(1), 1–7. https://doi.org/10.1093/dote/dox131

[171] Dempsey, Mullen, & Buzby, 1988.

[172] Medicare Payment Advisory Commission, 2016.

[173] Martino, R., Foley, N., Bhogal, S., Diamant, N., Speechley, M., & Teasell, R. (2005). Dysphagia after stroke: Incidence, diagnosis, and pulmonary complications. *Stroke*, *36*(12), 2756–2763. https://doi.org/10.1161/01.STR.0000190056.76543.eb

[174] Finestone, H. M., & Greene-Finestone, L. S. (2003). Rehabilitation medicine: 2. Diagnosis of dysphagia and its nutritional management for stroke patients. *CMAJ*, *169*(10), 1041–1044. Retrieved from http://www.cmaj.ca/content/169/10/1041.full

[175] Hansen, T. S., Engberg, A. W., & Larsen, K. (2008). Functional oral intake and time to reach unrestricted dieting for patients with traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, *89*(8), 1556–1562. https://doi.org/10.1016/j.apmr.2007.11.063

[176] Buchholz, D. W. (1994). Dysphagia associated with neurological disorders. *Acta Oto-Rhino-Laryngologica Belgica*, *48*(2), 143–155. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/8209677

Data Element for the Assessment of Special Services, Treatments, and Interventions: Mechanically Altered Diet

K0520. Nutritional Approaches Check all of the following nutritional approaches that apply on admission.	
	1. **On Admission**
	Check all that apply ↓
C. Mechanically altered diet – require change in texture of food or liquids (e.g., pureed food, thickened liquids)	☐

Current use

Mechanically Altered Diet is currently assessed in the MDS. It first assesses whether the resident received a mechanically altered diet while not a resident and within the last 7 days, and then whether the resident received a mechanically altered diet while a resident and within the last 7 days.

Prior evidence supporting use of Mechanically Altered Diet

In the national MDS 3.0 test in nursing homes, the Mechanically Altered Diet data element was shown to have almost perfect reliability (kappas from 0.90 to 0.96).[177]

Evidence supporting use of Mechanically Altered Diet from the National Beta Test

Assessing Mechanically Altered Diet: The Mechanically Altered Diet data element was included in the National Beta Test. The data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall). Across settings, 10 percent of assessments indicated mechanically altered diet. In the IRF setting, 15 percent of assessments noted mechanically altered diet. Detailed implementation is shown in Appendix C, Table 5.3.1, for all four settings.

Missing data: There were very low rates of missing data for the Mechanically Altered Diet data element both overall (1.2 percent) and in the IRF setting (0.7 percent).

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554, overall). The average time to complete the Mechanically Altered Diet item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in IRFs (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). IRR for the Mechanically Altered Diet data element was substantial/good across settings (0.65) and moderate in the IRF specifically (0.53). Percent agreement for the data element was 93 percent across settings and 89 percent in the IRF setting. Please refer to Table 5.3.2 in Appendix C for setting-specific kappa and percent agreement statistics for the Mechanically Altered Diet item.

Therapeutic Diet

A therapeutic diet is a diet intervention ordered by a health care practitioner as part of the treatment for a disease or clinical condition manifesting an altered nutritional status. This diet will eliminate, decrease, or increase certain substances in the diet (e.g., sodium or potassium). Therapeutic

[177] Saliba, & Buchanan, 2008b.

diets can include low cholesterol, renal, diabetic, and low salt diets,[178] the latter of which are most commonly used.[179]

Certain conditions, including diabetes,[180] chronic kidney disease,[181] hypertension,[182] and heart disease[183] are highly prevalent among older adults who may receive services in a PAC setting. For example, the percentage of adults with diabetes is 25.2 percent among individuals 65 years of age or older.[184] Additionally, 61.7 percent of adults 65 years of age or older have hypertension.[185] These conditions may be treated with a therapeutic diet.

The Therapeutic Diet data element is important to collect in the IRF setting to distinguish therapeutic diet from various other nutritional approaches. It is less resource intensive from the bedside nursing perspective but does signify one or more underlying clinical conditions that preclude the patient from eating a regular diet. Communication among PAC settings on whether a patient is receiving a particular therapeutic diet is critical to ensure safe transitions of care.

Relevance to IRFs

Therapeutic diets are not currently assessed in IRF-PAI, and data are lacking regarding the prevalence of therapeutic diets in the IRF setting. However, therapeutic diets are part of the treatment and lifestyle changes required for patients with chronic conditions, which are common in IRF populations. In 2013 and 2014, more than 5 percent of IRF cases were for cardiac conditions,[186] many of which require therapeutic diets (e.g., fluid restriction, low-fat, low sodium) for successful management of that condition while the patient undergoes rehabilitation services. Similarly, diabetes, a condition that requires a carbohydrate-controlled therapeutic diet, has been found to affect 23 percent of patients in IRFs after hip fracture and result in longer lengths of stay, lower functional status ratings, and reduced odds of discharge home.[187] Diabetes has also been shown to affect 20 to 22 percent of IRF knee replacement patients and 28 percent of stroke patients.[188] Fractures of the lower extremity, major joint replacements of the lower extremity, and stroke accounted for 12.2 percent, 7.8 percent, and 19.5 percent of IRF cases in 2014,

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[178] Kamel, H. K., Malekgoudarzi, B., & Pahlavan, M. (2000). Inappropriate use of therapeutic diets in the nursing home. *Journal of the American Geriatrics Society*, *48*(7), 856–857. https://doi.org/10.1111/j.1532-5415.2000.tb04771.x

[179] Crogan, N. L., Corbett, C. F., & Short, R. A. (2002). The minimum data set: Predicting malnutrition in newly admitted nursing home residents. *Clinical Nursing Research*, *11*(3), 341–353. https://doi.org/10.1177/105477380201100308

[180] Centers for Disease Control and Prevention. (2017a). *National Diabetes Statistics Report, 2017: Estimates of diabetes and its burden in the United States.* Retrieved from https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf

[181] Centers for Disease Control and Prevention. (n.d.). *Chronic kidney disease initiative* [website]. Last reviewed March 12, 2019. Retrieved from http://www.cdc.gov/ckd.

[182] Fang, J., Gillespie, C., Ayala, C., & Loustalot, F. (2018). Prevalence of self-reported hypertension and antihypertensive medication use among adults aged ≥18 years - United States, 2011-2015. *MMWR. Morbidity and Mortality Weekly Report*, *67*(7), 219–224. https://doi.org/10.15585/mmwr.mm6707a4

[183] Centers for Disease Control and Prevention. (2017b). *National Center for Health Statistics: Older persons' health*. Retrieved from https://www.cdc.gov/nchs/fastats/older-american-health.htm

[184] Centers for Disease Control and Prevention, 2017a.

[185] Fang, Gillespie, Ayala, & Loustalot, 2018.

[186] Medicare Payment Advisory Commission, 2016.

[187] Reistetter, T. A., Graham, J. E., Deutsch, A., Markello, S. J., Granger, C. V., & Ottenbacher, K. J. (2011). Diabetes comorbidity and age influence rehabilitation outcomes after hip fracture. *Diabetes Care*, *34*(6), 1375–1377. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3114361. https://doi.org/10.2337/dc10-2220

[188] DeJong, G., Hsieh, C. H., Gassaway, J., Horn, S. D., Smout, R. J., Putman, K., . . . Foley, M. P. (2009). Characterizing rehabilitation services for patients with knee and hip replacement in skilled nursing facilities and inpatient rehabilitation facilities. *Archives of Physical Medicine and Rehabilitation*, *90*(8), 1269–1283. https://doi.org/10.1016/j.apmr.2008.11.021

Roth, E. J., Lovell, L., Harvey, R. L., Heinemann, A. W., Semik, P., & Diaz, S. (2001). Incidence of and risk factors for medical complications during stroke rehabilitation. *Stroke*, *32*(2), 523–529. https://doi.org/10.1161/01.STR.32.2.523

respectively.[189] As therapeutic diets may be a common requirement of many key IRF populations and may be a marker of clinical complexity, standardized assessment of therapeutic diets is warranted in the IRF setting.

Data Element for the Assessment of Special Services, Treatments, and Interventions: Therapeutic Diet

K0520. Nutritional Approaches Check all of the following nutritional approaches that apply on admission.	
	1. **On Admission**
	Check all that apply ↓
D. Therapeutic diet (e.g., low salt, diabetic, low cholesterol)	☐

Current use

Therapeutic Diet is currently assessed in the MDS. It first assesses whether the resident received a therapeutic diet while not a resident and within the last 7 days, and then whether the resident received a therapeutic diet while a resident and within the last 7 days.

Prior evidence supporting use of Therapeutic Diet

In the national MDS 3.0 test in nursing homes, the Therapeutic Diet data element was shown to have substantial to almost perfect reliability (kappas from 0.89 to 0.93).[190]

Evidence supporting use of Therapeutic Diet from the National Beta Test

Assessing Therapeutic Diet: The Therapeutic Diet data element was included in the National Beta Test. This data element was administered to 629 patients/residents in HHAs, 762 in IRFs, 448 in LTCHs, and 1,087 in SNFs (n = 2,926 overall).

Across settings, more than half of assessments (52 percent) indicated therapeutic diet. In the IRF setting, 49 percent of assessments noted therapeutic diet. Detailed therapeutic diet implementation is shown in Appendix C, Table 5.4.1, for all four settings.

Missing data: There were low levels of missing data for the Therapeutic Diet data element both in the four settings combined (0.6 percent) and in the IRF setting specifically (0.8 percent).

Time to complete: Time to complete was examined among 422 assessments in HHAs, 457 in IRFs, 244 in LTCHs, and 431 in SNFs (n = 1,554 overall). The average time to complete the Therapeutic Diet item was 0.22 minutes overall (SD = 0.1) and 0.25 minutes in the IRF setting (SD = 0.1).

Interrater reliability: IRR was examined for 187 assessments in HHAs, 236 in IRFs, 203 in LTCHs, and 256 in SNFs (n = 882 overall). The kappa for the Therapeutic Diet data element was moderate across settings (0.60) and substantial/good in the IRF setting (0.70). Percent agreement for the data element was 80 percent across settings and 85 percent in the IRF setting. Please refer to Table 5.4.2 in Appendix C for setting-specific kappa and percent agreement statistics for the Therapeutic Diet item.

[189] Medicare Payment Advisory Commission, 2016.

[190] Saliba, & Buchanan, 2008b.

High-Risk Drug Classes: Use and Indication

Most patients receiving PAC services depend on short- and long-term medications to manage their medical conditions. However, medications are a leading cause of adverse events. A study by the U.S. Department of Health and Human Services (HHS) found that 31 percent of adverse events in 2008 among hospitalized Medicare beneficiaries were related to medication.[191] Adverse drug events (ADEs) may be caused by medication errors such as drug omissions, errors in dosage, and errors in dosing frequency.[192] In addition, approximately half of all hospital-related medication errors and 20 percent of ADEs occur during transitions within, admission to, transfer to, or discharge from a hospital.[193] ADEs are more common among older adults, who make up most patients receiving PAC services. The rate of emergency department visits for ADEs is three times higher among adults 65 years of age and older than that among those younger than age 65.[194]

Some classes of drugs are associated with more risk than others.[195] The six medication class response options in the High-Risk Drug Classes: Use and Indication data element are anticoagulants, antiplatelets, hypoglycemics (including insulin), opioids, antipsychotics, and antibiotics. These drug classes are considered high-risk because of the adverse effects that may result from use. In particular, anticoagulants and antiplatelets are associated with bleeding risk;[196] hypoglycemics are associated with fluid retention, heart failure, and lactic acidosis;[197] opioids are associated with misuse;[198] antipsychotics are associated with fractures and strokes;[199] and antimicrobials, the category of medications that includes antibiotics, are associated with various adverse events, such as central nervous systems effects and gastrointestinal intolerance.[200] Moreover, some medications in the six drug classes in this group of data elements are included in the 2019 Updated Beers Criteria® list as potentially inappropriate medications

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[191] Levinson, D. R. (2010). *Adverse events in hospitals: National incidence among Medicare beneficiaries*. OEI-06-09-00090. Washington, DC: U. S. Department of Health and Human Services, Office of Inspector General.

[192] Boockvar, K. S., Liu, S., Goldstein, N., Nebeker, J., Siu, A., & Fried, T. (2009). Prescribing discrepancies likely to cause adverse drug events after patient transfer. *Quality & Safety in Health Care*, *18*(1), 32–36. https://doi.org/10.1136/qshc.2007.025957

[193] Barnsteiner, 2005.

Rozich, J., & Roger, R. (2001). Medication safety: One organization's approach to the challenge. *Journal of Clinical Outcomes Management*, *2001*(8), 27–34.

Gleason, K. M., Groszek, J. M., Sullivan, C., Rooney, D., Barnard, C., & Noskin, G. A. (2004). Reconciliation of discrepancies in medication histories and admission orders of newly hospitalized patients. *American Journal of Health-System Pharmacy*, *61*(16), 1689–1695. https://doi.org/10.1093/ajhp/61.16.1689

[194] Shehab, N., Lovegrove, M. C., Geller, A. I., Rose, K. O., Weidle, N. J., & Budnitz, D. S. (2016). US emergency department visits for outpatient adverse drug events, 2013–2014. *Journal of the American Medical Association*, *316*(20), 2115–2125. https://doi.org/10.1001/jama.2016.16201

[195] Ibid.

[196] Shoeb, M., & Fang, M. C. (2013). Assessing bleeding risk in patients taking anticoagulants. *Journal of Thrombosis and Thrombolysis*, *35*(3), 312–319. https://doi.org/10.1007/s11239-013-0899-7

Melkonian, M., Jarzebowski, W., Pautas, E., Siguret, V., Belmin, J., & Lafuente-Lafuente, C. (2017). Bleeding risk of antiplatelet drugs compared with oral anticoagulants in older patients with atrial fibrillation: A systematic review and meta-analysis. *Journal of Thrombosis and Haemostasis (JTH)*, *15*(7), 1500–1510. https://doi.org/10.1111/jth.13697

[197] Hamnvik, O. P., & McMahon, G. T. (2009). Balancing risk and benefit with oral hypoglycemic drugs. *The Mount Sinai Journal of Medicine, New York*, *76*(3), 234–243. https://doi.org/10.1002/msj.20116

[198] Naples, J. G., Gellad, W. F., & Hanlon, J. T. (2016). The role of opioid analgesics in geriatric pain management. *Clinics in Geriatric Medicine*, *32*(4), 725–735. https://doi.org/10.1016/j.cger.2016.06.006

[199] Rigler, S. K., Shireman, T. I., Cook-Wiens, G. J., Ellerbeck, E. F., Whittle, J. C., Mehr, D. R., & Mahnken, J. D. (2013). Fracture risk in nursing home residents initiating antipsychotic medications. *Journal of the American Geriatrics Society*, *61*(5), 715–722. https://doi.org/10.1111/jgs.12216

Wang, S., Linkletter, C., Dore, D., Mor, V., Buka, S., & Maclure, M. (2012). Age, antipsychotics, and the risk of ischemic stroke in the Veterans Health Administration. *Stroke*, *43*(1), 28–31. https://doi.org/10.1161/STROKEAHA.111.617191

[200] Faulkner, C. M., Cox, H. L., & Williamson, J. C. (2005). Unique aspects of antimicrobial use in older adults. *Clinical Infectious Diseases*, *40*(7), 997–1004. https://doi.org/10.1086/428125

for use in older adults.[201] Although a complete medication list should record several important attributes of each medication (e.g., dosage, route, stop date), recording an indication for the drug is crucial.[202]

Relevance to IRFs

Many patients treated in the IRF setting have one or more conditions that require treatment with a medication in a high-risk drug class. In a nationally representative sample of Medicare beneficiaries in IRFs in 2012, almost 5 percent experienced some type of medication-related adverse event over a 1-month period, ranging in severity from a longer IRF stay to death.[203] In the same study, more than 8 percent of patients in IRFs experienced a medication-related "temporary harm event" during the 1-month period, defined as requiring medical intervention but not causing lasting harm.[204] Of all adverse and temporary harm events identified in IRFs, 46 percent were related to medication.[205] The top three categories of adverse or temporary harm events related to medications in IRFs were delirium and other changes in mental status due to medication, hypoglycemic events related to medication, and hypotension secondary to medication.[206]

Assessing use of high-risk medications by IRF patients and indications for each medication would provide important information related to patient safety in IRFs and care transitions between IRFs and other settings. The IRF-PAI does not currently contain data elements that document the use of any medication or the indication or reason for the patient taking the medication. The standardized assessment of high-risk medication use and ensuring that indications are noted in the medical record are important steps toward overall medication safety within and between PAC provider settings.

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[201] American Geriatrics Society 2019 Beers Criteria® Update Expert Panel. (2019). American Geriatrics Society 2019: Updated Beers Criteria® for Potentially Inappropriate Medication Use in Older Adults. *Journal of the American Geriatrics Society, 67*(4), 674–694. https://doi.org/10.1111/jgs.15767

[202] Li, Y., Salmasian, H., Harpaz, R., Chase, H., & Friedman, C. (2011). Determining the reasons for medication prescriptions in the EHR using knowledge and natural language processing. *AMIA Annual Symposium Proceedings, 2011*, 768–776.

[203] Levinson, D. R. (2016, July). *Adverse events in rehabilitation hospitals: National incidence among Medicare beneficiaries.* Washington, DC: U.S. Department of Health and Human Services, Office of the Inspector General. Available at: https://oig.hhs.gov/oei/reports/oei-06-14-00110.pdf

[204] Ibid.

[205] Ibid.

[206] Ibid.

Data Element for the Assessment of High-Risk Drug Classes: Use and Indication

N0415. High-Risk Drug Classes: Use and Indication		
1. Is taking Check if the patient is taking any medications by pharmacological classification, not how it is used, in the following classes **2. Indication noted** If column 1 is checked, check if there is an indication noted for all medications in the drug class	**1.** **Is taking** **Check all that apply** ↓	**2.** **Indication noted** **Check all that apply** ↓
A. Antipsychotic	☐	☐
E. Anticoagulant	☐	☐
F. Antibiotic	☐	☐
H. Opioid	☐	☐
I. Antiplatelet	☐	☐
J. Hypoglycemic (including insulin)	☐	☐
Z. None of the above	☐	

Current use

The MDS currently assesses what classes of medication residents receive. The number of days the resident received medications is assessed by category for antipsychotic, antianxiety, antidepressant, hypnotic, anticoagulant, antibiotic, diuretic, and opioid medications.

