Understanding Real-World Practice of Cognitive Screening and Assessment by Therapy Providers in Post-Acute Care

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Submitted to the Graduate Faculty of the

School of Health and Rehabilitation Sciences in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

University of Pittsburgh

2022

UNIVERSITY OF PITTSBURGH

SCHOOL OF HEALTH AND REHABILITATION SCIENCES

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University of Pittsburgh, 2022

At least 30-60% of older adults receiving post-acute care have cognitive impairments. If unaddressed, these impairments place older adults at risk of poor outcomes. Timely identification of older adults with cognitive impairments can influence patient and system outcomes. However, limited evidence exploring real-world post-acute care practices suggests there are inconsistent practices for identification of cognitive impairments. To mitigate risk of poor outcomes for this patient population, it is essential to first understand current practices and provider experiences of identifying cognitive impairments in post-acute care. Understanding current practices can inform future efforts to improve care quality and ultimately lead to positive patient outcomes.

To understand current practices, this dissertation focused on three aims. First, we examined electronic health record documentation for therapy providers in post-acute care to understand current documented practices of cognitive screening and assessment. We found evidence of cognitive screening for approximately 40 percent of older adults receiving post-acute care. Evidence of standardized assessment was observed in less than two percent of the cohort.

Second, we interviewed 18 therapy providers across post-acute care settings to explore their experiences of screening and assessing cognition, as well as what factors influenced their decision making processes. We found providers preferred to use informal observation over standardized assessments. Documentation patterns of therapy providers varied broadly across disciplines and settings due to varying documentation goals and lack of standard guidelines.

Third, we merged the quantitative and qualitative data. We found misalignment between

clinical documentation and provider reports of cognitive screening, assessment, and documentation in post-acute care. All therapy providers reported consistently screening for cognitive impairments, though it was inconsistently documented in the electronic health record.

Overall, these findings provide information to inform efforts to improve care quality for older adults with cognitive impairments. Future studies should (a) examine patient, caregiver, and provider priorities of cognitive screening and assessment, (b) include patients from diverse geographic regions and social backgrounds in quantitative and qualitative studies, and (c) explore the relationship between documentation of cognitive screening and assessment with stakeholder prioritized outcomes. These efforts can ultimately improve care quality and outcomes for older adults with cognitive impairments.

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Preface

My deepest thanks to mentors, dear friends, and loved ones for providing support and guidance in conducting this dissertation. It is a great privilege to work with scholars on generating new knowledge that has the potential to improve lives. A perhaps even greater privilege is the opportunity to gain deeper self-knowledge that leads to growth and fullness. I am grateful.

1.0 Introduction

1.1 Significance

1.1.1 Overview and Brief History of Post-Acute Care Policies and Payment

Medicare's prospective payment system that passed in 1984 incentivized hospital efficiency and resulted in a proliferation of post-acute skilled nursing and home health care.[1,2] To mitigate the consequence of excess spending from the prospective payment system, the Affordable Care Act that passed in 2009 aimed to align payment incentives for hospitals and post-acute care settings.[1] Subsequently, the Improving Medicare Post-Acute Care Transformation Act of 2014 built on the Affordable Care Act by calling for standardizing data elements across post-acute settings.[3,4] Standardized data elements were intended to allow for comparisons among patients across post-acute settings to inform value-based purchasing.[3,4] Cognitive function was one of the prioritized areas for standardized assessment across post-acute settings.[3,5]

1.1.2 Importance of Assessing Cognitive Function

1.1.2.1 Defining Cognitive Impairments

The Diagnostic and Statistical Manual defines dementia as significant declines (e.g., two or more standard deviations from age-adjusted norms) in one or more domains of cognitive function, which impacts independence in daily activities.[6,7] Domains include complex attention, executive function, learning and memory, language, perceptual motor function, and social cognition.[6,7] Mild cognitive impairments are defined as less significant declines (e.g., one standard

deviation below age-adjusted norms) in one or more areas.[6-8] Cognitive impairments, or declines in domains of cognitive function, co-occur with vascular, neurological, musculoskeletal, and metabolic diseases.[9]

1.1.2.2 Prevalence of Cognitive Impairments

Using this broad definition, approximately fifteen percent of community-dwelling older adults experience cognitive impairments.[10] Estimates are higher for those admitted to the hospital and post-acute care.[11-18] For example, approximately thirty percent of older adults admitted to the hospital,[11-14] fifty percent of patients admitted to inpatient rehabilitation,[15-17] and over sixty percent of older adults admitted to skilled nursing have cognitive impairments.[18] While the severity may vary based on diagnosis, vascular (e.g., stroke, heart failure), neurological (e.g., Parkinson's), musculoskeletal (e.g., joint replacement), and metabolic diseases (e.g., diabetes) all are associated with cognitive impairments.[11-14,19-22]

