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Functional Assessment Data: Current Status of Federal Initiatives to Support Interoperability among Post Acute Care Settings

Edgar Chou
Thomas Jefferson University

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Paulina Sockolow DrPH MS MBA
Drexel University
pss44@drexel.edu

Edgar Y. Chou MD MBA
Thomas Jefferson University
Edgar.Chou@jefferson.edu

Abstract

Health information needed along the transitions in care includes functional status such as self-care abilities assessments. Despite current federal efforts to support interoperability of functional status data, gaps still exist. Functional status assessments are included in data collection instruments widely used in four post acute care (PAC) settings, with each type of setting using a different standard instrument. These various instruments lack a shared standard for the content (meaning) of functional assessment items, necessitating mapping to a standard data terminology. Analysis indicates complete LOINC representation and incomplete SNOMED representation among functional status items and instruments. The new U.S. Core Data for Interoperability (USCDI) data standard has not included functional status in the next version to be adopted due in part to insufficiently defined use cases. The Post-Acute Care Interoperability Workgroup (PACIO) produced a FHIR implementation guide for functional status based on a use case. Gaps persist in PAC interoperability adoption.

Keywords: functional status, post acute care, LOINC, SNOMED, transition of care

1. Introduction

Almost half (45%) of Medicare beneficiaries require post acute care (PAC) following hospitalization, at a cost to taxpayers of more than $73 billion dollars annually. Therefore, the need for seamless exchange of health information (interoperability) along care settings is significant. Despite high adoption of electronic health records among home health agencies (78%) and skilled nursing facilities (66%) (as of 2017), interoperability adoption indicators continue to be low in PAC settings.(Hill, 2020)

Interoperability is needed to enable health information to accompany the patient during post-hospitalization transitions-in-care to and among PAC settings, such as home health care. Health information needed along the transitions in care includes functional status such as self-care abilities assessments. Functional status is a significant predictor of re-hospitalization risk (Hobensack et al., 2022; Shih et al., 2015), length of stay (Huggan et al., 2015), and death (Formiga et al., 2016). Functional status data is necessary for care planning decisions in home health care (Sockolow et al., 2020). For example, vision status informs assessment of a patient's ability to self-administer medication. In addition, the authors found that functional status information is desired by primary care physicians who see home health care patients two weeks post hospital discharge. Looking ahead, interoperability of functional status data would enable its availability for artificial intelligence, machine learning, and data science analyses. This analysis could advance the identification of patients at risk and improve patient outcomes.

Despite current federal efforts to support interoperability of functional status data, gaps still exist. This article will discuss these efforts and gaps.

2. Functional status assessments

A functional status assessment measures a person's ability to care for self. Item components of functional status assessment include: vision, speech, hearing, mobility, transferring, and Activities of Daily Living (ADLs) such as bathing, dressing, feeding, grooming, and toileting.

Functional status assessments are included in data collection instruments widely used in four PAC settings. However, each type of PAC care setting uses a standard instrument specific to the care setting:

- Center for Medicare and Medicaid (CMS) certified nursing homes use the Minimum Data Set (MDS) instrument to meet the federally mandated process for clinical assessment of all residents in Medicare and Medicaid certified nursing homes (Centers for Medicare and Medicaid, 2022b).
- Inpatient rehabilitation facilities use the Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF-PAI) to collect patient assessment data for quality measure calculation and payment determination in accordance with the IRF Quality Reporting Program (QRP) (Center for Medicare and Medicaid Services, 2022).

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- Long term care hospitals use the Long-term Care Data Set (LCDS) for continuity assessment record and evaluation (Centers for Medicare and Medicaid, 2022a).
- Home health care uses the Outcome and Assessment Information Set (OASIS) to document assessments of home-bound patients (Centers for Medicare and Medicaid Services, 2020).

These various instruments lack a shared standard for the content (meaning) of functional assessment items. This deficit is a barrier to interoperability and the potential for data to be ingested into an electronic health record where it can be accessible during workflow and be computable for decision support and contribute to calculation of a risk indicator.

3. Functional status data standards

Currently, the following efforts are underway to address the lack of a shared data standard for functional assessment items.

3.1 CMS Data Element Library Health IT Workgroup

CMS has created a centralized resource for its assessment instrument data elements (e.g., questions, responses) and their associated data standards, the Data Element Library (DEL). Workgroup members, including Dr. Terry O'Malley and Dr. Holly Miller, have catalogued the functional assessment items on three PAC instruments (MDS, IRF-PAI, OASIS) and a terminology, Functional Assessment Standardized Items (FASI), which harmonizes Medicaid Home and community based services (HCBS) (Centers for Medicare and Medicaid, 2021). They have cross-mapped the items to two standard data terminologies. Logical Observation Identifiers Names and Codes (LOINC) is a reference terminology for identifying observations, health measurements, and documents for use in data exchange which includes standardized patient assessment terms (Bakken et al., 2000; Choi et al., 2005). The Systematized Nomenclature of Medicine - Clinical Terms (SNOMED CT, or SNOMED) is a standardized, comprehensive, precise, and multilingual health terminology used for electronic exchange of clinical health information (National Library of Medicine, 2016).

A total of 204 items on versions of instruments in current use and FASI terminology were catalogued as functional status items. Of these, 178 (87.2%) were classified as Activities of Daily Living (ADL) with the balance classified as Instrumental ADLs (IADL, e.g., shopping).