Prior evidence supporting use of High-Risk Drug Classes: Use and Indication

The High-Risk Drug Classes: Use and Indication data element was not tested in prior demonstration efforts. However, the use of similar data elements in the MDS 3.0 speak to the feasibility of collecting data on patient medications in a standardized assessment.

Evidence supporting use of High-Risk Drug Classes: Use and Indication from the National Beta Test

Assessing High-Risk Drug Classes: Use and Indication: As part of the assessment of the medication reconciliation process, the National Beta Test included a data element that assesses whether the patient/resident was taking any medications in each of the six high-risk drug classes, and for each medication, whether there was a corresponding indication noted. The six classes are anticoagulants, antiplatelets (excluding low-dose aspirin), hypoglycemics (including insulin), opioids, antipsychotics, and antimicrobials (excluding topicals). In the National Beta Test, the data element was administered to 627 patients/residents in HHAs, 769 in IRFs, 459 in LTCHs, and 1,096 in SNFs (n = 2,951 overall).

In the four settings combined, the percentage of patients/residents taking medications in each of the six classes ranged from 12 percent (antipsychotics) to 51 percent (opioids). In the IRF setting, these percentages ranged from 9 percent (antipsychotics) to 61 percent (anticoagulants). The presence of indications for noted medications in the various classes ranged from 45 percent (anticoagulants and antiplatelets) to 92 percent (opioids) in the four settings combined, and in the IRF setting, the indication

percentages ranged from 29 percent (anticoagulants) to 91 percent (opioids). The overall and setting-specific findings for each high-risk drug class are detailed in Table 6.1.1 in Appendix C.

Missing data: There were very low rates of missing responses for the medication use items. In the four settings combined, missingness rates did not exceed 4.2 percent for any of the six drug class items. Similarly, in the IRF setting, missingness rates did not exceed 3.9 percent for the six drug class items. Missing data was also very low for indication items. Missingness rates did not exceed 1.2 percent in the four settings combined and did not exceed 2.1 percent in the IRF setting. In general, the low rate of missing data indicates feasibility of administration.

Time to complete: Time to complete was examined among 406 assessments in HHAs, 446 in IRFs, 271 in LTCHs, and 421 in SNFs (n = 1,544 overall). Average time to complete the High-Risk Drug Classes: Use and Indication items was approximately 1.0 minute (SD = 0.6 minutes) in the four settings combined and 1.1 minutes (SD = 0.6 minutes) in the IRF setting.

Interrater reliability: IRR was examined for 187 assessments in HHAs, 240 in IRFs, 212 in LTCHs, and 261 in SNFs (n = 900 overall). Kappas were not estimated within or across settings for items assessing antipsychotic use and indication of opioids because the proportions were out of range for stable kappa estimates.

In the four settings combined, IRRs across settings ranged from substantial/good to excellent/almost perfect (kappas = 0.72 to 0.89) for medication use items. In the IRF setting, kappas for medication use were also substantial/good to excellent/almost perfect (kappas = 0.71 to 0.86). For indication items, kappas ranged from substantial/good to excellent/almost perfect, both in the four settings combined (kappa = 0.65 to 0.87) and in the IRF setting (0.62 to 1.00).

Percent agreement was very high for the medication use items, both in the four settings combined (92 to 95 percent) and in the IRF setting (91 to 95 percent). Similarly, percent agreement was generally high for indication items, both in the four settings combined (82 to 94 percent) and in the IRF setting (81 to 100 percent). More-detailed IRR statistics are shown in Appendix C, Table 6.1.2.

Section 4: Medical Conditions and Co-Morbidities

Pain Interference

Pain is a highly prevalent medical condition in the United States. A Centers for Disease Control and Prevention (CDC) analysis of 2016 National Health Interview Study data found that 8 percent of Americans report high-impact chronic pain, that is, pain that limits life or work activities on most days or every day in the past 6 months.[207] Pain in older adults occurs in conjunction with many acute and chronic conditions, such as osteoarthritis, leg pain during the night, cancer and associated treatment, neuralgia from diabetes mellitus, infections such as herpes zoster/shingles, and peripheral vascular disease.[208] Conditions causing pain in older adults may be associated with depression,[209] sleep disturbance,[210] and lower participation in rehabilitation activities. [211]

A substantial percentage of older adults receiving services in a PAC setting experience pain. According to assessment testing performed in the PAC PRD, more than half of patients in the PAC settings reported having experienced "pain or hurting at any time during the last two days," with 55 percent in LTCHs, 65 percent in SNFs, 68 percent in IRFs, and 70 percent of patients in HHAs responding "yes" to this question.[212] According to the 2009 Medicare Current Beneficiary Survey, the prevalence of moderate-to-severe pain[213] among residents of skilled and non-skilled nursing facilities was 22 percent, and the prevalence of persistent pain—defined as the same or worse pain over time—was 65 percent.[214]

Pain in older adults can be treated with medications, complementary and alternative approaches, or physical therapy.[215] Treatment of pain in older adults may be complicated by factors such as dementia;

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[207] Dahlhamer, J., Lucas, J., Zelaya, C., Nahin, R., Mackey, S., DeBar, L., . . . Helmick, C. (2018). Prevalence of chronic pain and high-impact chronic pain among adults - United States, 2016. *MMWR. Morbidity and Mortality Weekly Report*, *67*(36), 1001–1006. https://doi.org/10.15585/mmwr.mm6736a2

[208] American Geriatrics Society Panel on Pharmacological Management of Persistent Pain in Older Persons. (2009). Pharmacological management of persistent pain in older persons. *Journal of the American Geriatrics Society*, *57*(8), 1331–1346. https://doi.org/10.1111/j.1532-5415.2009.02376.x

[209] Sullivan-Singh, S. J., Sawyer, K., Ehde, D. M., Bell, K. R., Temkin, N., Dikmen, S., . . . Hoffman, J. M. (2014). Comorbidity of pain and depression among persons with traumatic brain injury. *Archives of Physical Medicine and Rehabilitation*, *95*(6), 1100–1105. https://doi.org/10.1016/j.apmr.2014.02.001

[210] Eslami, V., Zimmerman, M. E., Grewal, T., Katz, M., & Lipton, R. B. (2016). Pain grade and sleep disturbance in older adults: Evaluation the role of pain, and stress for depressed and non-depressed individuals. *International Journal of Geriatric Psychiatry*, *31*(5), 450–457. https://doi.org/10.1002/gps.4349

Blytt, K. M., Bjorvatn, B., Husebo, B., & Flo, E. (2018). Effects of pain treatment on sleep in nursing home patients with dementia and depression: A multicenter placebo-controlled randomized clinical trial. *International Journal of Geriatric Psychiatry*, *33*(4), 663–670. https://doi.org/10.1002/gps.4839

[211] Chin, R. P. H., Ho, C. H., & Cheung, L. P. C. (2013). Scheduled analgesic regimen improves rehabilitation after hip fracture surgery. *Clinical Orthopaedics and Related Research*, *471*(7), 2349–2360. https://doi.org/10.1007/s11999-013-2927-5

Brenner, I. & Marsella, A. (2008). Factors influencing exercise participation by clients in long-term care. *Perspectives (Pre-2012)*, *32*(4), 5.

Zanca, J. M., Dijkers, M. P., Hammond, F. M., & Horn, S. D. (2013). Pain and its impact on inpatient rehabilitation for acute traumatic spinal cord injury: Analysis of observational data collected in the SCIRehab study. *Archives of Physical Medicine and Rehabilitation*, *94*(4, Suppl), S137–S144. https://doi.org/10.1016/j.apmr.2012.10.035

[212] Gage, B. (2016). Data from the PAC PRD study, 2008-2010 [data file]. Available from Barbara Gage, August 16, 2016.

[213] In this study, pain was measured based on two MDS items that assess pain frequency and intensity, with "moderate pain…defined as having daily mild to moderate pain" and "severe pain … as having daily pain at times horrible or excruciating."

[214] Shen, X., Zuckerman, I. H., Palmer, J. B., & Stuart, B. (2015). Trends in prevalence for moderate-to-severe pain and persistent pain among Medicare beneficiaries in nursing homes, 2006-2009. *Journals of Gerontology. Series A, Biological Sciences and Medical Sciences*, *70*(5), 598–603. https://doi.org/10.1093/gerona/glu226.

[215] National Institute on Aging. (2018, February 28). *Pain: You can get help*. Retrieved from https://www.nia.nih.gov/health/pain-you-can-get-help

high rates of polypharmacy; end-of-life care; and patient expectations, attitudes, and fears related to pain treatment.[216] Untreated pain is an often-debilitating condition that is associated with a host of adverse physical consequences, including loss of function, poor quality of life, disruption of sleep and appetite, inactivity, and weakness, as well as psychological effects such as depression, anxiety, fear, and anger.[217]

Relevance to IRFs

Many patients in the IRF setting report having pain and experiencing it often. From the 2018 National Beta Test, 79 percent of patients in the IRF setting reported having "pain or hurting." Of those who reported pain, 64 percent experienced pain "frequently" or "almost constantly."

Pain among IRF patients can interfere with rehabilitation and has potential secondary complications. The potential effects of pain on patient health are myriad, and it is critical to assess pain during hospitalization and after discharge. Assessing pain in IRF patients during their stay can lead to appropriate treatment and improved quality of life, reduce complications associated with immobility such as skin breakdown and infection, and facilitate rehabilitation efforts and returning to community settings. Pain assessment post-discharge can also be used to plan appropriate treatment and may reduce readmissions.

Data Elements for Assessment of Pain Interference

J0510. Pain Effect on Sleep	
Enter Code ☐	*Ask patient: "Over the past 5 days,* ***how much of the time has pain made it hard for you to sleep at night****?"* 0. **Does not apply – I have not had any pain or hurting in the past 5 days** → *Skip to XXXX* 1. **Rarely or not at all** 2. **Occasionally** 3. **Frequently** 4. **Almost constantly** 8. **Unable to answer**
J0520. Pain Interference with Therapy Activities	
Enter Code ☐	*Ask patient: "Over the past 5 days,* ***how often have you limited your participation in rehabilitation therapy sessions due to pain****?"* 0. **Does not apply – I have not received rehabilitation therapy in the past 5 days** 1. **Rarely or not at all** 2. **Occasionally** 3. **Frequently** 4. **Almost constantly** 8. **Unable to answer**

[216] Molton, I. R., & Terrill, A. L. (2014). Overview of persistent pain in older adults. *The American Psychologist*, *69*(2), 197–207. https://doi.org/10.1037/a0035794

[217] Institute of Medicine (IOM). (2011). *Relieving pain in America: A blueprint for transforming prevention, care, education, and research*. Washington, DC: The National Academies Press.

American Geriatrics Society Panel on Pharmacological Management of Persistent Pain in Older Persons, 2009.

J0530. Pain Interference with Day-to-Day Activities	
Enter Code ☐	*Ask patient: "Over the past 5 days,* ***how often have you limited your day-to-day activities (excluding rehabilitation therapy sessions) because of pain****?"* 1. **Rarely or not at all** 2. **Occasionally** 3. **Frequently** 4. **Almost constantly** 8. **Unable to answer**

Current use

Data elements on the topic of pain are currently assessed in OASIS and MDS. The OASIS assesses the frequency of pain interfering with patient's activity or movement. A pain assessment interview is included in MDS and has questions on whether pain has made it hard for the resident to sleep at night and whether pain has limited day-to-day activities.

Prior evidence supporting use of Pain Interference data elements

Two interview-based data elements, pain effect on sleep and pain effect on activities, were included in the PAC PRD testing of IRR and showed strong IRR (weighted kappas of 0.836 and 0.789, respectively).[218]

In a national test to develop and validate the MDS 3.0, two items (pain made it hard to sleep, pain limited day-to-day activities) were validated for measuring the effect of pain on function.[219]

Evidence supporting use of Pain from the National Beta Test

Assessing Pain: In the National Beta Test, three pain interference data elements were assessed: Effect of Pain on Sleep, Pain Interference with Rehabilitation Therapies (If Applicable), and Pain Interference with Daily Activities. A total of 489 patients/residents in HHAs, 618 in IRFs, 375 in LTCHs, and 872 in SNFs (n = 2,354 overall) reported experiencing any pain and were administered the three pain interference items. Setting-specific frequencies are shown in Appendix C, Table 7.1.1.

Across settings, among the 78 percent of patients/residents who reported experiencing any pain, pain interfered with sleep more often than "rarely" for two of three patients/residents (65 percent); 37 percent of patients/residents with pain had pain that made it difficult to sleep "frequently" or "almost constantly." In the IRF setting, among the 79 percent of patients who reported experiencing any pain, pain interfered with sleep more than "rarely" for two of three patients (68 percent); 39 percent of patients with pain in the IRF experienced pain that interfered with sleep "frequently" or "almost constantly."

Among the patients/residents who reported experiencing any pain, most had been offered rehabilitation therapies (e.g., physical therapy, occupational therapy, speech therapy), both across settings (89 percent) and in the IRF (98 percent). Across settings, among these patients/residents, 73 percent reported that pain rarely interfered with rehabilitation. Within the IRF setting, 76 percent of these patients reported that pain rarely interfered with rehabilitation; about 1 in 14 (7 percent) had pain that interfered with therapy "frequently" or "almost constantly."

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[218] Gage, B., Smith, L., Ross, J., Coots, L., Kline, T., Shamsuddin, K., ... & Gage-Croll, Z. (2012). *The development and testing of the Continuity Assessment Record and Evaluation (CARE) Item Set: Final report on reliability testing* (Vol. 2). Research Triangle Park, NC: RTI International. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/Downloads/The-Development-and-Testing-of-the-Continuity-Assessment-Record-and-Evaluation-CARE-Item-Set-Final-Report-on-Reliability-Testing-Volume-2-of-3.pdf

[219] Saliba & Buchanan, 2008a.

Across settings, among those who reported experiencing any pain, 55 percent of patients/residents reported pain limiting their daily activities (not including rehabilitation) more often than "rarely or not at all." About one in three of these patients/residents (33 percent) had pain that limited activities "frequently" or "almost constantly." In the IRF setting, 45 percent of patients with pain had pain that interfered more often than "rarely." About one of four IRF patients with pain (27 percent) had pain that limited activities "frequently" or "almost constantly."

Missing data: Overall, there were low rates of missing data for pain data elements. Across all settings, missing data did not exceed 2.4 percent for any data element. Similarly, in the IRF setting, missing data did not exceed 2.6 percent for any data element. In general, the low rate of missing data indicates feasibility of administration.

Time to complete: The length of time to administer the pain data elements was examined as another indicator of feasibility among 440 patients/residents in HHAs, 533 in IRFs, 321 in LTCHs, and 483 in SNFs (n = 1,777 overall). Across settings, the average time to complete the three interference items was 1.3 minutes (SD = 0.6). In the IRF setting, time to complete was similar, at 1.2 minutes (SD = 0.5).

Interrater reliability: IRR was assessed for 197 patients/residents in HHAs, 256 in IRFs, 232 in LTCHs, and 268 in SNFs (n = 953 overall). IRR statistics were generally excellent/perfect, indicating high levels of agreement in responses to the data elements across assessment staff. For the pain interference data elements across settings, kappas were excellent/almost perfect, with values of either 0.97 or 0.98. The same was true in the IRF setting, where excellent/almost perfect kappas ranged from 0.96 to 0.98. Percent agreement was similarly high, with nearly perfect or perfect agreement (98 percent for all items both across settings and in the IRF setting specifically). More-detailed IRR statistics are shown in Appendix C, Table 7.1.2.

Section 5: Impairments

Hearing and Vision Impairments

Hearing and vision impairments are common conditions that, if unaddressed, affect patients' and residents' activities of daily living, communication, physical functioning, rehabilitation outcomes, and overall quality of life. Sensory limitations can lead to confusion in new settings, increase isolation, contribute to mood disorders, and impede accurate assessment of other medical conditions, such as cognition. Hearing impairments may cause difficulty in communication of important information concerning the patient's or resident's condition, preferences, and care transitions; vision impairments have been associated with increased risk of falls. Both types of impairment can also interfere with comprehension of and adherence to discharge plans. Onset of hearing and vision impairments can be gradual, so accurate screening tools and follow-up evaluations are essential to determining which patients and residents need hearing- or vision-specific medical attention or assistive devices, and to ensuring that person-directed care plans are developed to accommodate patients' and residents' needs during PAC and at discharge.

Assessments pertaining to sensory status aid PAC providers in understanding the needs of their patients and residents by establishing a diagnosis of hearing or vision impairment, elucidating the patients' and residents' ability and willingness to participate in treatments or use assistive devices during their stays, and identifying appropriate ongoing therapy and support needs at the time of discharge. The standardized assessment of vision impairment among PAC patients and residents supports clinical decision making, early clinical intervention, person-centered care, and improved care continuity and coordination. The use of valid and reliable standardized assessments can aid in the communication of information within and across providers, further enabling the transfer of accurate health information.

Standardized Data Elements to Assess Hearing and Vision Impairments

CMS has identified two data elements for cross-setting standardized assessment of hearing and vision impairment.