1.1.2.3 Disparities with Cognitive Impairments

Racial and ethnic disparities exist among this high risk population of older adults with cognitive impairments.[23-26] Older adults identifying as African American or Hispanic are one and a half to two times, respectively, more likely to develop dementia compared to White counterparts.[20] Factors associated with disparities in cognition include racism and discrimination, comorbidities, lifestyle factors, wealth, and childhood adversity. [23,27-30] All aforementioned factors put stress on the body in a way that may speed up cognitive decline.[31] These aforementioned risk factors are more prevalent for older adults from minoritized racial and ethnic backgrounds.[32] Given these risk factors for ongoing disparities in cognitive impairments, it is critical to continue to

examine care delivery in the context of race and ethnicity to move towards health equity instead of exacerbating disparities.[33]

1.1.2.4 Impact of Cognitive Impairments

Cognitive impairments impact achievement of desired patient outcomes, including successful community discharge (i.e., being discharged back to the community and remaining there at least 30-days) and safe participation in daily activities.[34-43] This may be because impairments contribute to difficulties in managing medications and complex routines which can result in a failed care transition.[21,22] Impairments also place patients at higher risk of adverse events (e.g., accidental falls), hospitalization and rehospitalizations, longer lengths of hospital stay, and mortality.[12,14,34-43] Cognitive impairments are associated with up to 40% higher odds of preventable rehospitalizations.[12,13,37] Further, over 90% of hospitalized older adult patients who were readmitted to the hospital within one year had cognitive impairments.[14]

1.1.2.5 Identification of Cognitive Impairments

To mitigate poor outcomes for older adults with cognitive impairments, one strategy is to ensure systematic identification of cognitive impairments and corresponding intervention to promote positive outcomes.[14,39,44-48] Cognitive impairments can be identified through clinical judgment, team consensus, patient or caregiver report, or standardized assessments.[9,49] This dissertation focused on the use of clinical judgment, hereafter referred to as cognitive screening, and standardized cognitive assessment. International survey studies suggest that post-acute therapy providers frequently use informal observation of patients performing everyday tasks to screen for cognitive impairments.[50,51] Standardized assessments used to detect cognitive impairments can include assessments of cognitive status during discrete tasks (e.g., Montreal Cognitive

Assessment) or functional daily activities (e.g., Performance Assessment of Self-Care Skills).[52-54] Identifying cognitive impairments through screening or assessment can then guide appropriate intervention.[9,14,39,44-48,55] For example, metacognitive interventions and environmental modifications may lead to improved outcomes for older adults with cognitive impairments, which can be delivered by post-acute therapy providers. To do so, cognitive impairments must first be identified.[47,56]

1.1.3 Gap in the Literature

There is a paucity of evidence detailing the extent to which cognitive impairments are identified in real-world United States post-acute settings by therapy providers.[50,57] Considerable science exists on current practice recommendations for identifying cognitive impairments in primary care, yet no studies within the United States focus on (a) therapy providers or (b) the post-acute care context.[26,58,59] International studies indicate post-acute therapy providers rarely identify cognitive impairments through use of standardized assessments, and instead rely on informal observation of participation in daily activities.[50,51,60] It is unknown if practitioners in the United States follow the same trend of limiting standardized assessments in favor of observation.[57,61] Thus, examining current practices is warranted as a first step in improving care quality for this population.[62,63]

1.1.4 Methods to Understand Current Practices

To understand current practices, health services researchers have used electronic health record documentation to characterize care.[64-66] Specifically, physician and nurse researchers have quantified electronic health record data to inform quality improvement for patients with falls, hypertension, or heart failure.[64-66] Translating their efforts to characterize current post-acute care

practices of identifying cognitive impairments can lead to future efforts to improve care delivery for this population.

However, electronic health record data alone are insufficient for understanding the healthcare context influencing the decisions and processes for identifying cognitive impairments.[63,64,67,68] Exploring provider perspectives of care delivery is a crucial complement to examining electronic health record documentation when the end goal is optimizing care quality.[67-69] Employing mixed methods approaches can provide the most robust and holistic understanding of current practices, as the strengths of qualitative and quantitative findings can complement each other.[70-72] Thus, the dissertation characterized real-world rehabilitation practices for identifying cognitive impairments in post-acute care through a sequential, explanatory mixed methods design (Figure 1).