Among ADL items, Mobility (44.4%) and Device (18.0%) occurred the most often across the instruments and FASI terminology. Other categories each contributed less than 10% of the items.

All items on the PAC instruments and FASI mapped to LOINC (Office of the National Coordinator, 2022). IRF, OASIS, and FASI had no SNOMED representation., whereas MDS had substantial SNOMED (75.5%) representation. Items mapped to SNOMED were limited to toileting, mobility, eating, dressing, bathing, and continence.

In summary, all current DEL items mapped to a vocabulary standard. LOINC representation was complete and SNOMED representation was incomplete among both the functional status items and the PAC instruments; and absent in the FASI terminology.

3.2 U.S. Core Data for Interoperability (USCDI)

Unable to be included in the DEL analysis as a data standard due to its non-inclusion of functional status is the second effort, the U.S. Core Data for Interoperability (USCDI). The Office of the National Coordinator for Health Information Technology (ONC) leads its adoption as legislated in the ONC CURES Act (2020). The USCDI replaces the Common Clinical Data set (CCD) and is used by CMS, state, local, and tribal entities (Office of the National Coordinator for Health Information Technology (ONC), 2022).

USCDI Version 2 is the most current proposed standard: it incorporates Version 1 which has been adopted. Functional status is organized in the USDCI Functioning class (Functional Status, Disability Status, and Mental Function) (Office of the National Coordinator, 2022). Functioning class is categorized as having adoption hurdles, including insufficiently defined use cases and implementation or development burdens.

ONC, CMS (DEL) and the American Physical Therapy Association support moving Functioning class to the USCDI Version 2, in preparation for the standard to be adopted. However, IMOhealth noted concern about the technical specification of disability status in Spring 2022 (Office of the National Coordinator, 2022).

3.3 Post-Acute Care Interoperability Workgroup (PACIO)

The USCDI Functioning class use case adoption hurdle may be addressed by the third effort, the Post-Acute Care Interoperability Workgroup (PACIO) (PACIO Project, 2022). ONC and CMS lead the project intended to enable collaboration with industry participants to develop standards to promote reuse and

exchange of patient assessment data. The standards are to comply with Fast Healthcare Interoperability Resources (FHIR). The data is to be derived from PAC sources in the DEL analysis – MDS, IRF-PAI, and OASIS – as well as the long-term care hospital continuity assessment record and evaluation (LCDS) and other sources. PACIO uses standardized data elements from CMS instruments and data standards, including LOINC and SNOMED (Hill, 2020). PACIO recently produced a FHIR implementation guide for functional status (PACIO Project, 2022) based on a use case, Functional Performance. This use case has data structures that focus on observation/assessment data. of a person's abilities (strengths) and disabilities (impairments). The underpinning conceptual framework is the International Classification of Functioning, Disability and Health (Office of the National Coordinator, 2022).

4. Looking ahead

Implementation of data standards for functional status data would enable interoperability and accelerate data availability along transitions in care. Increased availability may facilitate inclusion of functional status data in analytic models. These models could inform clinical decision making at transitions in care junctions and in care settings, which has the potential to improve patient outcomes.

4.1 Data Standards

Efforts to adopt data standards relevant to functional status are led by the federal entities, ONC and CMS. Further work is needed for data standards to completely cover functional status items included in PAC sources and terminology. The DEL analysis indicates the completeness of the LOINC and the incompleteness of the SNOMED data standards for functional status. The USCDI currently lacks a standard for functional status, although PACIO has offered a needed use case. Unknown is whether and when Functional class will be moved from USCDI Comments into a Version to be adopted as a standard.

An incentive for development and adoption of data standards is implementation of interoperability, for which data standards are required. Notably, the Federal Register seems to merely encourage interoperability without actually mandating it.

4.2 Artificial Intelligence, Machine Learning, and Data Science

Interoperability could enable functional status data to be available for analytic methods that predict patient outcomes thereby informing clinical decision-making. Artificial intelligence, machine learning, and data science which produce models that incorporate functional status data could be applied at care settings along the transition in care. For example, models used to identify patients in hospital or rehabilitation facilities who should be referred to home care (Bowles et al., 2019) could be augmented with functional status data. Similarly, models which identify hospitalized patients who should be admitted more promptly to home health care (Topaz et al., 2018) could be enhanced. For home health care patients, functional status data could be included in models that predict future outcomes, such as re-hospitalization, to advise care planning. These models could inform the home health nurse's decision making by identifying patients whose visits should be prioritized.(Sockolow et al., 2021) These models could also apprise the primary care team who conducts the post-hospitalization visit for decisions on provision of clinical resources.(Sockolow et al., 2022) Incorporating functional status data in the development of predictive models could increase understanding of the relationships among functional status data and outcomes, thereby increasing prediction ability so as to improve care and health outcomes.

5. Conclusion

Interoperability is needed to allow important functional status data to accompany patient transitions-in-care from the hospital to and among PAC settings. Data standards are fundamental to enabling interoperability. However, only one established international data standard, LOINC, is complete in its coverage of functional status items and PAC functional assessment instruments and terminology. The other established international and new national data standards are incomplete. Implementing a shared data standard for functional status would enable interoperability, reduce duplication of effort in documentation. Furthermore, access to standardized functional status data along the transition in care would enable its trending and also support investigation and development of predictive models to improve care delivery and patient outcomes. The absence of a federal interoperability mandate or incentive is a missed opportunity for driving its adoption.

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