1. Hearing
2. Vision

Hearing

Hearing impairment is one of the most common complaints in adults over the age of 60 and is a major contributor to difficulties in speech comprehension.[220] Causes of hearing loss can include noise, earwax or fluid buildup, a punctured ear drum, viruses and bacteria, certain health conditions (e.g., stroke, cardiac conditions, and brain injury), medications, heredity, and aging.[221] Age-related hearing loss is caused by presbycusis and occurs gradually over time as an individual ages. It is typically hereditary and usually affects both ears. Hearing impairment in older adults has been associated with a myriad of

[220] Peelle, J. E., Troiani, V., Grossman, M., & Wingfield, A. (2011). Hearing loss in older adults affects neural systems supporting speech comprehension. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, *31*(35), 12638–12643. https://doi.org/10.1523/JNEUROSCI.2559-11.2011

[221] National Institute on Aging. (2018). *Hearing Loss: A common problem for older adults.* Retrieved from https://www.nia.nih.gov/health/hearing-loss-common-problem-older-adults

outcomes,[222] including falls,[223] dementia,[224] cognitive impairment,[225] anxiety,[226] emotional vitality,[227] and various medical conditions (e.g., arthritis, cancer, cardiovascular disease, diabetes, emphysema, high blood pressure, and stroke).[228]

A high proportion of older adults receiving services in a PAC setting experience hearing impairment. About 51 percent of nursing facility patients and residents are estimated to have moderate to severe hearing impairment.[229] Data from the PAC PRD suggest that severe hearing impairment affects 1 to 2 percent of Medicare FFS beneficiaries in the four types of PAC.[230] Among older adults more generally, reports on the prevalence of hearing loss vary. The National Institute on Deafness and Other Communication Disorders has stated that one-third of people between ages 65 and 74 have hearing loss and roughly half of those older than 75 are hearing-impaired.[231] Additionally, a study found that two-thirds of individuals aged 70 years or older have bilateral hearing loss and approximately three-quarters have hearing loss in at least one ear.[232]

Assessing hearing impairment is critical to improving patient outcomes, safety, and quality of life. In addition, assessment can inform future care planning and care transitions.

Relevance to IRFs

The IRF-PAI does not currently include the Hearing item or any comparable hearing impairment assessment items. In PAC PRD testing, 1.1 percent of IRF patients demonstrated severely impaired hearing.[233] Hearing impairments can affect patient communication with providers, which has implications for patient understanding of and adherence to treatment plans and rehabilitation goals. Hearing

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[222] Contrera, K. J., Wallhagen, M. I., Mamo, S. K., Oh, E. S., & Lin, F. R. (2016). Hearing loss health care for older adults. *Journal of the American Board of Family Medicine*, *29*(3), 394–403. https://doi.org/10.3122/jabfm.2016.03.150235

[223] Jiam, N. T. L., Li, C., & Agrawal, Y. (2016). Hearing loss and falls: A systematic review and meta-analysis. *The Laryngoscope*, *126*(11), 2587–2596. https://doi.org/10.1002/lary.25927

[224] Thomson, R. S., Auduong, P., Miller, A. T., & Gurgel, R. K. (2017). Hearing loss as a risk factor for dementia: A systematic review. *Laryngoscope Investigative Otolaryngology*, *2*(2), 69–79. https://doi.org/10.1002/lio2.65

Deal, J. A., Betz, J., Yaffe, K., Harris, T., Purchase-Helzner, E., Satterfield, S., . . . Lin, F. R., & the Health ABC Study Group. (2017). Hearing impairment and incident dementia and cognitive decline in older adults: The health ABC study. *Journals of Gerontology, Series A, Biological Sciences and Medical Sciences*, *72*(5), 703–709.

Wei, J., Hu, Y., Zhang, L., Hao, Q., Yang, R., Lu, H., . . . Chandrasekar, E. K. (2017). Hearing impairment, mild cognitive impairment, and dementia: A meta-analysis of cohort studies. *Dementia and Geriatric Cognitive Disorders. Extra*, *7*(3), 440–452. https://doi.org/10.1159/000485178

[225] Wei et al., 2017.

[226] Contrera, K. J., Betz, J., Deal, J., Choi, J. S., Ayonayon, H. N., Harris, T., . . . Lin, F. R., & the Health ABC Study. (2017). Association of hearing impairment and anxiety in older adults. *Journal of Aging and Health*, *29*(1), 172–184. https://doi.org/10.1177/0898264316634571

[227] Contrera, K. J., Betz, J., Deal, J. A., Choi, J. S., Ayonayon, H. N., Harris, T., . . . Lin, F. R., & the Health ABC Study. (2016). Association of hearing impairment and emotional vitality in older adults. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, *71*(3), 400–404. https://doi.org/10.1093/geronb/gbw005

[228] McKee, M. M., Stransky, M. L., & Reichard, A. (2018). Hearing loss and associated medical conditions among individuals 65 years and older. *Disability and Health Journal*, *11*(1), 122–125. https://doi.org/10.1016/j.dhjo.2017.05.007

[229] Garahan, M. B., Waller, J. A., Houghton, M., Tisdale, W. A., & Runge, C. F. (1992). Hearing loss prevalence and management in nursing home residents. *Journal of the American Geriatrics Society*, *40*(2), 130–134. https://doi.org/10.1111/j.1532-5415.1992.tb01932.x

[230] Hearing impairments were classified into categories from mildly impaired to severely impaired. The percentages reported here refer to severe impairment of hearing, defined as "Absence of useful hearing." (Gage, Morley, et al., 2012).

[231] National Institute on Deafness and Other Communication Disorders. (2018). *Hearing loss and older adults*. Retrieved from https://www.nidcd.nih.gov/health/hearing-loss-older-adults

[232] Goman, A. M., & Lin, F. R. (2016). Prevalence of hearing loss by severity in the United States. *American Journal of Public Health*, *106*(10), 1820–1822. https://doi.org/10.2105/AJPH.2016.303299

[233] Gage, Morley, et al., 2012.

impairments are also correlated with lower functional status and lower performance on measures of cognitive functioning in older adults,[234] which has implications for monitoring patient progress toward goals for some IRF patients and may also affect participation in some intensive rehabilitation therapies (e.g., speech and language therapies, cognitive rehabilitation). Assessing hearing would provide important information for communication, ensuring safety, care planning, care transitions, and resource use in IRFs.

Data Element for the Assessment of Impairments: Hearing

B0200. Hearing	
Enter Code ☐	**Ability to hear** (with hearing aid or hearing appliances if normally used) 0. **Adequate** – no difficulty in normal conversation, social interaction, listening to TV 1. **Minimal difficulty** – difficulty in some environments (e.g., when person speaks softly or setting is noisy) 2. **Moderate difficulty** – speaker has to increase volume and speak distinctly 3. **Highly impaired** – absence of useful hearing

Current use

The Hearing data element is currently collected in the MDS, and is assessed with the use of a hearing aid, if applicable.

Prior evidence supporting use of Hearing

The Hearing data element tested in the PAC PRD includes one question regarding hearing ability, which showed high reliability across PAC settings (unweighted kappa = 0.78). The MDS 3.0 version of the Hearing data element also had almost perfect agreement in the MDS 3.0 national test in nursing homes (weighted kappas = 0.94 and 0.89).[235]

Evidence supporting use of Hearing from the National Beta Test

Assessing Hearing: In the National Beta Test, a Hearing assessment item (with hearing aids, when applicable) was administered to 643 patients/residents in HHAs, 783 in IRFs, 498 in LTCHs, and 1,141 in SNFs (n = 3,065 overall). Overall, 74 percent of patients/residents had adequate hearing, 17 percent had minimal difficulty hearing, 8 percent had moderate difficulty hearing, and 1 percent were highly impaired. In the IRF setting, 75 percent of patients had adequate hearing, 18 percent had minimal difficulty hearing, 6 percent had moderate difficulty hearing, and 1 percent were highly impaired. See Appendix C, Table 8.1.1, for setting-specific response frequencies for the Hearing data element.

Missing data: There were very low rates of missing responses for the Hearing data element both overall (0.3 percent) and in the IRF setting (0.4 percent), indicating feasibility of administration.

Time to complete: Time to complete was assessed among 396 patients/residents in HHAs, 499 in IRFs, 301 in LTCHs, and 456 in SNFs (n = 1,652 overall). Across all settings and in the IRF setting specifically, the mean time to complete the Hearing item was 0.3 minutes (SD = 0.2 minutes).

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[234] Lin, F. R., Ferrucci, L., Metter, E. J., An, Y., Zonderman, A. B., & Resnick, S. M. (2011). Hearing loss and cognition in the Baltimore Longitudinal Study of Aging. *Neuropsychology*, *25*(6), 763–770. https://doi.org/10.1037/a0024238
Keller, B. K., Morton, J. L., Thomas, V. S., & Potter, J. F. (1999). The effect of visual and hearing impairments on functional status. *Journal of the American Geriatrics Society*, *47*(11), 1319–1325. https://doi.org/10.1111/j.1532-5415.1999.tb07432.x

[235] Saliba, & Buchanan, 2008b.

Interrater reliability: IRR was assessed for the Hearing item for 197 patients/residents in HHAs, 258 in IRFs, 237 in LTCHs, and 268 in SNFs (n = 960 overall). Across all settings, kappa for the Hearing item was substantial/good (0.65). In the IRF setting, kappa for the Hearing item also was substantial/good (0.67). Percent agreement was high for the Hearing item both across settings (84 percent) and in the IRF setting (87 percent). More-detailed IRR statistics are shown in Appendix C, Table 8.1.2.

Vision

Visual impairment can be caused by not only age-related diseases (e.g., age-related macular degeneration, cataracts, glaucoma, and diabetic retinopathy) but also nearsightedness, farsightedness, loss of near vision with age, and/or untreated disease.[236] In addition to conditions affecting the eye itself, visual deficits can be caused by other conditions, such as stroke and traumatic brain injury. Visual impairment in older adults has been associated with depression and anxiety,[237] lower cognitive function,[238] and poorer quality of life.[239]

The PAC PRD study found that between 1 and 3 percent of Medicare FFS beneficiaries among the four types of PAC providers had the most extreme category of visual impairment assessed, "No vision or object identification questionable." [240] Although most patients and residents in the PAC settings do not exhibit severely impaired vision, visual impairment affects a substantial proportion of older adults and is predicted to increase substantially over time. A study examining visual impairment among adults in the United States found that in 2015, among the 3.22 million persons in the United States who were visually impaired, the largest proportions comprised those in older age categories: 80 years of age and older (50 percent), 70–79 years (24 percent), and 60–69 years (16 percent).[241] By 2050, the proportion of adults with visual impairment will increase to 64 percent among individuals aged 80 years and older. [242]

Assessing visual impairment is critical to improving patient outcomes, safety, and quality of life. Additionally, assessment can inform future care planning and care transitions.

Relevance to IRFs

The IRF-PAI does not currently assess vision impairment. In PAC PRD testing, 1.7 percent of IRF patients demonstrated severely impaired vision, and this was associated with poorer outcomes with respect to change in self-care and mobility.[243] Additionally, assessment of this information is useful for ensuring safety in the IRF setting, as impaired vision increases the risk of falls.[244] Visual impairments are

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[236] Cimarolli, V. R., Boerner, K., Brennan-Ing, M., Reinhardt, J. P., & Horowitz, A. (2012). Challenges faced by older adults with vision loss: A qualitative study with implications for rehabilitation. *Clinical Rehabilitation*, *26*(8), 748–757. https://doi.org/10.1177/0269215511429162

[237] Heesterbeek, T. J., van der Aa, H. P. A., van Rens, G. H. M. B., Twisk, J. W. R., & van Nispen, R. M. A. (2017). The incidence and predictors of depressive and anxiety symptoms in older adults with vision impairment: A longitudinal prospective cohort study. *Ophthalmic & Physiological Optics*, *37*(4), 385–398. https://doi.org/10.1111/opo.12388

[238] Chen, S. P., Bhattacharya, J., & Pershing, S. (2017). Association of vision loss with cognition in older adults. *JAMA Ophthalmology*, *135*(9), 963–970. https://doi.org/10.1001/jamaophthalmol.2017.2838

[239] Tseng, Y. C., Liu, S. H. Y., Lou, M. F., & Huang, G. S. (2018). Quality of life in older adults with sensory impairments: A systematic review. *Quality of Life Research*, *27*(8), 1957–1971. https://doi.org/10.1007/s11136-018-1799-2

[240] Gage, Morley, et al., 2012.

[241] Varma, R., Vajaranant, T. S., Burkemper, B., Wu, S., Torres, M., Hsu, C., . . . McKean-Cowdin, R. (2016). Visual impairment and blindness in adults in the United States: Demographic and geographic variations from 2015 to 2050. *JAMA Ophthalmology*, *134*(7), 802–809. https://doi.org/10.1001/jamaophthalmol.2016.1284

[242] Ibid.

[243] Ibid

[244] Ivers, R. Q., Norton, R., Cumming, R. G., Butler, M., & Campbell, A. J. (2000). Visual impairment and risk of hip fracture. *American Journal of Epidemiology*, *152*(7), 633–639. https://doi.org/10.1093/aje/152.7.633

also associated with poorer rehabilitation outcomes among older IRF patients.[245] Visual impairments may also affect patients' participation in some rehabilitation therapies and their ability to complete cognitive assessment tools (e.g., performance on visual-motor tasks). Assessing vision would provide important information for patient safety, communication, care planning, care transitions, and resource use in IRFs.

Data Element for the Assessment of Impairments: Vision

B1000. Vision	
Enter Code ☐	**Ability to see in adequate light** (with glasses or other visual appliances) 0. **Adequate** – sees fine detail, such as regular print in newspapers/books 1. **Impaired** – sees large print, but not regular print in newspapers/books 2. **Moderately impaired** – limited vision; not able to see newspaper headlines but can identify objects 3. **Highly impaired** – object identification in question, but eyes appear to follow objects 4. **Severely impaired** – no vision or sees only light, colors, or shapes; eyes do not appear to follow objects

Current use

Vision is currently assessed in the OASIS and MDS, with corrective lenses when applicable. Vision is assessed in OASIS with three response options ranging from 0 (normal vision) to 2 (severely impaired). The Vision data element (Ability to See in Adequate Light) in the MDS contains five response options ranging from 0 (adequate) to 4 (severely impaired).

Prior evidence supporting use of Vision

The MDS 3.0 Vision data element has been shown to perform reliably in screening for vision impairment (weighted kappa = 0.917) in the national MDS 3.0 test in nursing homes.[246] The Vision data element is also linked to performance with readily available materials (i.e., newspaper). In addition, the Vision data element was tested in the PAC PRD assessment. The PAC PRD found substantial agreement for IRR across settings for this data element (kappa of 0.74).[247]

Evidence supporting use of Vision from the National Beta Test

Assessing Vision: In the National Beta Test, the Vision assessment item (with corrective lenses when applicable) was administered to 643 patients/residents in HHAs, 783 in IRFs, 498 in LTCHs, and 1,141 in SNFs (n = 3,065 overall).

Overall, 78 percent of patients/residents had adequate vision, 16 percent had impaired vision, and 6 percent had moderately to severely impaired vision. In the IRF setting, 85 percent of patients/residents had adequate vision, 12 percent had impaired vision, and 3 percent had moderately to severely impaired vision. Setting-specific frequencies are shown in Appendix C, Table 9.2.1.

Missing data: There were very low rates of missing responses for the Vision item both overall (0.6 percent) and in the IRF setting (0.6 percent), indicating feasibility of administration.

Freeman, E. E., Muñoz, B., Rubin, G., & West, S. K. (2007). Visual field loss increases the risk of falls in older adults: The Salisbury eye evaluation. *Investigative Ophthalmology & Visual Science*, *48*(10), 4445–4450. https://doi.org/10.1167/iovs.07-0326

[245] Lieberman, D., Friger, M., & Lieberman, D. (2004). Visual and hearing impairment in elderly patients hospitalized for rehabilitation following hip fracture. *Journal of Rehabilitation Research and Development*, *41*(5), 669–674. https://doi.org/10.1682/JRRD.2003.11.0168

[246] Saliba, & Buchanan, 2008b.

[247] Gage, Smith, et al., 2012.

Time to complete: Time to complete was assessed among 396 patients/residents in HHAs, 499 in IRFs, 301 in LTCHs, and 456 in SNFs (n = 1,652 overall). Across all settings and in the IRF setting specifically, the mean time to complete the Vision item was 0.3 minutes (SD = 0.2 minutes).

Interrater reliability: IRR was assessed for the Vision item for 197 patients/residents in HHAs, 258 in IRFs, 237 in LTCHs, and 268 in SNFs (n = 960). Across all settings, kappa for the Vision item was moderate (0.56). In the IRF setting, kappa for the Vision item was also moderate (0.50). Percent agreement was high for the Vision item across settings (83 percent). Agreement for the Vision items in the IRF setting was slightly higher (90 percent). More-detailed IRR statistics are shown in Appendix C, Table 9.2.2.

Section 6: New Category: Social Determinants of Health

Standardized Data Elements to Assess for Social Determinants of Health

CMS has identified data elements for cross-setting standardization of assessment for seven social determinants of health (SDOH). The data elements are as follows:

1. Race
2. Ethnicity
3. Preferred Language
4. Interpreter Services;
5. Health Literacy
6. Transportation
7. Social Isolation

Race and Ethnicity

Relevance to IRFs

The persistence of racial and ethnic disparities in health and health care is widely documented, including in PAC settings.[248] Although racial and ethnic disparities decrease when social factors are controlled for, they often remain. The root causes of these disparities are not always clear because data on many SDOH are not collected. Measuring SDOH in IRF settings is an important step to addressing these avoidable differences in health outcomes. Collecting data on race and ethnicity supports patient-centered care and informs understanding of patient complexity and risk factors that may affect payment, quality measurement, and care outcomes for IRFs. Improving how race and ethnicity data are collected is an important component of improving quality by identifying and addressing health disparities that affect Medicare beneficiaries.

[248] Agency for Healthcare Research and Quality. (2018, September). *2017 National Healthcare Quality and Disparities Report.* AHRQ Pub. No. 18-0033-EF. Rockville, MD: Author.

Fiscella, K., & Sanders, M. R. (2016). Racial and ethnic disparities in the quality of health care. *Annual Review of Public Health, 37*(1), 375–394. https://doi.org/10.1146/annurev-publhealth-032315-021439

Centers for Medicare & Medicaid Services. (2018, February). *2018 National Impact Assessment of the Centers for Medicare & Medicaid Services (CMS) Quality Measures Reports.* Baltimore, MD: U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services.

Smedley, B. D., Stith, A. Y., & Nelson, A. R. (2003). *Unequal treatment: confronting racial and ethnic disparities in health care*. Washington: D.C., National Academy Press.