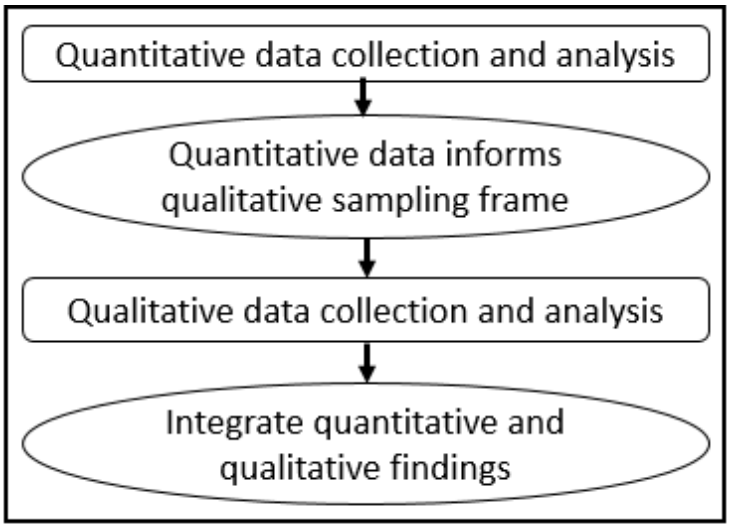

Figure 1: Sequential Mixed Methods Design

1.1.5 Guiding Framework

Grounding the exploration of documentation and provider experiences in Donabedian's healthcare quality framework provides a lens for examining how the healthcare context (e.g., provider training) influences care delivery and outcomes.[73-79] The Systems Engineering Initiative for Patient Safety (SEIPS) builds on Donabedian's framework by expanding contextual factors, such as patient characteristics and organizational culture (see Figure 2).[73,75] The context includes variables at the patient, provider, organizational, and policy level, considering all levels can influence provider actions and outcomes.[80] Bidirectional arrows between context, process, and outcome indicate the interdependencies of these three components in determining overall quality.[75,81] The conceptual framework was chosen to examine the relationship between contextual factors (e.g., post-acute setting), processes of care, (e.g., cognitive screening) and outcomes (e.g. readmissions).[70-72] Through understanding real-world post-acute setting in which care delivery occurs, researchers will be better equipped to address contextual factors to improve care quality for older adults with cognitive impairments.[82]

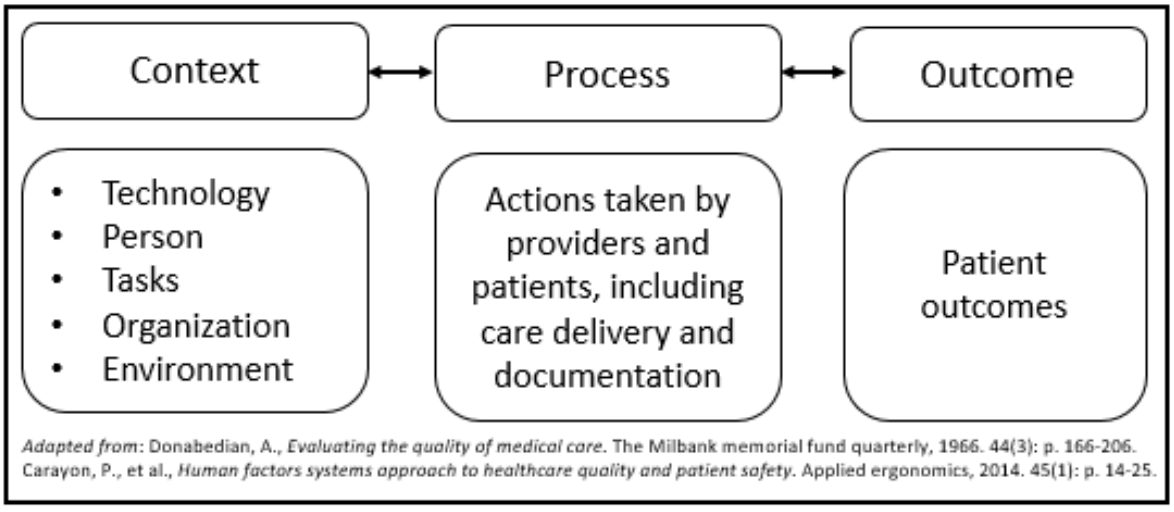

Figure 2: Conceptual Framework

1.1.6 Stakeholder Engagement

Health services researchers have engaged stakeholders throughout the research process as an additional strategy to enhance quality of care.[83-85] Engaging stakeholders contributes to enhanced relevance of findings through improved data collection (e.g., refinement of the interview guide) and interpretation of results.[84-86] Accordingly, this dissertation engaged post-acute care stakeholders with diverse perspectives (i.e., healthcare administrator, clinician, patient). Integration of their lived experiences contributed to enhanced relevance of findings, as well as contributed to shared understanding of research among non-research stakeholders.

1.2 Specific Aims

To gain a robust understanding of current practices, this dissertation characterized contemporary post-acute care identification of cognitive impairments with consideration of the healthcare context. Results provide a foundation for future efforts to enhance contextual factors that facilitate identification and documentation of cognitive impairments through the following specific aims.

AIM 1: Characterized contemporary cognitive screening and assessment documentation by therapy providers in post-acute care (Chapter 2). The study merged Medicare claims data with electronic health record documentation of the post-acute care stay. Frequencies and associations among cognitive screening and assessment processes with contextual factors (e.g., organizational culture), and outcomes (i.e., readmissions) were examined.

AIM 2: Explored rehabilitation providers' perspectives of identifying cognitive impairments in post-acute care (Chapter 3). This qualitative study used a multiple case study design with rehabilitation therapy providers. Using purposive and maximum variation sampling, the study team recruited at least two sites per post-acute setting (i.e., inpatient rehabilitation, skilled nursing, home health) and patient populations served. Within each site, the study team recruited a cluster of therapy providers from each discipline (i.e., occupational, physical, speech therapy) to gain an understanding of how the therapy team addressed cognitive impairments in their specific organizational context. Results included themes related to the healthcare context, process of identifying cognitive impairments, and outcomes of older adults with cognitive impairments in post-acute care.