Chase, J. D., Huang, L., Russell, D., Hanlon, A., O'Connor, M., Robinson, K. M., & Bowles, K. H. (2018). Racial/ethnic disparities in disability outcomes among post-acute home care patients. *Journal of Aging and Health, 30*(9), 1406–1426. https://doi.org/10.1177/0898264317717851

Data Elements for the Assessment of SDOH: Race and Ethnicity

Ethnicity

A1005. Ethnicity Are you of Hispanic, Latino/a, or Spanish origin?	
↓	**Check all that apply**
☐	**A.** No, not of Hispanic, Latino/a, or Spanish origin
☐	**B.** Yes, Mexican, Mexican American, Chicano/a
☐	**C.** Yes, Puerto Rican
☐	**D.** Yes, Cuban
☐	**E.** Yes, another Hispanic, Latino, or Spanish origin
☐	**X.** Patient unable to respond

Race

A1010. Race What is your race?	
↓	**Check all that apply**
☐	**A.** White
☐	**B.** Black or African American
☐	**C.** American Indian or Alaska Native
☐	**D.** Asian Indian
☐	**E.** Chinese
☐	**F.** Filipino
☐	**G.** Japanese
☐	**H.** Korean
☐	**I.** Vietnamese
☐	**J.** Other Asian
☐	**K.** Native Hawaiian
☐	**L.** Guamanian or Chamorro
☐	**M.** Samoan
☐	**N.** Other Pacific Islander
☐	**X.** Patient unable to respond

Current use

A Race and Ethnicity data element is currently collected in the MDS, LCDS, IRF-PAI, and OASIS. The data element consists of a single question, which aligns with the 1997 Office of Management and Budget (OMB) minimum data standards for federal data collection efforts.[249] The 1997 OMB Standard lists five minimum categories of race: (1) American Indian or Alaska Native, (2) Asian, (3) Black or African American, (4) Native Hawaiian or Other Pacific Islander, and (5) White. The 1997

[249] Office of Management and Budget. (1997, October 30). Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity (Notice of Decision). *Federal Register*, *62*(210), 58782–58790. Retrieved from https://www.govinfo.gov/content/pkg/FR-1997-10-30/pdf/97-28653.pdf

OMB Standard also lists two minimum categories of ethnicity: (1) Hispanic or Latino, and (2) Not Hispanic or Latino.[250] The current version uses a "Mark all that apply" response option.

Evidence supporting use of Race and Ethnicity

The modification will result in two separate data elements, one for race and one for ethnicity, that will conform with the 2011 HHS Data Standards for person-level data collection and the 1997 OMB Standards. The 2011 HHS Data Standards permit the collection of more-detailed information on population groups provided additional categories can be aggregated into the OMB minimum standard set of categories. The 2011 HHS Data Standards require a two-question format when self-identification is used to collect data on race and ethnicity. Large federal surveys, such as the National Health Interview Survey, the Behavioral Risk Factor Surveillance System, and the National Survey on Drug Use and Health, have implemented the 2011 HHS Data Standards. CMS has similarly updated the Medicare Current Beneficiary Survey, the Medicare Health Outcomes Survey, and the Health Insurance Marketplace Application for Health Coverage with the 2011 HHS data standards.

Preferred Language and Interpreter Services

Relevance to IRFs

More than 64 million people in the United States speak a language other than English at home, and nearly 40 million of those individuals have limited English proficiency (LEP).[251] Individuals with LEP have been shown to receive worse care and have poorer health outcomes, including higher readmission rates.[252] Communication with individuals with LEP is an important component of quality health care, which starts by understanding the population in need of language services. Unaddressed language barriers between a patient and provider care team negatively affect the ability to identify and address individual medical and non-medical care needs, to convey and understand clinical information, and to convey and understand discharge and follow-up instructions, all of which are necessary for providing high-quality care. Understanding the communication assistance needs of residents and patients with LEP, including individuals who are deaf or hard of hearing, is critical for ensuring good outcomes.

Data Elements for the Assessment of SDOH: Preferred Language and Interpreter Services

A1110. Language	
Enter Code ☐	**A. What is your preferred language?** ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ **B. Do you need or want an interpreter to communicate with a doctor or health care staff?** 0. **No** 1. **Yes** 9. **Unable to determine**

[250] Ibid.

[251] U.S. Census Bureau, 2013-2017 American Community Survey. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S1601&prodType=table

[252] Karliner, L. S., Kim, S. E., Meltzer, D. O., & Auerbach, A. D. (2010). Influence of language barriers on outcomes of hospital care for general medicine inpatients. *Journal of Hospital Medicine, 5*(5), 276–282. https://doi.org/10.1002/jhm.658

Kim, E. J., Kim, T., Paasche-Orlow, M. K., Rose, A. J., & Hanchate, A. D. (2017). Disparities in hypertension associated with limited English proficiency. *Journal of General Internal Medicine, 32*(6), 632–639. https://doi.org/10.1007/s11606-017-3999-9

National Academies of Sciences, Engineering, and Medicine. (2016). *Accounting for social risk factors in Medicare payment: Identifying social risk factors*. Washington, DC: The National Academies Press.

Current use

The preferred language of residents and patients and the need for interpreter services are assessed in two PAC assessment tools. The LCDS and the MDS use the same two data elements to assess preferred language and whether a patient or resident needs or wants an interpreter to communicate with health care staff. The current preferred language data element in LCDS and MDS is open-ended, allowing the patient or resident to identify their preferred language, including American Sign Language. The MDS initially implemented preferred language and interpreter services data elements to assess the needs of SNF residents and patients and inform care planning. For alignment purposes, the LCDS later adopted the same data elements for LTCHs.

Evidence supporting use of Preferred Language and Interpreter Services

The 2009 National Academies of Sciences, Engineering, and Medicine (NASEM) report on standardizing data for health care quality improvement emphasizes that language and communication needs should be assessed as a standard part of health care delivery and quality improvement strategies.[253] Although the 2011 HHS Primary Language Data Standard recommends a two-part question to assess spoken language, the need to improve the assessment of language preferences and communication needs across PAC settings should be balanced with the provider and patient assessment burden. In addition, preferred spoken language would not allow information to be collected on American Sign Language, as is accounted for by the preferred language and interpreter services data elements currently in the MDS and LCDS.

Health Literacy

Relevance to IRFs

Similar to language barriers, low health literacy can interfere with communication between the provider and resident or patient and the ability for residents and patients or their caregivers to understand and follow treatment plans, including medication management. Poor health literacy is linked to lower levels of knowledge about health, worse health outcomes, receipt of fewer preventive services, higher medical costs, and higher rates of emergency department use.[254]

Data Element for the Assessment of SDOH: Health Literacy

B1300. Health Literacy How often do you need to have someone help you when you read instructions, pamphlets, or other written material from your doctor or pharmacy?	
Enter Code ☐	0. **Never** 1. **Rarely** 2. **Sometimes** 3. **Often** 4. **Always** 8. **Patient unable to respond**

[253] Institute of Medicine. (2009). *Race, ethnicity, and language data: Standardization for health care quality improvement.* Washington, DC: The National Academies Press.

[254] National Academies of Sciences, Engineering, and Medicine, 2016. Accounting for social risk factors in Medicare payment: Identifying social risk factors. Washington, DC: The National Academies Press.

Current use

A health literacy data element is not currently used in any of the PAC assessment tools.

Evidence supporting use of Health Literacy

Health literacy is prioritized by Healthy People 2020 as an SDOH.[255] NASEM's 2016 report on accounting for social risk factors in Medicare payment considers health literacy an individual risk factor affected by other social risk factors.[256] The Single Item Literacy Screener (SILS) question, which assesses reading ability (a primary component of health literacy), tested reasonably well against the 36-item Short Test of Functional Health Literacy in Adults (S-TOFHLA), a thoroughly vetted and widely adopted health literacy test, in assessing the likelihood of low health literacy in an adult sample from primary care practices participating in the Vermont Diabetes Information System.[257] SILS is publicly available, and shorter and easier to administer than the S-TOFHLA. Research found that a positive result on the SILS demonstrates an increased likelihood that an individual has low health literacy.[258]

Transportation

Relevance to IRFs

Transportation barriers can affect access to needed health care, causing missed appointments, delayed care, and unfilled prescriptions, all of which can have a negative impact on health outcomes.[259] Access to transportation for ongoing health care and medication access needs, particularly for those with chronic diseases, is essential to successful chronic disease management. Adopting a data element to collect and analyze information regarding transportation needs across PAC settings will facilitate the connection to programs that can address identified needs.

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[255] Healthy People 2020. (2019, February). *Social determinants of health*. Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health.

[256] U.S. Department of Health & Human Services, Office of the Assistant Secretary for Planning and Evaluation. (2016, December). *Report to Congress: Social risk factors and performance under Medicare's value-based purchasing programs*. Washington, DC: Author. Retrieved from https://aspe.hhs.gov/pdf-report/report-congress-social-risk-factors-and-performance-under-medicares-value-based-purchasing-programs.

[257] Morris, N. S., MacLean, C. D., Chew, L. D., & Littenberg, B. (2006). The Single Item Literacy Screener: Evaluation of a brief instrument to identify limited reading ability. *BMC Family Practice*, *7*(1), 21. https://doi.org/10.1186/1471-2296-7-21 Note: At the beginning of this article, the researchers note they substitute the term health literacy with the phase "reading ability" when discussing their results.

[258] Brice, J. H., Foster, M. B., Principe, S., Moss, C., Shofer, F. S., Falk, R. J., . . . DeWalt, D. A. (2014). Single-item or two-item literacy screener to predict the S-TOFHLA among adult hemodialysis patients. *Patient Education and Counseling*, *94*(1), 71–75. https://doi.org/10.1016/j.pec.2013.09.020

[259] Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: Transportation barriers to health care access. *Journal of Community Health*, *38*(5), 976–993. https://doi.org/10.1007/s10900-013-9681-1

Data Element for the Assessment of SDOH: Transportation

A1250. Transportation Has lack of transportation kept you from medical appointments, meetings, work, or from getting things needed for daily living?	
↓	**Check all that apply**
☐	**A.** Yes, it has kept me from medical appointments or from getting my medications
☐	**B.** Yes, it has kept me from non-medical meetings, appointments, work, or from getting things that I need
☐	**C.** No
☐	**X.** Patient unable to respond

Current use

A transportation data element is not currently used in any of the PAC assessment tools.

Evidence supporting use of Transportation

The data element uses the Transportation item from the Protocol for Responding to and Assessing Patient Assets, Risks, and Experiences (PRAPARE) tool and is reflective of research on the importance of addressing transportation as a critical SDOH. The national PRAPARE SDOH assessment protocol is developed and owned by the National Association of Community Health Centers, in partnership with the Association of Asian Pacific Community Health Organization, the Oregon Primary Care Association, and the Institute for Alternative Futures. More information about development of the PRAPARE tool can be found at http://www.nachc.org/prapare. Items in the assessment tool are consistent with Healthy People 2020 priorities and ICD-10 coding.[260]

Social Isolation

Relevance to IRFs

Distinct from loneliness, social isolation refers to an actual or perceived lack of contact with other people, such as living alone or residing in a remote area. [261] Social isolation tends to increase with age, is a risk factor for physical and mental illness, and is a predictor of mortality.[262] PAC providers are well-suited to design and implement programs to increase social engagement of patients while accounting for individual needs and preferences. Adopting a data element to collect and analyze information about social isolation in IRFs and across PAC settings would facilitate the identification of patients who are socially isolated and who may benefit from engagement efforts.

[260] National Association of Community Health Centers. (2019). *PRAPARE*. Retrieved from http://www.nachc.org/research-and-data/prapare/.

[261] Tomaka, J., Thompson, S., & Palacios, R. (2006). The relation of social isolation, loneliness, and social support to disease outcomes among the elderly. *Journal of Aging and Health*, *18*(3), 359–384. https://doi.org/10.1177/0898264305280993

Leading Age. (2019). Social Connectedness and Engagement Technology for Long-Term and Post-Acute Care: A Primer and Provider Selection Guide. Washington, DC: Author. Available at https://www.leadingage.org/white-papers/social-connectedness-and-engagement-technology-long-term-and-post-acute-care-primer-and

[262] Landeiro, F., Barrows, P., Nuttall Musson, E., Gray, A. M., & Leal, J. (2017). Reducing social isolation and loneliness in older people: A systematic review protocol. *BMJ Open*, *7*(5), e013778. https://doi.org/10.1136/bmjopen-2016-013778

Ong, A. D., Uchino, B. N., & Wethington, E. (2016). Loneliness and health in older adults: A mini-review and synthesis. *Gerontology*, *62*(4), 443–449. https://doi.org/10.1159/000441651

Leigh-Hunt, N., Bagguley, D., Bash, K., Turner, V., Turnbull, S., Valtorta, N., & Caan, W. (2017). An overview of systematic reviews on the public health consequences of social isolation and loneliness. *Public Health*, *152*, 157–171. https://doi.org/10.1016/j.puhe.2017.07.035

Data Element for the Assessment of SDOH: Social Isolation

D0700. Social Isolation How often do you feel lonely or isolated from those around you?	
Enter Code ☐	0. **Never** 1. **Rarely** 2. **Sometimes** 3. **Often** 4. **Always** 8. **Patient unable to respond**

Current use

A social isolation data element is not currently used in any of the PAC assessment tools.

Evidence supporting use of Social Isolation

The data element uses the social isolation item from the Accountable Health Communities (AHC) Screening Tool, which was selected from the Patient-Reported Outcomes Measurement Information System (PROMIS) Item Bank on Emotional Distress. The AHC Screening Tool was developed by a panel of interdisciplinary experts that looked at evidence-based ways to measure SDOH, including social isolation. More information about the AHC Screening Tool can be found at https://innovation.cms.gov/Files/worksheets/ahcm-screeningtool.pdf.

APPENDIX A:
Transfer of Health Information: Setting-Specific Language

Tables A-1 and A-2 below summarize the setting specific language used to describe the resident or patient within each PAC setting. There are no other differences in the content or language within each Transfer of Health Information to the Provider-Post-Acute Care quality measure data element and within each Transfer of Health Information to the Patient–Post-Acute Care quality measure data element.

Table A-1
Transfer of Health Information to the Provider–Post-Acute Care: Setting-Specific Language

IRF	LTCH	SNF
Discharge	**Discharge**	**Discharge**
A2121. Provision of Current Reconciled Medication List to Subsequent Provider at Discharge At the time of discharge to another provider, did your facility provide the patient's current reconciled medication list to the subsequent provider? Enter Code: □ 0. No - Current reconciled medication list not provided to the subsequent provider 1. Yes - Current reconciled medication list provided to the subsequent provider	**A2121. Provision of Current Reconciled Medication List to Subsequent Provider at Discharge** At the time of discharge to another provider, did your facility provide the patient's current reconciled medication list to the subsequent provider? Enter Code: □ 0. No - Current reconciled medication list not provided to the subsequent provider 1. Yes - Current reconciled medication list provided to the subsequent provider	**A2121. Provision of Current Reconciled Medication List to Subsequent Provider at Discharge** At the time of discharge to another provider, did your facility provide the resident's current reconciled medication list to the subsequent provider? Enter Code: □ 0. No - Current reconciled medication list not provided to the subsequent provider 1. Yes - Current reconciled medication list provided to the subsequent provider
A2122. Route of Current Reconciled Medication List Transmission to Subsequent Provider Indicate the route(s) of transmission of the current reconciled medication list to the subsequent provider. A. Electronic Health Record B. Health Information Exchange Organization C. Verbal (e.g., in-person, telephone, video conferencing) D. Paper-based (e.g., fax, copies, printouts) E. Other Methods (e.g., texting, email, CDs)	**A2122. Route of Current Reconciled Medication List Transmission to Subsequent Provider** Indicate the route(s) of transmission of the current reconciled medication list to the subsequent provider. A. Electronic Health Record B. Health Information Exchange Organization C. Verbal (e.g., in-person, telephone, video conferencing) D. Paper-based (e.g., fax, copies, printouts) E. Other Methods (e.g., texting, email, CDs)	**A2122. Route of Current Reconciled Medication List Transmission to Subsequent Provider** Indicate the route(s) of transmission of the current reconciled medication list to the subsequent provider. A. Electronic Health Record B. Health Information Exchange Organization C. Verbal (e.g., in-person, telephone, video conferencing) D. Paper-based (e.g., fax, copies, printouts) E. Other Methods (e.g., texting, email, CDs)

Table A-2
Transfer of Health Information to the Patient–Post-Acute Care: Setting-Specific Language

IRF	LTCH	SNF
Discharge	**Discharge**	**Discharge**
A2123. Provision of Current Reconciled Medication List to Patient at Discharge At the time of discharge, did your facility provide the patient's current reconciled medication list to the patient, family and/or caregiver? Enter Code: □ 0. No - Current reconciled medication list not provided to the patient, family and/or caregiver 1. Yes - Current reconciled medication list provided to the patient, family and/or caregiver **A2124. Route of Current Reconciled Medication List Transmission to Patient** Indicate the route(s) of transmission of the current reconciled medication list to the patient/family/caregiver. A. Electronic Health Record (e.g., electronic access to patient portal) B. Health Information Exchange Organization C. Verbal (e.g., in-person, telephone, video conferencing) D. Paper-based (e.g., fax, copies, printouts) E. Other Methods (e.g., texting, email, CDs)	**A2123. Provision of Current Reconciled Medication List to Patient at Discharge** At the time of discharge, did your facility provide the patient's current reconciled medication list to the patient, family and/or caregiver? Enter Code: □ 0. No - Current reconciled medication list not provided to the patient, family and/or caregiver 1. Yes - Current reconciled medication list provided to the patient, family and/or caregiver **A2124. Route of Current Reconciled Medication List Transmission to Patient** Indicate the route(s) of transmission of the current reconciled medication list to the patient/family/caregiver. A. Electronic Health Record (e.g., electronic access to patient portal) B. Health Information Exchange Organization C. Verbal (e.g., in-person, telephone, video conferencing) D. Paper-based (e.g., fax, copies, printouts) E. Other Methods (e.g., texting, email, CDs)	**A2123. Provision of Current Reconciled Medication List to Resident at Discharge** At the time of discharge, did your facility provide the resident's current reconciled medication list to the resident, family and/or caregiver? Enter Code: □ 0. No - Current reconciled medication list not provided to the resident, family and/or caregiver 1. Yes - Current reconciled medication list provided to the resident, family and/or caregiver? **A2124. Route of Current Reconciled Medication List Transmission to Resident** Indicate the route(s) of transmission of the current reconciled medication list to the resident/family/caregiver. A. Electronic Health Record (e.g., electronic access to patient portal) B. Health Information Exchange Organization C. Verbal (e.g., in-person, telephone, video conferencing) D. Paper-based (e.g., fax, copies, printouts) E. Other Methods (e.g., texting, email, CDs)

APPENDIX B:
Discharge to Community–PAC IRF QRP Analyses

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016

Number of beneficiaries included in the model = 594,733

Observed number (percent) of beneficiaries in the sample who were discharged to community = 383,703 (64.52%).

Model c-statistic = 0.708

Based on Medicare fee-for-service claims data from CY 2015–2016. These model estimates only apply to CY 2015–2016 IRF data. We will re-estimate the regression model for each measurement period to allow the estimated effects of patient characteristics to vary over time.

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
Intercept	.		3.060	0.038	<.0001	.	.	.
Age and Sex Groupings (Reference: Female, age 18–64 years)								
Male, age 18–64 years	36,396	6.1	−0.034	0.017	0.0486	0.967	0.935	1.000
Male, age 65–74 years	91,141	15.3	−0.050	0.015	0.0009	0.951	0.923	0.980
Male, age 75–79 years	49,544	8.3	−0.163	0.017	<.0001	0.849	0.822	0.877
Male, age 80–84 years	43,991	7.4	−0.280	0.017	<.0001	0.756	0.731	0.781
Male, age 85–89 years	31,807	5.4	−0.468	0.018	<.0001	0.626	0.604	0.649
Male, age 90–94 years	12,492	2.1	−0.623	0.024	<.0001	0.536	0.512	0.562
Male, age ≥ 95 years	2,360	0.4	−0.660	0.045	<.0001	0.517	0.473	0.565
Female, age 65–74 years	98,577	16.6	−0.010	0.015	0.4982	0.990	0.961	1.019
Female, age 75–79 years	58,311	9.8	−0.149	0.016	<.0001	0.862	0.835	0.890
Female, age 80–84 years	57,036	9.6	−0.299	0.016	<.0001	0.742	0.718	0.766
Female, age 85–89 years	49,097	8.3	−0.504	0.017	<.0001	0.604	0.584	0.624
Female, age 90–94 years	23,430	3.9	−0.616	0.020	<.0001	0.540	0.520	0.562
Female, age ≥ 95 years	5,493	0.9	−0.714	0.032	<.0001	0.490	0.460	0.521
Original Reason for Entitlement								
Age ≥ 65 at IRF admission and original reason for entitlement was disability or ESRD	76,090	12.8	−0.108	0.009	<.0001	0.898	0.882	0.914

(continued)

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
Principal Diagnosis Clinical Classifications Software (CCS) Groupings Based on Prior Acute Stay (Reference: includes all CCS numbers not listed as risk adjusters)								
Other Infectious and Parasitic Diseases (1, 3-10)	1,367	0.2	−0.323	0.063	<.0001	0.724	0.640	0.818
Infectious & Parasitic Disease: Septicemia (2)	31,937	5.4	−0.263	0.026	<.0001	0.769	0.731	0.809
Neoplasms - Liver, Pancreas, Bronchus, Lung, Ovary, Brain & Nervous System (16, 17, 19, 27, 35)	2,958	0.5	−0.593	0.048	<.0001	0.553	0.503	0.607
Secondary Malignant Neoplasm (42)	2,181	0.4	−0.638	0.053	<.0001	0.528	0.476	0.586
Neoplasms-Benign (44-47); Neoplasms-Low (22-26, 28-31, 36); Neoplasms-Medium (11-15, 18, 20-21, 32-34, 37-41, 43)	7,911	1.3	−0.418	0.035	<.0001	0.658	0.615	0.705
Endocrine Disorders (48, 51, 53, 54)	1,745	0.3	−0.166	0.058	0.0041	0.847	0.756	0.949
Diabetes with and without Complications (49, 50)	8,230	1.4	−0.401	0.034	<.0001	0.670	0.626	0.716
Nutritional Defic and Other Nutritional Disorders (52, 58)	1,021	0.2	−0.503	0.071	<.0001	0.605	0.527	0.695
Fluid/Electrolyte Disorders (55)	4,236	0.7	−0.411	0.040	<.0001	0.663	0.613	0.717
Diseases of Blood and Blood-Forming Organs (56-57, 59-64)	2,298	0.4	−0.457	0.050	<.0001	0.633	0.575	0.698
Dis Nerv Syst: Meningitis, Encephalitis, Other CNS infection (76-78)	1,577	0.3	−0.531	0.059	<.0001	0.588	0.524	0.660
Dis Nerv Syst: Parkinson's, MS, Other Hered CNS Disease, Paralysis (79-82)	5,732	1.0	−0.498	0.037	<.0001	0.608	0.565	0.654
Dis Nerv Syst: Epilepsy; Convulsions (83)	3,790	0.6	−0.221	0.043	<.0001	0.802	0.737	0.872
Dis Nerv Syst: Other Nervous System Disorders (95)	10,013	1.7	−0.364	0.032	<.0001	0.695	0.653	0.740
Circ Syst: Heart Valve Disorders (96)	7,951	1.3	−0.300	0.039	<.0001	0.741	0.687	0.799
Circ Syst: Carditis & Other Heart Disease (97, 104)	1,088	0.2	−0.420	0.070	<.0001	0.657	0.573	0.753
Circ Syst: HTN & HTN Complication (98, 99)	5,209	0.9	−0.322	0.038	<.0001	0.725	0.673	0.780
Circ Syst: Acute MI & Cardiac Arrest (100, 107)	11,904	2.0	−0.395	0.032	<.0001	0.674	0.633	0.717

(continued)

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
Circ Syst: Coron Athero & Chest Pain (101, 102)	10,491	1.8	−0.331	0.035	<.0001	0.718	0.670	0.769
Circ Syst: Pulmonary Heart Disease (103)	2,767	0.5	−0.214	0.047	<.0001	0.807	0.736	0.886
Circ Syst: Conduction Disorders & Cardiac Dysrhythmia (105, 106)	9,441	1.6	−0.300	0.032	<.0001	0.741	0.696	0.789
Circ Syst: CHF (108)	13,531	2.3	−0.388	0.030	<.0001	0.679	0.640	0.720
Circ Syst: CVD (109-111, 113)	105,186	17.7	−0.582	0.027	<.0001	0.559	0.530	0.589
Circ Syst: TIA (112)	2,964	0.5	−0.082	0.049	0.0954	0.921	0.837	1.014
Circ Syst: Peripheral and Visceral Atherosclerosis (114)	3,891	0.7	−0.532	0.042	<.0001	0.588	0.541	0.638
Circ Syst: Aneurysm (115)	2,407	0.4	−0.366	0.051	<.0001	0.693	0.627	0.766
Circ Syst: Arterial Embolism & Other Circul Disease (116, 117)	3,418	0.6	−0.424	0.043	<.0001	0.654	0.601	0.712
Circ Syst: Phlebitis, Varicose Veins, Hemorrhoids, Other Vein Disease (118-121)	2,182	0.4	−0.343	0.051	<.0001	0.709	0.642	0.784
Resp Syst: Pneumonia, Influenza, Acute Bronchitis, Other Upper Resp (122,123, 125-126)	11,289	1.9	−0.212	0.031	<.0001	0.809	0.762	0.859
Resp Syst: Tonsillitis, Pleurisy, Lung Disease, Other Lower or Upper Resp (124, 130, 132-134)	2,509	0.4	−0.343	0.049	<.0001	0.709	0.645	0.780
Resp Syst: COPD & Asthma (127, 128)	6,501	1.1	−0.410	0.037	<.0001	0.664	0.617	0.713
Resp Syst: Aspiration Pneumonia (129)	2,988	0.5	−0.374	0.045	<.0001	0.688	0.630	0.752
Resp Syst: Adult Respiratory Failure (131)	7,560	1.3	−0.299	0.034	<.0001	0.741	0.693	0.793
Diseases of Digestive System (135-144, 146-148, 154,155)	11,510	1.9	−0.332	0.031	<.0001	0.717	0.676	0.762
Digestive System - Intestinal Obstruction without Hernia (145)	2,948	0.5	−0.188	0.046	<.0001	0.829	0.757	0.907
Biliary Disease, Liver Disease, Pancreatic disorders (149-152)	4,161	0.7	−0.335	0.041	<.0001	0.716	0.661	0.775
GI Hemorrhage (153)	3,846	0.6	−0.301	0.041	<.0001	0.740	0.683	0.803
Genitourinary: Other (156, 160-166, 168-175)	1,721	0.3	−0.274	0.059	<.0001	0.760	0.678	0.853
Genitourinary: Acute or Chronic Renal Failure (157,158)	9,630	1.6	−0.417	0.032	<.0001	0.659	0.620	0.702
Genitourinary: UTI (159)	8,102	1.4	−0.356	0.033	<.0001	0.700	0.656	0.747

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Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
Diseases of the Skin and Subcutaneous Tissue (167, 197-200)	4,479	0.8	−0.288	0.040	<.0001	0.749	0.694	0.810
Infective Arthritis and Osteomyelitis (201)	2,046	0.3	−0.448	0.052	<.0001	0.639	0.577	0.708
Rheumatoid Arthritis, Lupus, Other Connective Tissue Disease (202, 210)	4,150	0.7	−0.368	0.041	<.0001	0.692	0.640	0.750
Other Joint Disorders & Osteoporosis (204, 206)	1,104	0.2	−0.253	0.073	0.0006	0.777	0.673	0.897
Back Problem (205)	30,099	5.1	−0.171	0.026	<.0001	0.843	0.802	0.886
Pathological Fracture (207)	5,536	0.9	−0.426	0.037	<.0001	0.653	0.608	0.702
Other Bone Disease (212)	1,957	0.3	−0.193	0.058	0.0008	0.824	0.737	0.923
Congenital Anomalies (213-217)	914	0.2	−0.226	0.082	0.0056	0.798	0.680	0.936
Joint Injury (225)	616	0.1	−0.427	0.092	<.0001	0.652	0.544	0.782
Fracture of Hip (226)	57,263	9.6	−0.466	0.028	<.0001	0.627	0.594	0.662
Spinal Cord Injury (227)	1,527	0.3	−0.760	0.063	<.0001	0.468	0.414	0.529
Skull and Face Fractures & Other Fractures (228, 231)	21,298	3.6	−0.324	0.028	<.0001	0.723	0.684	0.764
Fracture of Upper Limb (229)	5,236	0.9	−0.468	0.038	<.0001	0.626	0.581	0.674
Fracture of Lower Limb (230)	12,229	2.1	−0.622	0.030	<.0001	0.537	0.506	0.569
Sprains and Strains & Superficial Injury/Contusion (232, 239)	1,963	0.3	−0.174	0.056	0.0018	0.841	0.754	0.938
Intracranial Injury (233)	16,147	2.7	−0.538	0.034	<.0001	0.584	0.546	0.625
Crush Injury (234)	1,746	0.3	−0.069	0.060	0.244	0.933	0.830	1.048
Open Wound Head & Extremities, Burns, Other Injuries due to External Causes (235, 236, 240, 244)	2,256	0.4	−0.311	0.052	<.0001	0.733	0.661	0.811
Complications of Device, Procedures, or Medical Care (237-238)	27,998	4.7	−0.386	0.023	<.0001	0.680	0.649	0.711
Poison Psychotropic Agents, Poison Other Med, Poison Nonmed (241-243)	1,093	0.2	−0.175	0.071	0.014	0.840	0.730	0.965
Symptoms, Signs & Ill-Defined Conditions & Factors influencing health status (245-247, 249-259)	5,237	0.9	−0.277	0.038	<.0001	0.758	0.704	0.816

(continued)

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
Gangrene (248)	2,824	0.5	−0.674	0.049	<.0001	0.510	0.464	0.561
Mental Illness (650-670)	3,272	0.6	−0.289	0.049	<.0001	0.749	0.681	0.824
IRF Case-Mix Groups (CMGs) (Reference: Stroke: Motor Score > 44.45 (CMGs: 0101-0103); Expired (CMGs: 5101-5104))								
Stroke: Motor Score 26.15-44.45 (CMGs: 0104-0107)	51,933	8.7	-0.574	0.027	<.0001	0.563	0.535	0.593
Stroke: (Motor <26.15 Age >84.5), (Motor > 22.35 Motor <26.15 Age <84.5) (CMGs: 0108-0109)	22,064	3.7	-1.481	0.028	<.0001	0.227	0.215	0.240
Stroke: Motor Score <22.35 and Age <84.5 (CMG: 0110)	37,142	6.3	-1.982	0.027	<.0001	0.138	0.131	0.145
Traumatic Brain Injury: Motor Score >28.75 (CMGs: 0201-0205)	10,363	1.7	-0.543	0.039	<.0001	0.581	0.538	0.627
Traumatic Brain Injury: Motor Score <28.75 (CMGs: 0206-0207)	9,844	1.7	-1.405	0.038	<.0001	0.245	0.228	0.264
Non-traumatic Brain Injury: Motor Score >35.05 (CMGs: 0301-0302)	11,886	2.0	-0.473	0.036	<.0001	0.623	0.581	0.668
Non-traumatic Brain Injury: Motor Score <35.05 (CMGs: 0303-0304)	24,887	4.2	-1.190	0.031	<.0001	0.304	0.286	0.323
Traumatic Spinal Cord Injury: All (CMGs: 0401-0405)	4,262	0.7	-1.299	0.047	<.0001	0.273	0.249	0.299
Non-traumatic Spinal Cord Injury: Motor Score >31.25 (CMGs: 0501-0503)	9,265	1.6	-0.527	0.042	<.0001	0.591	0.544	0.641
Non-traumatic Spinal Cord Injury: Motor Score <31.25 (CMGs: 0504-0506)	15,463	2.6	-1.494	0.035	<.0001	0.224	0.209	0.241
Neurological: Motor Score >37.35 (CMGs: 0601-0602)	14,291	2.4	-0.495	0.035	<.0001	0.610	0.570	0.653
Neurological: Motor Score <37.35 (CMGs: 0603-0604)	54,240	9.1	-1.112	0.030	<.0001	0.329	0.310	0.349
Fracture of Lower Extremity: Motor Score >28.15 (CMGs: 0701-0703)	24,735	4.2	-0.386	0.036	<.0001	0.680	0.633	0.730
Fracture of Lower Extremity: Motor Score <28.15 (CMG: 0704)	47,974	8.1	-1.360	0.034	<.0001	0.257	0.240	0.274
Replacement of Lower Extremity Joint: Motor Score >28.65 (CMGs: 0801-0804)	25,157	4.2	-0.382	0.039	<.0001	0.682	0.632	0.737
Replacement of Lower Extremity Joint: Motor Score <28.65 (CMGs: 0805-0806)	16,215	2.7	-1.191	0.038	<.0001	0.304	0.282	0.327
Other Orthopedic: Motor Score >24.15 (CMGs: 0901-0903)	11,492	1.9	-0.453	0.039	<.0001	0.636	0.589	0.686
Other Orthopedic: Motor Score <24.15 (CMG: 0904)	29,110	4.9	-1.239	0.032	<.0001	0.290	0.272	0.309
Amputation, Lower Extremity: Motor Score >36.25 (CMGs:1001-1002)	3,408	0.6	-0.481	0.052	<.0001	0.618	0.559	0.684
Amputation, Lower Extremity: Motor Score <36.25 (CMG:1003) & Amputation, Non-Lower Extremity (CMGs: 1101-1102)	12,303	2.1	-1.146	0.039	<.0001	0.318	0.295	0.343
Osteoarthritis: All (CMGs: 1201-1203)	866	0.2	-1.077	0.081	<.0001	0.341	0.291	0.399
Rheumatoid, Other Arthritis: All (CMGs: 1301-1303)	1,573	0.3	-1.003	0.063	<.0001	0.367	0.324	0.415
Cardiac: Motor Score >38.55 (CMGs: 1401-1402)	10,982	1.9	-0.473	0.038	<.0001	0.623	0.579	0.671

(continued)

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
Cardiac: Motor Score <38.55 (CMGs: 1403-1404)	29,247	4.9	-1.002	0.032	<.0001	0.367	0.345	0.391
Pulmonary: Motor Score >39.05 (CMGs: 1501-1502)	4,083	0.7	-0.544	0.047	<.0001	0.581	0.530	0.637
Pulmonary: Motor Score <39.05 (CMGs: 1503-1504)	8,948	1.5	-1.057	0.037	<.0001	0.348	0.323	0.374
Pain Syndrome: All (CMGs: 1601-1603)	2,207	0.4	-1.025	0.057	<.0001	0.359	0.321	0.401
Major Multiple Trauma Without Brain or Spinal Cord Injury (CMGs: 1701-1704)	10,641	1.8	-1.114	0.038	<.0001	0.328	0.305	0.354
Major Multiple Trauma With Brain or Spinal Cord Injury (CMGs: 1801-1803)	3,141	0.5	-1.036	0.050	<.0001	0.355	0.322	0.392
Guillain Barre (CMGs: 1901-1903)	1,231	0.2	-1.180	0.070	<.0001	0.307	0.268	0.352
Miscellaneous (CMGs: 2001-2004), Burns (CMG 2101), Short-stay cases (CMG: 5001)	72,447	12.2	-0.907	0.030	<.0001	0.404	0.381	0.428
Surgical Categories Based on Prior Acute Stay								
Cardiothoracic surgery	31,341	5.3	0.211	0.020	<.0001	1.235	1.189	1.283
Otolaryngology	1,652	0.3	0.043	0.055	0.4294	1.044	0.938	1.162
Neurosurgery	27,063	4.6	0.016	0.017	0.3397	1.016	0.984	1.049
General surgery	44,588	7.5	0.105	0.015	<.0001	1.110	1.078	1.143
Obstetrics/Gynecology	930	0.2	−0.085	0.072	0.24	0.919	0.797	1.058
Orthopedic surgery	170,827	28.7	0.066	0.013	<.0001	1.068	1.041	1.097
Plastic surgery	12,880	2.2	−0.083	0.021	<.0001	0.920	0.884	0.958
Urologic surgery	4,018	0.7	0.066	0.036	0.069	1.068	0.995	1.147
Vascular surgery	14,347	2.4	0.100	0.020	<.0001	1.106	1.063	1.150
Dialysis in Prior Acute Stay where End-Stage Renal Disease Not Indicated								
Dialysis Where HCC133 (End-Stage Renal Disease) Not Indicated	6,099	1.0	−0.086	0.029	0.0033	0.918	0.867	0.972
Prior Acute Length of Stay in Non-Psychiatric Hospital or Prior Stay in Psychiatric Hospital (Reference: 1-3 days in Non-Psychiatric Hospital)								
Prior acute stay in psychiatric hospital	683	0.1	−0.538	0.091	<.0001	0.584	0.489	0.698
4-5 days in non-psychiatric hospital	150,262	25.3	−0.089	0.008	<.0001	0.915	0.900	0.930
6-8 days in non-psychiatric hospital	123,559	20.8	−0.224	0.009	<.0001	0.799	0.785	0.814