AIM 3: Identified similarities and differences of current practices of identifying cognitive impairments in post-acute care according to electronic health record documentation and provider perspectives (Chapter 4). Using a mixed methods integrative approach, the study merged findings from Aims 1 and 2 to describe similarities and differences in processes and influences of cognitive screening and assessment.

The dissertation studies are relevant**,** because they provide valuable data that inform steps toward improving post-acute care quality for older adults with cognitive impairments.

2.0 Examining Real-World Therapy Practices of Cognitive Screening and Assessment in Post-Acute Care

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Citation: Rouch S, Terhorst LA, Skidmore ER, Rodakowski J, Gary-Webb TL, & Leland NE (in press). Examining real-world therapy practice of cognitive screening and assessment in post-acute care. Journal of the American Medical Directors Association.

2.1 Introduction

Cognitive impairments occur for 15-35% of older adults receiving hospital care and 30-60% receiving post-acute care.[11,13,14,17,18,38] They can co-occur across a broad range of conditions, including vascular (e.g., heart failure), neurological (e.g., Parkinson's), musculoskeletal (e.g., joint replacement), and metabolic diagnoses (e.g., diabetes).[11,13,19]

Evidence of poor outcomes and health inequities for older adults with cognitive impairments highlight the need to address healthcare quality.[38,87] Poor outcomes include medication non-adherence, increased falls, and failed care transitions.[88-91] These outcomes are more prevalent among older adults identifying as Black/African American compared to White counterparts, further highlighting the need to improve healthcare quality in the identification of cognitive impairments.[24,25]

Older adults transitioning from acute care to post-acute care are a high-risk population requiring intensive rehabilitation, including occupational, physical, and speech therapy.[92] Rehabilitation therapy providers are key members of the multidisciplinary team to identify

cognitive impairments.[3,47,56,93] Once cognitive impairments are identified, therapy providers can incorporate evidence-based guidelines in daily treatments, caregiver training, and care transition planning.[38,47,56,93] For example, metacognitive interventions and environmental modifications have been shown to lead to improved outcomes for patients with stroke or hip fracture, respectively.[47,56]

Thus, targeting rehabilitation therapy identification of cognitive impairments may lead to improved outcomes.[92] Accordingly, health system leaders have identified cognitive screening and assessment as a practices that should be implemented for every patient in post-acute care.[94] Policy efforts have also called for routine implementation of cognitive assessment to promote improved care coordination. Specifically, the Improving Medicare Post-Acute Care Transformation Act has generated heightened awareness for the need to implement standardized data measures for cognitive status among Medicare patients across post-acute settings.[95]

The evaluation of electronic health record documentation provides opportunities to understand current practices and inform future quality initiatives.[64-66] Current studies use frameworks that incorporate the healthcare context.[64-66] For example, Donabedian's healthcare quality framework and the Systems Engineering Initiative for Patient Safety provide the opportunity to explore the relationship between the healthcare context, process, and outcomes.[67,75] The healthcare context includes integrating social determinants of health (e.g., education, income) into analyses, given their relationship with access, quality, and outcomes.[96,97] Thus, the Donabedian Healthcare Quality and Systems Engineering Initiative for Patient Safety Framework guided the research questions and analytic approach.

This study examined current post-acute care practices of identifying cognitive impairments by therapy providers by quantifying cognitive screening and assessment in the electronic health record documentation. Results can elucidate current practice patterns to guide future quality

improvement by answering the research questions: What is current therapy documentation of cognitive screening and assessment across post-acute settings? What is the relationship between documentation of cognitive screening with patient factors and outcomes?

2.2 Methods

2.2.1 Data Sources

This analysis used Medicare claims and electronic health record data from one large health system in one geographic region, as well as census data merged at the facility zip code level.[98] Data were sourced from patient-level admissions to one of 13 hospitals between September 1, 2016 to October 31, 2018. Patients were included in the analysis if they were 65 years or older and were admitted to the hospital for one of the top ten most frequent diagnoses provided to the Centers for Medicare and Medicaid in the billing process[99] (Table 1). Included patients were discharged from the hospital by September 30, 2018 to post-acute care as their first discharge site from hospital discharge. Electronic health record therapy documentation had to correspond to dates in post-acute care from the Medicare claims file, including occupational, physical, or speech therapy. Over the two-year period, only a patient's first acute care hospitalization qualified them for inclusion in the study.