(continued)

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
9-10 days in non-psychiatric hospital	41,459	7.0	−0.310	0.013	<.0001	0.734	0.715	0.753
11-14 days in non-psychiatric hospital	45,891	7.7	−0.369	0.013	<.0001	0.692	0.674	0.710
15-20 days in non-psychiatric hospital	28,005	4.7	−0.470	0.016	<.0001	0.625	0.606	0.645
21-30 days in non-psychiatric hospital	14,369	2.4	−0.520	0.021	<.0001	0.595	0.570	0.620
30+ days in non-psychiatric hospital	6,038	1.0	−0.691	0.031	<.0001	0.501	0.471	0.532
Comorbidities - Hierarchical Condition Categories (HCCs) (* indicates that the HCC is based on the most recent acute care claim only. HCCs not preceded by * are based on acute care claims from the past 365 days (including the most recent acute care claim)).								
HCC3: Bacterial, Fungal, and Parasitic Central Nervous System Infections*	2,497	0.4	−0.111	0.044	0.0109	0.895	0.822	0.975
HCC6: Opportunistic Infections	2,395	0.4	−0.093	0.044	0.032	0.911	0.836	0.992
HCC7: Other Infectious Diseases*	64,584	10.9	−0.026	0.010	0.0117	0.975	0.956	0.994
HCC8: Metastatic Cancer and Acute Leukemia*	8,774	1.5	−0.288	0.024	<.0001	0.750	0.716	0.785
HCC9: Lung and Other Severe Cancers*	7,099	1.2	−0.182	0.026	<.0001	0.834	0.793	0.877
HCC10: Lymphoma and Other Cancers*	6,990	1.2	−0.101	0.026	0.0001	0.904	0.859	0.952
HCC11: Colorectal, Bladder, and Other Cancers*	3,107	0.5	−0.022	0.039	0.5774	0.979	0.907	1.056
HCC12: Breast, Prostate, and Other Cancers and Tumors*	8,071	1.4	−0.042	0.025	0.0895	0.959	0.913	1.007
HCC13; HCC14: Other Respiratory and Heart Neoplasms; Other Digestive and Urinary Neoplasms*	3,190	0.5	−0.021	0.039	0.5843	0.979	0.908	1.056
HCC17: Diabetes with Acute Complications	1,887	0.3	−0.143	0.050	0.0045	0.867	0.785	0.957
HCC18; HCC19: Diabetes with Chronic Complications; Diabetes without Complication	214,610	36.1	−0.047	0.006	<.0001	0.954	0.942	0.966
HCC20: Type I Diabetes Mellitus*	4,232	0.7	−0.063	0.034	0.067	0.939	0.878	1.004

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Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
HCC21: Protein-Calorie Malnutrition	40,992	6.9	−0.170	0.012	<.0001	0.844	0.825	0.863
HCC22: Morbid Obesity	45,288	7.6	−0.067	0.012	<.0001	0.935	0.914	0.956
HCC23: Other Significant Endocrine and Metabolic Disorders*	24,160	4.1	−0.044	0.015	0.0027	0.957	0.930	0.985
HCC24: Disorders of Fluid/Electrolyte/Acid-Base Balance*	208,632	35.1	−0.071	0.007	<.0001	0.931	0.919	0.943
HCC27: End-Stage Liver Disease	3,796	0.6	−0.368	0.035	<.0001	0.692	0.646	0.742
HCC28: Cirrhosis of Liver	5,487	0.9	−0.268	0.029	<.0001	0.765	0.722	0.810
HCC29: Chronic Hepatitis	1,930	0.3	−0.030	0.051	0.5499	0.970	0.879	1.071
HCC36: Peptic Ulcer, Hemorrhage, Other Specified Gastrointestinal Disorders*	31,245	5.3	−0.046	0.013	0.0005	0.956	0.931	0.980
HCC39: Bone/Joint/Muscle Infections/Necrosis*	12,511	2.1	−0.083	0.022	0.0002	0.921	0.882	0.961
HCC40: Rheumatoid Arthritis and Inflammatory Connective Tissue Disease	31,201	5.3	−0.013	0.013	0.3136	0.987	0.962	1.013
HCC46: Severe Hematological Disorders*	3,468	0.6	−0.148	0.037	<.0001	0.862	0.803	0.927
HCC48: Coagulation Defects and Other Specified Hematological Disorders*	50,705	8.5	−0.039	0.011	0.0004	0.962	0.942	0.983
HCC49: Iron Deficiency and Other/Unspecified Anemias and Blood Disease*	207,568	34.9	−0.030	0.007	<.0001	0.970	0.957	0.983
HCC50: Delirium and Encephalopathy*	65,056	10.9	−0.047	0.010	<.0001	0.954	0.936	0.972
HCC51; HCC52: Dementia With Complications; Dementia Without Complication	62,160	10.5	−0.159	0.009	<.0001	0.853	0.837	0.869
HCC53: Nonpsychotic Organic Brain Syndromes/Conditions	9,747	1.6	−0.089	0.023	<.0001	0.915	0.875	0.957
HCC54; HCC55: Drug/Alcohol Psychosis; Drug/Alcohol Dependence*	16,762	2.8	−0.040	0.018	0.0263	0.961	0.928	0.995
HCC56: Drug/Alcohol Abuse, Without Dependence*	57,695	9.7	−0.046	0.010	<.0001	0.956	0.936	0.975
HCC57: Schizophrenia	3,293	0.6	−0.223	0.039	<.0001	0.800	0.742	0.863
HCC58: Major Depressive, Bipolar, and Paranoid Disorders	13,759	2.3	−0.109	0.019	<.0001	0.896	0.863	0.931

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Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
HCC59: Reactive and Unspecified Psychosis	2,825	0.5	−0.124	0.041	0.0024	0.883	0.815	0.957
HCC60: Personality Disorders	309	0.1	−0.249	0.124	0.0435	0.779	0.612	0.993
HCC61: Depression	79,813	13.4	−0.057	0.009	<.0001	0.944	0.929	0.961
HCC64 - HCC67: Profound Mental Retardation/Developmental Disability; Severe Mental Retardation/Developmental Disability; Moderate Mental Retardation/Developmental Disability; Mild Mental Retardation, Autism, Down Syndrome	2,088	0.4	−0.141	0.049	0.004	0.869	0.790	0.956
HCC68; HCC69: Other Developmental Disability; Attention Deficit Disorder	1,497	0.3	−0.144	0.058	0.0136	0.866	0.772	0.971
HCC70: Quadriplegia	3,073	0.5	−0.294	0.040	<.0001	0.745	0.690	0.806
HCC71: Paraplegia	4,102	0.7	−0.213	0.035	<.0001	0.808	0.755	0.866
HCC72: Spinal Cord Disorders/Injuries	7,962	1.3	−0.112	0.027	<.0001	0.894	0.849	0.942
HCC73: Amyotrophic Lateral Sclerosis and Other Motor Neuron Disease*	316	0.1	−0.130	0.122	0.2874	0.878	0.691	1.116
HCC74: Cerebral Palsy	1,148	0.2	−0.224	0.066	0.0006	0.799	0.703	0.909
HCC78: Parkinson's and Huntington's Diseases	19,341	3.3	−0.058	0.016	0.0004	0.943	0.913	0.974
HCC80: Coma, Brain Compression/Anoxic Damage	19,430	3.3	−0.144	0.018	<.0001	0.866	0.836	0.897
HCC82: Respirator Dependence/Tracheostomy Status	3,322	0.6	−0.052	0.038	0.1666	0.949	0.882	1.022
HCC85: Congestive Heart Failure	147,151	24.7	−0.085	0.008	<.0001	0.918	0.905	0.932
HCC86: Acute Myocardial Infarction*	12,259	2.1	−0.100	0.020	<.0001	0.905	0.871	0.941
HCC87: Unstable Angina and Other Acute Ischemic Heart Disease*	9,721	1.6	−0.046	0.023	0.0413	0.955	0.914	0.998
HCC90: Heart Infection/Inflammation, Except Rheumatic*	5,209	0.9	−0.088	0.031	0.0039	0.916	0.862	0.972
HCC91: Valvular and Rheumatic Heart Disease*	53,766	9.0	−0.026	0.010	0.0103	0.974	0.955	0.994
HCC96: Specified Heart Arrhythmias	177,247	29.8	−0.088	0.007	<.0001	0.916	0.904	0.928
HCC99: Cerebral Hemorrhage*	9,314	1.6	−0.151	0.024	<.0001	0.860	0.821	0.901

(continued)

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
HCC100: Ischemic or Unspecified Stroke*	16,066	2.7	−0.193	0.020	<.0001	0.824	0.793	0.857
HCC103: Hemiplegia/Hemiparesis	82,270	13.8	−0.146	0.011	<.0001	0.864	0.846	0.883
HCC104: Monoplegia, Other Paralytic Syndromes	2,549	0.4	−0.030	0.045	0.5036	0.971	0.889	1.059
HCC105: Late Effects of Cerebrovascular Disease, Except Paralysis	25,984	4.4	−0.073	0.015	<.0001	0.929	0.902	0.957
HCC106: Atherosclerosis of the Extremities with Ulceration or Gangrene*	8,107	1.4	−0.233	0.029	<.0001	0.792	0.748	0.838
HCC107: Vascular Disease with Complications*	10,636	1.8	−0.065	0.022	0.0025	0.937	0.898	0.977
HCC108: Vascular Disease*	70,461	11.9	−0.042	0.009	<.0001	0.959	0.941	0.976
HCC109: Other Circulatory Disease*	52,711	8.9	−0.004	0.010	0.6912	0.996	0.976	1.016
HCC110 - HCC112: Cystic Fibrosis; Chronic Obstructive Pulmonary Disease; Fibrosis of Lung and Other Chronic Lung Disorders	119,087	20.0	−0.086	0.008	<.0001	0.918	0.904	0.932
HCC114: Aspiration and Specified Bacterial Pneumonias*	20,928	3.5	−0.062	0.016	0.0001	0.940	0.911	0.970
HCC116: Viral and Unspecified Pneumonia, Pleurisy*	35,314	5.9	−0.007	0.013	0.5576	0.993	0.968	1.017
HCC117: Pleural Effusion/Pneumothorax*	23,621	4.0	−0.041	0.015	0.0073	0.960	0.932	0.989
HCC120: Major Eye Infections/Inflammations*	151	0.03	−0.149	0.174	0.3918	0.862	0.613	1.211
HCC132: Kidney Transplant Status	4,575	0.8	−0.300	0.034	<.0001	0.741	0.694	0.791
HCC133: End-Stage Renal Disease	27,548	4.6	−0.364	0.015	<.0001	0.695	0.675	0.716
HCC134: Dialysis Status	445	0.1	−0.202	0.102	0.0472	0.817	0.670	0.998
HCC135; HCC140: Acute Renal Failure; Unspecified Renal Failure	101,623	17.1	−0.134	0.009	<.0001	0.875	0.860	0.890
HCC136: Chronic Kidney Disease (Stage 5)	638	0.1	−0.353	0.084	<.0001	0.703	0.596	0.828
HCC137: Chronic Kidney Disease, Severe (Stage 4)	6,523	1.1	−0.202	0.027	<.0001	0.817	0.775	0.862
HCC138: Chronic Kidney Disease, Moderate (Stage 3)	31,128	5.2	−0.026	0.013	0.0525	0.975	0.950	1.000
HCC139: Chronic Kidney Disease, Mild or Unspecified (Stages 1-2 or Unspecified)	24,845	4.2	−0.067	0.015	<.0001	0.935	0.909	0.962
HCC142: Urinary Obstruction and Retention*	53,230	9.0	−0.051	0.010	<.0001	0.951	0.932	0.970

(continued)

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
HCC143: Urinary Incontinence*	22,227	3.7	−0.020	0.015	0.1931	0.980	0.951	1.010
HCC144: Urinary Tract Infection*	82,781	13.9	−0.058	0.009	<.0001	0.944	0.927	0.961
HCC157; HCC158: Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone; Pressure Ulcer of Skin with Full Thickness Skin Loss*	3,998	0.7	−0.269	0.034	<.0001	0.764	0.715	0.817
HCC159: Pressure Ulcer of Skin with Partial Thickness Skin Loss*	5,120	0.9	−0.283	0.030	<.0001	0.753	0.711	0.798
HCC160: Pressure Pre-Ulcer Skin Changes or Unspecified Stage*	4,739	0.8	−0.225	0.031	<.0001	0.799	0.752	0.849
HCC161: Chronic Ulcer of Skin, Except Pressure	11,066	1.9	−0.124	0.022	<.0001	0.883	0.845	0.922
HCC162: Severe Skin Burn or Condition	196	0.03	−0.071	0.153	0.6453	0.932	0.690	1.258
HCC164: Cellulitis, Local Skin Infection*	21,169	3.6	−0.070	0.016	<.0001	0.933	0.904	0.963
HCC166; HCC167: Severe or Major Head Injury*	8,872	1.5	−0.104	0.026	<.0001	0.901	0.856	0.948
HCC169: Vertebral Fractures without Spinal Cord Injury*	13,949	2.3	−0.056	0.020	0.005	0.945	0.909	0.983
HCC170: Hip Fracture/Dislocation*	11,610	2.0	−0.169	0.022	<.0001	0.844	0.809	0.882
HCC171: Major Fracture, Except of Skull, Vertebrae, or Hip*	8,797	1.5	−0.201	0.025	<.0001	0.818	0.779	0.859
HCC174: Other Injuries*	165,242	27.8	−0.093	0.010	<.0001	0.912	0.895	0.929
HCC176: Complications of Specified Implanted Device or Graft*	11,794	2.0	−0.087	0.021	<.0001	0.917	0.880	0.954
HCC178: Major Symptoms, Abnormalities*	264,309	44.4	−0.052	0.007	<.0001	0.950	0.937	0.962
HCC179: Minor Symptoms, Signs, Findings*	101,062	17.0	−0.048	0.009	<.0001	0.953	0.938	0.970
HCC188: Artificial Openings for Feeding or Elimination*	7,624	1.3	−0.148	0.025	<.0001	0.862	0.821	0.905
HCC189; HCC190: Amputation Status, Lower Limb/Amputation Complications; Amputation Status, Upper Limb	10,966	1.8	−0.028	0.022	0.2082	0.972	0.931	1.016
HCC197: Supplemental Oxygen	19,741	3.3	−0.089	0.017	<.0001	0.915	0.886	0.945
HCC199: Patient Lifts, Power Operated Vehicles, Beds*	1,344	0.2	−0.061	0.058	0.2928	0.941	0.840	1.054
HCC200: Wheelchairs, Commodes*	3,362	0.6	−0.087	0.038	0.02	0.917	0.852	0.986

(continued)

Table B-1.
Logistic Regression Model Results for Discharge to Community–Post Acute Care (PAC) Inpatient Rehabilitation Facility (IRF) Quality Reporting Program (QRP), Calendar Year 2015–2016 (continued)

Risk Adjuster	N	%	Estimate	SE[1]	p-value	Odds Ratio (OR)	OR 95% Lower CL[2]	OR 95% Upper CL
Acute History: Number of Hospital Stays in Past Year, Excluding Most Recent Stay (Reference: No stays)								
1 Stay - Acute history	138,336	23.3	−0.423	0.007	<.0001	0.655	0.646	0.664
2 Stays - Acute history	42,380	7.1	−0.426	0.011	<.0001	0.653	0.639	0.668
3 Stays - Acute history	34,795	5.9	−0.849	0.012	<.0001	0.428	0.418	0.438
4 Stays - Acute history	11,464	1.9	−0.694	0.020	<.0001	0.499	0.480	0.520
5 Stays - Acute history	11,014	1.9	−1.042	0.021	<.0001	0.353	0.339	0.367
6 Stays - Acute history	6,150	1.0	−1.096	0.027	<.0001	0.334	0.317	0.352
7 Stays - Acute history	4,818	0.8	−1.223	0.031	<.0001	0.294	0.277	0.313
8 Stays - Acute history	2,268	0.4	−1.027	0.044	<.0001	0.358	0.328	0.390
9 Stays - Acute history	2,874	0.5	−1.370	0.041	<.0001	0.254	0.235	0.275
10+ Stays - Acute history	7,413	1.2	−1.476	0.026	<.0001	0.229	0.217	0.241

[1] SE = Standard Error; [2] CL = Confidence Limit.

Source: RTI International analysis of Medicare claims data (program reference: MM130 Model 3)

Table B-2.

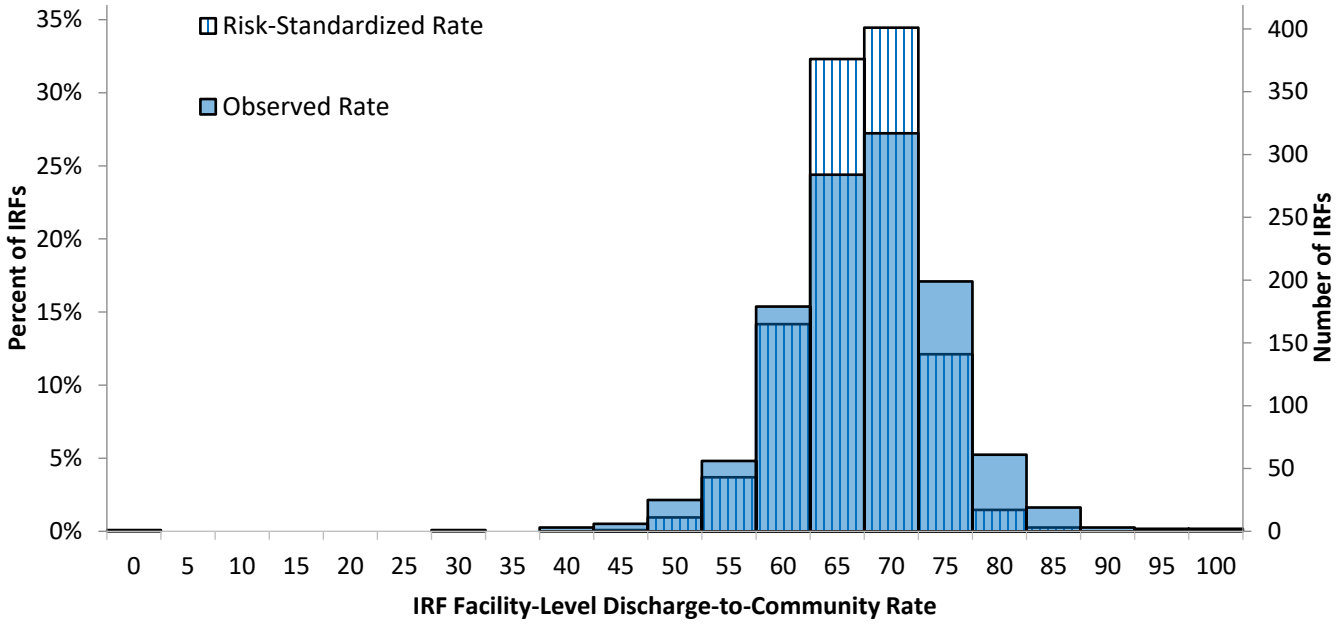
Inpatient Rehabilitation Facility: Facility-Level Observed and Risk-Standardized Discharge-to-Community Rates, 2015-2016

Discharge-to-Community Rate	Mean	SD	Min	1st pctl	5th pctl	10th pctl	25th pctl	50th pctl (Median)	75th pctl	90th pctl	95th pctl	99th pctl	Max
Observed	65.10	7.83	0	45.51	52.44	55.97	60.52	65.35	69.95	73.82	77.20	82.23	100.00
Risk-Standardized	64.46	5.35	42.44	50.19	55.39	57.79	60.97	64.74	67.94	70.99	72.79	76.50	84.26

NOTE: Based on CY 2015-2016 Medicare fee-for-service claims data from 1,158 IRFs. Facility-level number of IRFs stays ranged from 1 to 6,469 with a mean of 514.6 and median of 341.0. SD = standard deviation, pctl = percentile. Source: RTI International analysis (program reference: MM130).

Figure B-1.

Inpatient Rehabilitation Facility: Facility-Level Observed and Risk-Standardized Discharge-to-Community Rates, 2015-2016



NOTE: Based on CY 2015-2016 Medicare fee-for-service claims data from 1,158 IRFs. Facility-level number of IRFs stays ranged from 1 to 6,469 with a mean of 514.6 and median of 341.0. Solid bars represent the observed rate distribution; striped bars represent the risk-standardized rate distribution; the overlap between solid and striped bars represents the overlap between observed and risk-standardized rate distributions. Source: RTI International analysis (program reference: MM130).

APPENDIX C:
National Beta Test Supplementary Tables

The reference tables in this appendix refer to the SPADEs tested in the National Field Test. Alphanumeric item numbers (Example: b1a, b1b, b1c) refer to the items as labeled in the assessment protocols, which are available for download here: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/IMPACT-Act-of-2014/-IMPACT-Act-Standardized-Assessment-National-Testing-.html

Table 1.1: Assessment Counts for National Beta Test Results

	HHA N = 35	IRF N = 22	LTCH N = 26	SNF N = 60	Overall N = 143
Admission	653	794	507	1167	3121
Time to Complete (Facility/Agency Staff only)	469	549	386	565	1969
IRR	198	261	242	274	976

Table 1.2: Frequency and Percentage of Assessments Completed of Each Module

Module	Domains	Frequency	Percent
Communicative, N = 3121			
A1-A2	Hearing and Vision	3065	98.2
B1	Brief Interview for Mental Status (BIMS)	3062	98.1
D	Pain Interview	3031	97.1
E1	PHQ-2 to 9	3010	96.4
B2	Confusion Assessment Method (CAM)	2973	95.3
I	Medication Reconciliation Protocol	2951	94.6
J	Special Services, Treatments, and Interventions (SSTI)	2926	93.8
All modules	At least one response in each module	2795	89.2

NOTE: Percentage of assessments are based on assessments used in the frequency tables where “completed” means responded to at least one data element.

Cognitive Status: Brief Interview for Mental Status (BIMS)

Table 2.1.1: Admission Response Distributions (in Percentages) for BIMS Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	646	786	496	1134	**3062**
# of words repeated after 1st attempt (b1a)					
Three	94	96	91	94	**94**
Two	4	3	4	4	**4**
One	1	1	2	1	**1**
None or no answer	0	1	3	1	**1**
Recalls current year (b1b)					
Correct	89	94	88	87	**89**
Missed by 1 year	2	1	4	2	**2**
Missed by 2-5 years	1	1	1	2	**1**
Missed by >5 years or no answer	7	4	8	9	**7**
Recalls current month (b1c)					
Accurate within 5 days	94	93	90	90	**91**
Missed by 6 days - 1 mo	3	3	2	4	**3**
Missed by >1 mo or no answer	4	4	8	6	**5**
Recalls current day of week (b1d)					
Accurate	88	84	77	76	**81**
Incorrect or no answer	12	16	23	24	**19**
Recalls 'sock' (b1e)					
Yes, no cue required	80	84	78	76	**79**
Yes, after cue	9	5	9	9	**8**
No recall or answer	11	11	13	15	**13**
Recalls 'blue' (b1f)					
Yes, no cue required	84	85	78	79	**81**
Yes, after cue	11	11	12	13	**12**
No recall or answer	6	5	10	8	**7**
Recalls 'bed' (b1g)					
Yes, no cue required	73	75	64	66	**70**
Yes, after cue	12	10	12	14	**12**
No recall or answer	14	14	24	19	**18**

(continued)

Table 2.1.1: Admission Response Distributions (in Percentages) for BIMS Items (continued)

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	646	786	496	1134	**3062**
BIMS Impairment Category					
Intact	80	82	73	72	**76**
Moderately impaired	17	15	19	22	**18**
Severely impaired	4	3	7	7	**5**

Table 2.1.2: IRR Kappa/Weighted Kappa and Percent Agreement for BIMS Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	**199**	**259**	**238**	**270**	**966**
Kappa/weighted kappa					
# of words repeated after 1st attempt (b1a)	-	-	-	-	**-**
Recalls current year (b1b)	0.88	-	0.90	0.93	**0.90**
Recalls current month (b1c)	-	-	0.89	0.86	**-**
Recalls current day of week (b1d)	0.92	0.81	0.91	0.86	**0.88**
Recalls 'sock' (b1e)	0.87	0.91	0.91	0.91	**0.91**
Recalls 'blue' (b1f)	0.84	0.82	0.87	0.78	**0.83**
Recalls 'bed' (b1g)	0.93	0.90	0.93	0.93	**0.93**
BIMS Impairment Category	0.94	0.85	0.91	0.91	**0.91**
Percent agreement					
# of words repeated after 1st attempt (b1a)	96	97	96	96	**96**
Recalls current year (b1b)	97	98	97	97	**98**
Recalls current month (b1c)	98	99	97	96	**98**
Recalls current day of week (b1d)	98	94	97	95	**96**
Recalls 'sock' (b1e)	94	97	95	96	**95**
Recalls 'blue' (b1f)	95	95	93	91	**94**
Recalls 'bed' (b1g)	96	95	95	96	**96**
BIMS Impairment Category	97	95	95	95	**96**

NOTE: Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Cognitive Status: Confusion Assessment Method (CAM)

Table 2.2.1: Admission Response Distributions (in Percentages) for CAM Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	**630**	**771**	**471**	**1101**	**2973**
Evidence of change in mental status from baseline (b2a)					
Yes	5	6	5	4	**5**
Did patient have difficulty focusing attn (b2b)					
Behavior not present	89	85	89	90	**88**
Behavior continuously present	2	3	3	3	**3**
Behavior present, fluctuates	9	11	8	8	**9**
Was patient thinking disorganized (b2c)					
Behavior not present	95	94	93	94	**94**
Behavior continuously present	1	2	2	1	**1**
Behavior present, fluctuates	4	5	4	6	**5**
Did patient have altered consciousness (b2d)					
Behavior not present	98	95	94	96	**96**
Behavior continuously present	1	1	2	1	**1**
Behavior present, fluctuates	2	3	3	3	**3**

Table 2.2.2: IRR Kappa/Weighted Kappa and Percent Agreement for CAM items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	**189**	**245**	**223**	**257**	**914**
Kappa/weighted kappa					
Evidence of change in mental status from baseline (b2a)	-	0.60	-	-	-
Did patient have difficulty focusing attn (b2b)	0.66	0.55	0.75	0.70	**0.66**
Was patient thinking disorganized (b2c)	-	-	-	0.68	-
Did patient have altered consciousness (b2d)	-	-	-	-	-
Percent agreement					
Evidence of change in mental status from baseline (b2a)	97	93	98	97	**96**
Did patient have difficulty focusing attn (b2b)	91	89	93	93	**91**
Was patient thinking disorganized (b2c)	94	93	96	94	**94**
Did patient have altered consciousness (b2d)	98	97	95	96	**96**

NOTE: Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Mental Status: PHQ-2 to 9

Table 3.1.1: Admission Response Distribution (in Percentages) for PHQ-2 to 9 Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	639	776	479	1116	**3010**
Symptom presence & frequency: little interest or pleasure (e1a)					
No	65	61	56	65	**62**
0-1 day	4	4	5	3	**4**
2-6 days	15	16	13	13	**14**
7-11 days (half or more)	9	10	11	9	**10**
12-14 days (nearly all)	8	10	16	10	**11**
Symptom presence & frequency: feeling down, depressed, hopeless (e1b)					
No	62	57	49	58	**57**
0-1 day	3	6	4	5	**4**
2-6 days	20	19	19	19	**19**
7-11 days (half or more)	7	9	13	8	**9**
12-14 days (nearly all)	8	8	16	11	**10**
PHQ-2					
Mean (SD)	2.2 (1.6)	2.3 (1.7)	2.7 (1.8)	2.4 (1.7)	**2.4 (1.7)**
Eligible for PHQ-9 per PHQ-2					
Yes	24	27	38	27	**28**
# of assessments eligible for PHQ-9 per PHQ-2	153	209	182	306	**850**
Symptom presence & frequency: too little/too much sleep (e1c)					
No	30	34	34	33	**33**
0-1 day	2	3	1	2	**2**
2-6 days	15	15	13	16	**15**
7-11 days (half or more)	19	16	20	16	**17**
12-14 days (nearly all)	34	31	32	34	**33**
Symptom presence & frequency: tired / no energy (e1d)					
No	10	11	13	10	**11**
0-1 day	1	0	1	1	**1**
2-6 days	9	17	13	17	**15**
7-11 days (half or more)	27	26	23	28	**26**
12-14 days (nearly all)	52	46	50	44	**48**
Symptom presence & frequency: poor appetite or overeating (e1e)					
No	50	43	34	46	**44**
0-1 day	1	2	2	1	**1**

(continued)

Table 3.1.1: Admission Response Distribution (in Percentages) for PHQ-2 to 9 Items (continued)

Items	HHA	IRF	LTCH	SNF	Overall
2-6 days	9	11	10	9	**10**
7-11 days (half or more)	17	13	16	15	**15**
12-14 days (nearly all)	22	31	39	29	**30**
Symptom presence & frequency: feel bad about self (e1f)					
No	55	52	51	58	**55**
0-1 day	1	2	1	1	**1**
2-6 days	12	12	12	10	**12**
7-11 days (half or more)	15	16	10	12	**13**
12-14 days (nearly all)	17	17	26	18	**19**
Symptom presence & frequency: trouble concentrating (e1g)					
No	54	47	44	48	**48**
0-1 day	1	1	1	1	**1**
2-6 days	15	16	9	16	**14**
7-11 days (half or more)	11	11	12	13	**12**
12-14 days (nearly all)	19	25	34	22	**25**
Symptom presence & frequency: moving or speaking slowly (e1h)					
No	64	62	50	68	**62**
0-1 day	1	0	2	1	**1**
2-6 days	9	9	10	7	**9**
7-11 days (half or more)	8	13	13	10	**11**
12-14 days (nearly all)	18	16	25	14	**18**
Symptom presence & frequency: suicidal thoughts (e1i)					
No	82	78	77	80	**79**
0-1 day	2	4	3	2	**3**
2-6 days	9	7	7	9	**8**
7-11 days (half or more)	5	3	5	5	**4**
12-14 days (nearly all)	3	7	7	4	**5**
PHQ-9					
Mean (SD)	11.4 (5.0)	11.8 (5.3)	13.0 (5.8)	11.5 (5.1)	**11.9 (5.3)**
Depression categorization (PHQ-9)					
None (0 – 4)	10	4	6	7	**6**
Mild (5 – 9)	27	36	27	33	**31**
Moderate (10 – 14)	37	32	25	34	**32**
Moderately severe (15 – 19)	20	19	28	18	**21**
Severe (20 – 27)	6	9	14	8	**9**

Table 3.1.2: IRR Kappa/Weighted Kappa and Percent Agreement for PHQ-2 to 9 Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	196	254	231	267	**948**
Kappa/weighted kappa					
Symptom present: little interest or pleasure (e1a1)	0.95	0.99	0.99	0.98	**0.98**
Symptom frequency: little interest or pleasure (e1a2)	0.98	1.00	0.98	0.98	**0.99**
Symptom present: feeling down, depressed, hopeless (e1b1)	0.99	0.98	1.00	0.99	**0.99**
Symptom frequency: feeling down, depressed, hopeless (e1b2)	0.93	0.98	0.98	0.99	**0.98**
Eligible for PHQ-9 per PHQ-2	0.96	0.98	0.98	0.98	**0.98**
Symptom present: too little/too much sleep (e1c1)	0.90	1.00	1.00	1.00	**0.98**
Symptom frequency: too little/too much sleep (e1c2)	1.00	0.98	0.90	0.96	**0.96**
Symptom present: tired / no energy (e1d1)	1.00	0.91	0.95	0.94	**0.95**
Symptom frequency: tired / no energy (e1d2)	1.00	0.93	0.98	1.00	**0.98**
Symptom present: poor appetite or overeating (e1e1)	0.96	0.93	0.95	1.00	**0.96**
Symptom frequency: poor appetite or overeating (e1e2)	1.00	1.00	1.00	1.00	**1.00**
Symptom present: feel bad about self (e1f1)	1.00	1.00	1.00	1.00	**1.00**
Symptom frequency: feel bad about self (e1f2)	1.00	1.00	0.95	1.00	**0.98**
Symptom present: trouble concentrating (e1g1)	1.00	1.00	1.00	0.97	**0.99**
Symptom frequency: trouble concentrating (e1g2)	0.96	0.97	0.94	1.00	**0.97**
Symptom present: moving or speaking slowly (e1h1)	1.00	0.94	0.90	1.00	**0.95**
Symptom frequency: moving or speaking slowly (e1h2)	1.00	0.87	1.00	1.00	**0.97**
Symptom present: suicidal thoughts (e1i1)	1.00	1.00	0.94	1.00	**0.98**
Symptom frequency: suicidal thoughts (e1i2)	0.93	1.00	0.95	1.00	**0.97**
Sum of all symptom frequencies (PHQ-9) *	0.97	0.95	0.95	0.97	**0.96**
Percent Agreement					
Symptom present: little interest or pleasure (e1a1)	97	100	100	99	**99**
Symptom frequency: little interest or pleasure (e1a2)	99	100	98	98	**99**
Symptom present: feeling down, depressed, hopeless (e1b1)	99	99	100	100	**100**
Symptom frequency: feeling down, depressed, hopeless (e1b2)	95	98	98	99	**98**
Eligible for PHQ-9 per PHQ-2	98	99	99	99	**99**
Symptom present: too little/too much sleep (e1c1)	96	100	100	100	**99**
Symptom frequency: too little/too much sleep (e1c2)	100	98	94	96	**97**
Symptom present: tired / no energy (e1d1)	100	98	99	99	**99**
Symptom frequency: tired / no energy (e1d2)	100	96	99	100	**99**
Symptom present: poor appetite or overeating (e1e1)	98	97	97	100	**98**
Symptom frequency: poor appetite or overeating (e1e2)	100	100	100	100	**100**
Symptom present: feel bad about self (e1f1)	100	100	100	100	**100**

(continued)

Table 3.1.2: IRR Kappa/Weighted Kappa and Percent Agreement for PHQ-2 to 9 Items (continued)

Items	HHA	IRF	LTCH	SNF	Overall
Symptom frequency: feel bad about self (e1f2)	100	100	95	100	**98**
Symptom present: trouble concentrating (e1g1)	100	100	100	99	**100**
Symptom frequency: trouble concentrating (e1g2)	96	97	97	100	**98**
Symptom present: moving or speaking slowly (e1h1)	100	97	95	100	**98**
Symptom frequency: moving or speaking slowly (e1h2)	100	93	100	100	**98**
Symptom present: suicidal thoughts (e1i1)	100	100	98	100	**99**
Symptom frequency: suicidal thoughts (e1i2)	93	100	95	100	**97**
Sum of all symptom frequencies (PHQ-9)*	96	94	94	96	**95**

NOTE: As classified into the five categories shown in Table 3.1.1. Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Special Services, Treatments, and Interventions (SSTI)

Table 4.1.1: Admission Response Distributions (in Percentages) for SSTI–Chemotherapy Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Treatment performed: Chemotherapy (j2a)	1	3	0	1	**1**
Chemo treatment performed: IV (j2a2a)	0	1	0	0	**0**
Chemo treatment performed: oral (j2a3a)	0	2	0	1	**1**
Chemo treatment performed: other (j2a10a)	0	0	0	0	**0**

Table 4.1.2: IRR Kappa and Percent Agreement for SSTI–Chemotherapy Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa/Weighted kappa					
Noted treatment performed: Chemotherapy (j2a)	-	-	-	-	-
Noted chemo treatment performed: IV (j2a2a)	-	-	-	-	-
Noted chemo treatment performed: oral (j2a3a)	-	-	-	-	-
Noted chemo treatment performed: other (j2a10a)	-	-	-	-	-
Percent Agreement					
Noted treatment performed: Chemotherapy (j2a)	99	100	100	99	**100**
Noted chemo treatment performed: IV (j2a2a)	100	100	100	99	**100**
Noted chemo treatment performed: oral (j2a3a)	100	100	100	100	**100**