Table 1: Top Ten CMS Diagnoses

Diagnostic Group	DRG Code
Total hip/knee joint replacement	(MS-DRG 469, 470)
Septicemia or severe sepsis	(MS-DRG 870–872)
Heart failure & shock	(MS-DRG 291–293)
Stroke	(MS-DRG 61–66)
Simple pneumonia & pleurisy	(MS-DRG 193–195)
Renal failure	(MS-DRG 682–684)
Kidney & urinary tract infection	(MS-DRG 689–690)
Chronic obstructive pulmonary disease	(MS-DRG 190–192)
Hip & femur procedure except major joint	(MS-DRG 480–482)
Cellulitis	(MS-DRG 602, 603)

2.2.2 Stakeholder Engagement

The study team collaborated health system leaders, clinicians, and information technology experts from the health system where the data were pulled. Health system leadership nominated six expert clinicians across disciplines (e.g., occupational therapy, physical therapy, speech language pathology). They represented the settings where post-acute care patients receive care throughout the episode (e.g., acute care, skilled nursing, home health). They participated in individual and group conference calls and emails. The expert panel prioritized cognitive screening and assessment as one of four key practices they expected rehabilitation therapists to perform for all patients to facilitate a safe and effective discharge. The panel guided the research team in identifying where cognitive screening and assessment were documented in each of the care settings. The study team collaborated with information technology experts through email and phone calls, who provided input on the format of the electronic health record data fields.

2.2.3 Variable Operationalization

Guided by Donabedian's healthcare quality framework and the Systems Engineering Initiative for Patient Safety framework, the study explored the relationship between documentation of cognitive screening (i.e., process) with patient factors (i.e., context) and 30-day readmissions (i.e., outcomes). See Figure 2 for details.[73,75]

2.2.3.1 Process Variable: Cognitive Screening and Assessment

The study team created a dichotomous indicator for any documentation of cognitive screening or assessment by occupational, physical, and speech therapy during the post-acute care stay. Cognitive screening was operationalized as any documentation on discrete cognition fields (Table 2). Electronic health record documentation systems were set up for therapists to document on these fields in all post-acute care settings, with the exception of physical therapy in home health. According to clinical and information technology stakeholders, there were no discrete fields available for physical therapy to document cognitive screening in home health.

Cognitive assessment included any formal standardized assessments in the documentation. Stakeholders reported that standardized assessments were documented in narrative cognitive comments section. The research team conducted a hand search of these narrative fields for common standardized assessments reported by stakeholders, including abbreviations and full spellings for the following assessments: Global Deterioration Scale (GDS),[100] Executive Function Performance Test (EFPT),[101] Mini-Mental State Examination (MMSE),[102] Montreal Cognitive Assessment (MoCA),[53] Performance Assessment of Self-Care Skills (PASS),[52] and Saint Louis University Mental Status (SLUMS).[103] The first and senior author met weekly to discuss observations of what was narratively documented in the cognition comments fields to create

decision rules. The study team created a dichotomous indicator for cognitive assessment when documentation included (a) naming the assessment and (b) writing the assessment was completed OR providing a score. For example, if the cognitive comments narrative included “MoCA 26/30” or “MoCA completed,” cognitive assessment was counted.

Table 2: Discrete Cognition Fields Across Therapy Disciplines and Post-Acute Care Settings

Cognitive Behavior Discrete Field	IRF			SNF			HH		
	OT	PT	SLP	OT	PT	SLP	OT	PT	SLP
Affect / behavior	X	X	X	X	X				
Alertness				X	X	X			
Attention / focus	X	X	X				X		X
Comprehension	X	X	X						
Deficit awareness						X			
Expression	X	X	X						
Follows directions	X	X	X	X	X				
Global cognition	X	X	X						
Memory	X	X	X	X	X	X	X		X
Numerical reasoning									X
Orientation	X	X	X	X	X	X	X		X
Problem Solving	X	X	X	X		X			X
Safety awareness	X	X		X	X	X	X		
Sequencing							X		

HH=home health; IRF=inpatient rehabilitation facility; OT=occupational therapy; PT=physical therapy; SLP=speech langauge pathology; SNF=skilled nursing facility

2.2.3.2 Contextual Variables

Guided by the literature and conceptual framework, contextual variables associated with cognitive impairments and care delivery were included for patient and organizational factors.[11,13,14,38]

Patient variables included race, diagnosis, comorbidity level, sex, length of acute hospital stay, and any utilization of the intensive care unit. Patient ethnicity was not included as a variable given there was over 20% missingness. Patient race was operationalized as Black/African American, White, or other. Patient's identifying as American Indian or Alaskan Native (0.2%), Asian (0.5%), declined (0.5%), or not specified (0.6%) were collapsed into "other" as these patients collectively consisted of less than two percent of the overall sample. Patient diagnosis was the admitting hospital diagnosis (Table 1).[99] Comorbidity score was measured by the Elixhauser index.[104] Age was a continuous variable measured in years. Electronic health record documentation reported on a patient's sex as male or female, which was operationalized into a

single variable—female.[38] Length of acute hospital stay was a continuous variable measured in days.[38] Any utilization of the intensive care unit was operationalized into a single dichotomous variable.

Organizational variables included number of therapy disciplines received, post-acute care setting, and social determinants of health at the site level. Therapy utilization was operationalized as a categorical variable of the number of therapy disciplines providing any care, including evaluation or treatment.[38] Post-acute care setting was a categorical variable indicating the first setting after the index hospitalization.[38] Social determinants of health were integrated from public data following the process of Weech-Malondo and colleagues (2019). The study used the site zip code to capture per capita income, percentage of the population under the poverty level, percentage of population with high school education or higher, and percent unemployment rate. [105,106] These variables were sourced from the 2017 census data.[98]

2.2.3.3 Outcome Variable

Any hospital readmission within 30 days of hospital discharge was the primary outcome given the association with cognitive impairments and prioritization by policy makers.[14,38,88] The variable was a dichotomous indicator of any hospital admission within the same health system within 30 days of acute hospital discharge.[11,38]

2.2.4 Statistical Approach

SAS, version 9.4 (SAS Institute, Inc., Cary, NC) was used to merge the Medicare claims data, electronic health record data, and census data prior to the analyses.

2.2.4.1 Frequency of Cognitive Screening and Assessment

Cognitive screening and assessment were examined descriptively. Data were stratified by therapy discipline and post-acute setting.

2.2.4.2 Relationship Between Patient Factors and Cognitive Screening and Assessment

Logistic regression examined the relationship between documentation of cognitive screening or assessment with patient factors. Patient race and diagnosis were the independent variables for this analysis.[11,13,19,24,25] To ensure lack of multicollinearity, only the most relevant control variable was included when two or more control variables were strongly correlated ($r>.7$, $p<.0001$ for continuous variables; Cramer's $V>.8$ for categorical variables). Unemployment rate and poverty rate were excluded from the analysis given their strong correlation with education level. All other planned covariates were used. Significance level was set to $p<.05$. Parameter estimates, standard errors, odds ratios, and 95% confidence intervals were examined.

2.2.4.3 Relationship Between Cognitive Screening and Assessment with 30-day Readmissions

A generalized linear model with a binary distribution was used to determine the relationship documentation of cognitive screening and 30-day readmissions.[107] In addition to the control variables used in the logistic regression, interaction terms for post-acute setting and (a) cognitive screening and (b) race were included. The PROC GLIMMIX procedure was used for the unconditional means model followed by an iterative process of adding predictors and control variables individually.[107] Significance level was set to $p<.05$. Parameter estimates, standard errors, odds ratios, and 95% confidence intervals were examined.

2.3 Results

2.3.1 Sample

The final sample included 2,535 patients (Table 3). The cohort was on average 77.3 (9.1) years old, 60.2% female, and 91% white. Acute length of stay was on average 4.0 (3.0) days. Patients had an average Elixhauser comorbidity index score of 2.2 (2.7). The most common admission diagnoses were total hip or knee joint replacement (41.7%) and stroke (15.3%). Ten percent of patients had an ICU stay during the index hospitalization. Of the 2,535 patients, 22.6% were discharged to inpatient rehabilitation (n=13 sites), 9.3% were discharged to skilled nursing (n=9 sites), and 68.1% were discharged to home health (n=12 locations). Most patients only received one therapy discipline (51.4%). Finally, 10.9% of the patients were readmitted to the hospital within 30 days.

Table 3: Demographics

	Full Cohort	Skilled nursing Cohort	Inpatient rehabilitation Cohort	Home health Cohort
Patient sample size, n (%)	2535 (100)	235 (9.3)	574 (22.6)	1726 (68.1)
Age, M (SD)	77.3 (9.1)	82.3 (9.6)	79.6 (8.9)	75.8 (8.6)
Female, n (%)	1525 (60.2)	167 (71.1)	318 (55.4)	1040 (60.3)
Race, n (%)				
Black or African American	182 (7.2)	33 (14.0)	43 (7.5)	106 (6.1)
Other[a]	48 (1.9)	4 (1.7)	20 (3.5)	24 (1.4)
White	2306 (91.0)	198 (84.3)	511 (89.0)	1596 (92.5)
Admission Diagnosis, n (%)				
Total hip/knee joint replacement	1057 (41.7)	56 (23.8)	86 (15.0)	915 (53.0)
Stroke	388 (15.3)	19 (8.1)	298 (51.9)	71 (4.1)
Heart failure or shock	229 (9.0)	23 (9.8)	18 (3.1)	188 (10.9)
Septicemia or severe sepsis	165 (6.5)	28 (11.9)	31 (5.4)	106 (6.1)
Pneumonia/ pleurisy	151 (6.0)	21 (8.9)	15 (2.6)	115 (6.7)
Hip or femur procedure except major joint	129 (5.1)	29 (12.3)	77 (13.4)	23 (1.3)
Renal failure	121 (4.8)	21 (8.9)	23 (4.0)	77 (4.7)
Kidney/ UTI	121 (4.7)	21 (8.9)	17 (3.0)	83 (4.1)
Chronic obstructive pulmonary disease	116 (4.6)	10 (4.3)	5 (0.9)	101 (5.9)
Cellulitis	58 (2.3)	7 (3.0)	4 (0.7)	47 (2.7)
Length of hospital stay (days), M (SD)	4.0 (3.0)	5.7 (3.2)	4.6 (3.4)	3.6 (2.7)
Elixhauser comorbidity score, M (SD)	2.2 (2.7)	2.8 (3.1)	2.7 (2.8)	2.0 (2.5)
Intensive care utilization, n (%)	255 (10.1)	27 (11.5)	132 (23.0)	96 (5.6)
Any hospital readmission, n (%)	276 (10.9)	26 (11.1)	80 (13.9)	170 (9.9)
Number of facilities, n (%)	34 (100)	9 (26.5)	13 (38.2)	12 (35.3)
Number of therapy disciplines received[b]				
0	10 (0.4)	0 (0)	10 (4.3)	0 (0)
1	1304 (51.4)	0 (0)	5 (2.1)	1299 (75.3)
2	688 (27.1)	184 (32.1)	120 (51.1)	384 (22.2)
3	533 (21.0)	390 (67.9)	100 (42.6)	43 (2.5)
Social determinants of health by post-acute site zip code, M (SD)				
Per capita income	16906 (8091)	20727 (7187)	20,438 (11,630)	15133 (5980)
Percentage high school or higher	92.5 (7.6)	93.8 (3.0)	92.1 (4.4)	92.3 (8.9)
Unemployment rate, 16 years and older	2.7 (3.8)	1.4 (0.5)	2.1 (1.0)	3.1 (4.5)
Percentage below poverty, ages 24-65	15.2 (18.4)	9.6 (4.7)	20.7 (17.1)	14.1 (19.5)