Items	HHA	IRF	LTCH	SNF	Overall
Noted chemo treatment performed: other (j2a10a)	100	100	100	100	**100**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.2.1: Admission Response Distributions (in Percentages) for SSTI–Radiation

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Treatment performed: Radiation (j2b)	0	0	0	0	**0**

Table 4.2.2: IRR Kappa and Percent Agreement for SSTI–Radiation Item

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa/Weighted kappa					
Noted treatment performed: Radiation (j2b)	-	-	-	-	-
Percent Agreement					
Noted treatment performed: Radiation (j2b)	99	100	100	100	**100**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.3.1: Admission Response Distributions (in Percentages) for SSTI–Oxygen Therapy Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Treatment performed: Oxygen Therapy (j2c)	13	17	44	16	**20**
Type of O2 therapy performed: intermittent (j2c2a)	7	11	37	11	**14**
Type of O2 therapy performed: continuous (j2c3a)	6	8	5	5	**6**
Type of O2 therapy performed: high-concentration (j2c4a)	0	1	6	0	**1**

Table 4.3.2: IRR Kappa and Percent Agreement for SSTI–Oxygen Therapy Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Treatment performed: Oxygen Therapy (j2c)	0.82	0.80	0.86	0.71	**0.82**
Type of O2 therapy performed: intermittent (j2c2a)	-	0.76	0.82	0.75	**0.81**
Type of O2 therapy performed: continuous (j2c3a)	-	0.68	0.35	-	0.55
Type of O2 therapy performed: high-concentration (j2c4a)	-	-	-	-	-
Percent Agreement					
Treatment performed: Oxygen Therapy (j2c)	96	94	93	91	**93**
Type of O2 therapy performed: intermittent (j2c2a)	98	95	92	95	**95**
Type of O2 therapy performed: continuous (j2c3a)	97	95	92	93	**94**
Type of O2 therapy performed: high-concentration (j2c4a)	100	100	97	100	**99**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.4.1: Admission Response Distributions (in Percentages) for SSTI–Suctioning Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Treatment performed: Suctioning (j2d)	0	1	5	1	**1**
Type of suctioning performed: scheduled (j2d2a)	0	0	1	0	**0**
Type of suctioning performed: as needed (j2d3a)	0	1	5	1	**1**

Table 4.4.2: IRR Kappa/Weighted Kappa and Percent Agreement for SSTI–Suctioning Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Treatment performed: Suctioning (j2d)	-	-	-	-	-
Type of suctioning performed: scheduled (j2d2a)	-	-	-	-	-
Type of suctioning performed: as needed (j2d3a)	-	-	-	-	-
Percent Agreement					
Treatment performed: Suctioning (j2d)	99	99	98	96	**98**
Type of suctioning performed: scheduled (j2d2a)	100	99	99	99	**99**
Type of suctioning performed: as needed (j2d3a)	99	100	98	96	**98**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.5.1: Admission Response Distributions (in Percentages) for SSTI–Tracheostomy Care Item

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Treatment performed: Tracheostomy Care (j2e)	0	1	5	0	**1**

Table 4.5.2: IRR Kappa and Percent Agreement for SSTI–Tracheostomy Care Item

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa/Weighted kappa					
Treatment performed: Tracheostomy Care (j2e)	-	-	-	-	-
Percent Agreement					
Treatment performed: Tracheostomy Care (j2e)	100	100	99	100	**100**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.6.1: Admission Response Distributions (in Percentages) for SSTI–Noninvasive Mechanical Ventilator (NIMV)

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Treatment performed: Non-invasive Mechanical Ventilator (j2g)	4	6	9	4	**5**
Type of NIMV performed: BiPAP (j2g2a)	1	1	7	1	**2**
Type of NIMV performed: CPAP (j2g3a)	2	6	2	3	**3**

Table 4.6.2: IRR Kappa/Weighted Kappa and Percent Agreement for SSTI–Noninvasive Mechanical Ventilator (NIMV) Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Treatment performed: Non-invasive Mechanical Ventilator (j2g)	-	-	0.77	-	-
Type of NIMV performed: BiPAP (j2g2a)	-	-	-	-	-
Type of NIMV performed: CPAP (j2g3a)	-	-	-	-	-
Percent Agreement					
Treatment performed: Non-invasive Mechanical Ventilator (j2g)	96	98	96	98	**97**
Type of NIMV performed: BiPAP (j2g2a)	96	100	97	100	**98**
Type of NIMV performed: CPAP (j2g3a)	98	98	98	98	**98**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.7.1: Admission Response Distributions (in Percentages) for SSTI–Invasive Mechanical Ventilator Item

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Treatment performed: Invasive Mechanical Ventilator (j2f)	0	0	3	0	**0**

Table 4.7.2: IRR Kappa and Percent Agreement for SSTI–Invasive Mechanical Ventilator Item

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Treatment performed: Invasive Mechanical Ventilator (j2f)	-	-	-	-	-
Percent Agreement					
Treatment performed: Invasive Mechanical Ventilator (j2f)	100	100	100	100	**100**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.8.1: Admission Response Distributions (in Percentages) for SSTI–IV Meds Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Other treatment performed: IV Meds (j2h)	15	17	77	16	**25**
Type of IV meds given: antibiotics (j2h3a)	4	8	64	9	**16**
Type of IV meds given: anticoagulation (j2h4a)	8	6	17	6	**8**
Type of IV meds given: other (j2h10a)	6	5	20	4	**7**

Table 4.8.2: IRR Kappa/Weighted Kappa and Percent Agreement for SSTI–IV Meds Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Other treatment performed: IV Meds (j2h)	0.15	0.61	0.68	0.52	**0.70**
Type of IV meds given: antibiotics (j2h3a)	-	-	0.84	0.78	**0.88**
Type of IV meds given: anticoagulation (j2h4a)	-	-	0.13	-	**0.13**
Type of IV meds given: other (j2h10a)	-	-	0.46	-	**0.46**
Percent Agreement					
Other treatment performed: IV Meds (j2h)	83	91	89	87	**88**
Type of IV meds given: antibiotics (j2h3a)	98	97	93	96	**96**
Type of IV meds given: anticoagulation (j2h4a)	90	94	82	92	**90**
Type of IV meds given: other (j2h10a)	93	98	79	94	**91**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.9.1: Admission Response Distributions (in Percentages) for SSTI–Transfusions Item

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Other treatment performed: Transfusions (j2i)	0	1	2	0	**0**

Table 4.9.2: IRR Kappa/Weighted Kappa and Percent Agreement for SSTI–Transfusions Item

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Other treatment performed: Transfusions (j2i)	-	-	-	-	-
Percent Agreement					
Other treatment performed: Transfusions (j2i)	100	99	99	100	**100**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.10.1: Admission Response Distributions (in Percentages) for SSTI–Dialysis Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Other treatment performed: Dialysis (j2j)	3	5	15	3	**5**
Type of dialysis performed: hemodialysis (j2j2a)	3	4	15	3	**5**
Type of dialysis performed: peritoneal (j2j3a)	0	0	0	0	**0**

Table 4.10.2: IRR Kappa/Weighted Kappa and Percent Agreement for SSTI–Dialysis Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Other treatment performed: Dialysis (j2j)	-	-	0.92	-	-
Type of dialysis performed: hemodialysis (j2j2a)	-	-	0.90	-	-
Type of dialysis performed: peritoneal (j2j3a)	-	-	-	-	-
Percent Agreement					
Other treatment performed: Dialysis (j2j)	98	98	98	99	**98**
Type of dialysis performed: hemodialysis (j2j2a)	98	98	97	99	**98**
Type of dialysis performed: peritoneal (j2j3a)	100	100	100	100	**100**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 4.11.1: Admission Response Distributions (in Percentages) for SSTI–IV Access Items

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Other treatment performed: IV Access (j2k)	4	22	91	10	**24**
Type of IV access: peripheral IV (j2k2a)	0	14	40	2	**11**
Type of IV access: midline (j2k3a)	0	1	13	0	**2**
Type of IV access: central line (j2k4a)	3	6	54	7	**13**
Type of IV access: other (j2k10a)	0	2	3	1	**1**

Table 4.11.2: IRR Kappa/Weighted Kappa and Percent Agreement for SSTI–IV Access Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Other treatment performed: IV Access (j2k)	-	0.81	-	0.74	**0.90**
Type of IV access: peripheral IV (j2k2a)	-	0.81	0.77	-	**0.81**
Type of IV access: midline (j2k3a)	-	-	0.75	-	-
Type of IV access: central line (j2k4a)	-	-	0.78	-	**0.85**
Type of IV access: other (j2k10a)	-	-	-	-	-
Percent Agreement					
Other treatment performed: IV Access (j2k)	97	94	99	95	**96**
Type of IV access: peripheral IV (j2k2a)	100	96	89	97	**96**
Type of IV access: midline (j2k3a)	100	99	94	100	**98**
Type of IV access: central line (j2k4a)	98	98	89	97	**96**
Type of IV access: other (j2k10a)	97	98	95	99	**97**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Nutritional Approaches

Table 5.1.1: Admission Response Distributions (in Percentages) for Nutritional Approaches–Parenteral/IV Feeding

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Nutritional approach performed: parenteral/IV (j1a)	0	1	4	0	**1**

Table 5.1.2: IRR Kappa/Weighted Kappa and Percent Agreement for Nutritional Approaches–Parenteral/IV Feeding

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Nutritional approach performed: parenteral/IV (j1a)	-	-	-	-	-
Percent Agreement					
Nutritional approach performed: parenteral/IV (j1a)	100	100	99	100	**100**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 5.2.1: Admission Response Distributions (in Percentages) for Nutritional Approaches–Feeding Tube

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Nutritional approach performed: feeding tube (j1b)	0	3	8	2	**3**

Table 5.2.2: IRR Kappa/Weighted Kappa and Percent Agreement for Nutritional Approaches–Feeding Tube

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Nutritional approach performed: feeding tube (j1b)	-	-	-	-	-
Percent Agreement					
Nutritional approach performed: feeding tube (j1b)	100	100	98	100	**100**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 5.3.1: Admission Response Distributions (in Percentages) for Nutritional Approaches–Mechanically Altered Diet

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Nutritional approach performed: mechanically altered diet (j1c)	2	15	14	11	**10**

Table 5.3.2: IRR Kappa/Weighted Kappa and Percent Agreement for Nutritional Approaches–Mechanically Altered Diet

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Nutritional approach performed: mechanically altered diet (j1c)	-	0.53	0.69	0.70	**0.65**
Percent Agreement					
Nutritional approach performed: mechanically altered diet (j1c)	100	89	92	94	**93**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Table 5.4.1: Admission Response Distributions (in Percentages) for Nutritional Approaches–Therapeutic Diet

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	629	762	448	1087	**2926**
Nutritional approach performed: therapeutic diet (j1d)	54	49	59	49	**52**

Table 5.4.2: IRR Kappa/Weighted Kappa and Percent Agreement for Nutritional Approaches–Therapeutic Diet

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	236	203	256	**882**
Kappa					
Nutritional approach performed: therapeutic diet (j1d)	0.43	0.70	0.62	0.61	**0.60**
Percent Agreement					
Nutritional approach performed: therapeutic diet (j1d)	71	85	82	80	**80**

NOTE: Based on dichotomized never noted vs. noted any day. Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

High-Risk Drug Classes: Use and Indication Items

Table 6.1.1: Admission Response Distributions (in Percentages) for Medication Class Taking and Indication Items

Medication Class	HHA (627)		IRF (769)		LTCH (459)		SNF (1096)		**Overall (2951)**	
	Taking (Percent)	Indication (Percent)	Taking (Percent)	Indication (Percent)	Taking (Percent)	Indication (Percent)	Taking (Percent)	Indication (Percent)	Taking (Percent)	Indication (Percent)
Anticoagulants	29	47	61	29	66	20	42	77	**48**	**45**
Antiplatelets	15	52	19	31	16	10	12	77	**15**	**45**
Hypoglycemics	29	47	30	49	48	52	26	72	**31**	**56**
Opioids	39	87	51	91	64	90	52	96	**51**	**92**
Antipsychotics	9	73	9	33	14	30	16	89	**12**	**66**
Antimicrobials	13	57	23	60	73	22	27	84	**30**	**53**

NOTE: Indication (percent) reflects percent with indication among those taking medications in that class

Table 6.1.2: IRR Kappa and Percent Agreement for Medication Class Taking and Indication Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	187	240	212	261	**900**
Kappa					
Is patient taking: anticoagulants (i1a1)	0.78	0.84	0.87	0.85	**0.85**
Is patient taking: antiplatelets (i1a2)	0.69	0.71	0.83	-	**0.72**
Is patient taking: hypoglycemics (i1a3)	0.83	0.80	0.97	0.90	**0.89**
Is patient taking: opioids (i1a4)	0.84	0.86	0.90	0.85	**0.86**
Is patient taking: antipsychotics (i1a5)	-	-	-	-	-
Is patient taking: antimicrobials (i1a6)	-	0.76	0.93	0.82	**0.86**
Indication noted for anticoagulants (i1b1)	0.54	0.64	0.80	0.87	**0.78**
Indication noted for antiplatelets (i1b2)	0.69	0.85	-	0.89	**0.87**
Indication noted for hypoglycemics (i1b3)	0.39	0.62	0.70	0.75	**0.65**
Indication noted for opioids (i1b4)	-	-	-	-	-
Indication noted for antipsychotics (i1b5)	0.33	1.00	0.88	0.73	**0.81**
Indication noted for antimicrobials (i1b6)	0.74	0.63	0.72	-	**0.81**
Percent Agreement					
Is patient taking: anticoagulants (i1a1)	91	93	94	93	**93**
Is patient taking: antiplatelets (i1a2)	92	91	95	91	**92**
Is patient taking: hypoglycemics (i1a3)	92	92	99	96	**95**
Is patient taking: opioids (i1a4)	92	93	96	92	**93**
Is patient taking: antipsychotics (i1a5)	96	95	94	93	**94**
Is patient taking: antimicrobials (i1a6)	94	91	97	93	**94**
Indication noted for all meds in class (i1b1-6)	79	89	91	96	**90**
Indication noted for anticoagulants (i1b1)	77	85	94	95	**89**
Indication noted for antiplatelets (i1b2)	84	93	100	95	**94**
Indication noted for hypoglycemics (i1b3)	69	82	85	90	**82**
Indication noted for opioids (i1b4)	87	96	89	100	**94**
Indication noted for antipsychotics (i1b5)	63	100	95	89	**90**
Indication noted for antimicrobials (i1b6)	88	81	91	98	**91**

NOTE: Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Pain: Pain Interference

Table 7.1.1: Admission Response Distributions (in Percentages) for Pain Interference Items Among Patients/Residents Reporting Any Pain in the Last 3 Days or 5 Days

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	489	618	375	872	**2354**
How often pain made it hard to sleep (d3)					
Rarely or not at all	40	32	29	37	**35**
Occasionally	29	30	24	28	**28**
Frequently	19	26	29	23	**24**
Almost constantly	12	13	17	13	**13**
Offered rehab therapies (d4a)					
Yes	78	98	81	93	**89**
Yes N	379	606	302	803	**2090**
How often limited rehab due to pain (d4b)					
Rarely or not at all	74	76	62	73	**73**
Occasionally	14	17	17	16	**16**
Frequently	7	5	14	8	**8**
Almost constantly	5	2	7	3	**4**
How often limited daily activities due to pain (d4c)					
Rarely or not at all	40	55	42	41	**45**
Occasionally	26	18	19	26	**23**
Frequently	17	16	20	21	**19**
Almost constantly	16	11	19	12	**14**

Table 7.1.2: IRR Kappa/Weighted Kappa and Percent Agreement for Pain Interference Items

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	197	256	232	268	953
Kappa					
How often pain made it hard to sleep (d3)	0.96	0.98	0.98	0.99	0.98
How often limited rehab due to pain (d4b)	0.95	0.96	0.98	0.97	0.97
How often limited daily activities due to pain (d4c)	0.97	0.98	0.99	0.98	0.98
Percent Agreement					
How often pain made it hard to sleep (d3)	95	98	98	100	98
How often limited rehab due to pain (d4b)	97	98	98	99	**98**
How often limited daily activities due to pain (d4c)	97	98	99	99	**98**

NOTE: Interrater reliability not shown for items with proportions out of range for stable kappa estimate (per study power calculations). Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect. *Pearson correlation for rating of worst pain, which is on a 0-10 scale

Impairments: Hearing

Table 8.1.1: Admission Response Distributions (in Percentages) for Hearing Item

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	643	783	498	1141	**3065**
Ability to hear (a1)					
Adequate	65	75	81	76	**74**
Minimal difficulty	24	18	13	15	**17**
Moderate difficulty	11	6	4	8	**8**
Highly impaired	0	1	1	1	**1**

Table 8.1.2: IRR Weighted Kappa and Percent Agreement for Hearing Item

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	197	258	237	268	**960**
Weighted kappa					
Ability to hear (a1)	0.71	0.67	0.58	0.62	**0.65**
Percent agreement					
Ability to hear (a1)	83	87	84	83	**84**

NOTE: Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.

Impairments: Vision

Table 9.2.1: Admission Response Distributions (in Percentages) for Vision Item

Items	HHA	IRF	LTCH	SNF	Overall
# of assessments	643	783	498	1141	**3065**
Ability to see (a2)					
Adequate	73	85	76	78	**78**
Impaired	21	12	16	16	**16**
Moderately impaired	4	2	6	4	**4**
Highly impaired	1	1	1	1	**1**
Severely impaired	1	0	1	1	**1**

Table 9.2.2: IRR Weighted Kappa and Percent Agreement for Vision Item

Items	HHA	IRF	LTCH	SNF	Overall
# of patients	197	258	237	268	**960**
Weighted kappa					
Ability to see (a2)	0.67	0.50	0.47	0.57	**0.56**
Percent agreement					
Ability to see (a2)	83	90	75	83	**83**

NOTE: Interpretation of kappa or weighted kappa is as follows: 0.00-0.20: slight/poor; 0.21-0.40: fair; 0.41-0.60: moderate; 0.61-0.80: substantial/good; 0.81-1.00: excellent/almost perfect.