[a]includes American Indian or Alaska Native, Asian, declined, or not specified
[b]includes occupational therapy, physical therapy, and speech language pathology

2.3.2 Frequency of Cognitive Screening and Assessment Documentation

Thirty-eight percent of the patient sample had documentation of a cognitive screening or assessment by any therapy discipline, which varied across skilled nursing (80.9%), inpatient rehabilitation (79.4%), and home health (18.5%) (Table 4). Patterns of documentation varied by discipline across settings. For patients receiving occupational therapy services, it was more frequent to have documentation of cognitive screening or assessment in skilled nursing (84.6%) and home health (71.8%) compared to inpatient rehabilitation (30.3%). In contrast, for patients receiving speech therapy services, documentation occurred for all patients in inpatient rehabilitation (100%) compared to home health (65.6%) and skilled nursing (53.3%). For patients receiving physical therapy, approximately one third of patients had documentation of cognitive screening in inpatient rehabilitation (34.8%) and skilled nursing (35.6%). Physical therapy did not document on any cognitive discrete fields in home health, as there were no discrete fields available.

Documentation of cognitive assessment was limited in skilled nursing (n=5) and home health (n=24) based on the cognition comment fields. There was no evidence of documentation of standardized assessments in inpatient rehabilitation.

Table 4: Documentation of Cognitive Screening Across Post-Acute Care Settings

	Full Cohort (n=2535)	Skilled nursing (n=235)	Inpatient rehabilitation (n=574)	Home health (n=1,726)
Type of therapy Received, n (%)				
Occupational Therapy	1228 (48.4)	221 (94.9)	574 (100)	433 (25.1)
Physical Therapy	2492 (98.3)	219 (94.0)	574 (100)	1699 (98.4)
Speech Language Pathology	559 (22.1)	105 (46.0)	390 (68.5)	64 (3.7)
Documentation of cognitive screening				
Any discipline, n (%)	965 (38.1)	190 (80.9)	456 (79.4)	319 (18.5)
Occupational Therapy, n (%)*	672 (54.7)	187 (84.6)	174 (30.3)	311 (71.8)
Physical Therapy, n (%)*	278 (11.2)	78 (35.6)	200 (34.8)	0 (0.0)[a]
Speech Language Pathology, n (%)*	488 (87.3)	56 (53.3)	390 (100)	42 (65.6)
Documentation of standardized cognitive assessment, n	29	5[b]	0	24[c]

*Percentage of patients is based on the denominator of the number of patients receiving that therapy discipline.
[a]Physical therapy does not document on discrete cognitive fields in home health
[b]indicates documentation of the Global Deterioration Scale, documented by speech language pathology only
[c]indicates documentation of the St. Louis University Mental Status assessment, documented by speech langauge pathology only

2.3.3 Relationship Between Cognitive Screening and Assessment with Patient Factors

The final model with all covariates explained 58.9% of the variance in documentation of cognitive screening or assessment (Table 5). Patient race, as well as income and education level measured at the site level, were not significantly associated with documentation of cognitive screening or assessment. Compared to patients with an admitting diagnosis of total knee or hip joint replacement, patients admitted for pneumonia (OR=0.53, 95% CI:0.27, 0.999) or urinary tract infection (OR=0.52, 95% CI:0.28, 0.97) had significantly lower odds of cognitive screening or assessment. Alternatively, patients admitted for stroke had significantly higher odds (OR=2.07, 95% CI:1.13, 3.82). Post-acute setting was significantly associated with documentation of cognitive screening or assessment, where patients in inpatient rehabilitation had lower odds of

having documentation than home health (OR=0.32, 95% CI:0.21, 0.49). Patients with more comorbidities had slightly higher odds to have documentation of cognitive screening (OR=1.12, 95% CI:1.06, 1.19).

Table 5: Relationship Between Documentation of Cognitive Screening and Patient Factors

	Point Estimate	Standard Error	Odds Ratio (B)	95% Confidence Interval
Intercept	3.38**	1.27		
Age, in years	-0.003	0.009	0.99	0.98, 1.01
Female	0.07	0.16	1.13	0.82, 1.56
Race				
Black or African American	0.41	0.32	1.51	0.80, 2.83
Other[a]	-0.02	0.65	0.98	0.28, 3.50
White	Reference group			
Admission Diagnosis				
Stroke	0.73*	0.31	2.07*	1.13, 3.82
Heart failure or shock	-0.16	0.30	0.86	0.48, 1.53
Septicemia or severe sepsis	-0.44	0.32	0.64	0.34, 1.20
Pneumonia/ pleurisy	-0.63*	0.32	0.53*	0.27, 0.999
Hip or femur procedure except major joint	-0.16	0.28	0.85	0.49, 1.49
Renal failure	-0.10	0.34	0.91	0.47, 1.77
Kidney/ UTI	-0.66*	0.32	0.52*	0.28, 0.97
Chronic obstructive pulmonary disease	0.33	0.37	1.39	0.67, 2.88
Cellulitis	0.11	0.52	1.12	0.40, 3.01
Total hip/knee joint replacement	Reference group			
Length of hospital stay (days)	-0.006	0.02	0.99	0.95, 1.03
Elixhauser comorbidity score	0.12***	0.03	1.12***	1.06, 1.19
Intensive care utilization	-0.15	0.28	0.86	0.50, 1.49
Number of therapy disciplines received				
0	-6.06***	1.12	0.002***	<.001, 0.02
1	-8.00***	0.43	<.001***	<.001, <.001
2	-2.39***	0.26	0.09***	0.06, 0.15
3	Reference group			
Post-acute care setting				
Inpatient rehabilitation	-1.00***	0.21	0.32***	0.21, 0.49
Skilled nursing	0.30	0.25	1.27	0.77, 2.07
Home health	Reference group			
Social determinants of health by post-acute site zip code				
Per capita income, in dollars	0.0000002	0.000009	1.0	1.0, 1.0
Percentage individuals completed high school education or greater	0.05	1.21	1.05	0.10, 11.25

*p<.05; **p<.01; ***p<.001

Logistic regression fit statistics: Wald chi square test, x^2=513.3, df=23, p<.001; R square=.58, Max Rescaled R square=.79; AIC=3370.5

[a]includes American Indian or Alaska Native, Asian, declined, or not specified

2.3.4 Relationship Between Cognitive Screening and Assessment with 30-day Readmissions

Cognitive screening was not significantly associated with 30-day readmissions (OR=0.81, 95% CI:0.53, 1.28) (Table 6). Patients admitted with a diagnosis of total hip or knee joint replacement was associated with significantly lower odds of 30-day readmissions compared to eight of the nine other diagnoses. Increased odds of readmissions were significant for each additional day spent in the hospital (OR=1.07; 95% CI:1.03, 1.11). When including interaction terms for post-acute setting with race and with cognitive screening, there were no additional significant findings.

Table 6: Relationship Between Documentation of Cognitive Screening and 30-day Readmissions

Model	Point Estimate	Standard Error	Odds Ratios (B)	95% Confidence Interval
Intercept	-3.66*	1.15		
Cognitive screening or assessment, yes	-0.19	0.23	0.81	0.53, 1.28
Age, in years	-0.01	0.01	0.99	0.98, 1.01
Female	-0.17	0.14	0.84	0.64, 1.10
Race				
Black or African American	0.21	0.23	1.24	0.79, 1.95
Other	0.05	0.46	1.06	0.43, 2.58
White			Reference Group	
Admission Diagnosis				
Stroke	1.18***	0.29	3.27***	1.85, 5.76
Heart failure or shock	1.64***	0.26	5.16***	3.10, 8.57
Septicemia or severe sepsis	1.56***	0.28	4.78***	2.74, 8.35
Pneumonia/ pleurisy	1.10**	0.31	3.00**	1.64, 5.51
Hip or femur procedure except major joint	0.67	0.37	1.95	0.94, 4.01
Renal failure	1.20**	0.32	3.31**	1.76, 6.21
Kidney/ UTI	1.25**	0.33	3.51**	1.83, 6.73
Chronic obstructive pulmonary disease	1.63***	0.30	5.08***	2.81, 9.20
Cellulitis	1.32**	0.41	3.76**	1.69, 8.37
Total hip/knee joint replacement			Reference Group	
Length of hospital stay (days)	0.07**	0.02	1.07**	1.03, 1.11
Elixhauser comorbidity score	-0.04	0.02	0.96	0.92, 1.01
Intensive care utilization	0.35	0.22	1.43	0.92, 2.20
Number of therapy disciplines received				
0	1.54	0.78	4.66	0.99, 21.91
1	0.23	0.37	1.26	0.61, 2.60
2	0.10	0.25	1.10	0.68, 1.80
3			Reference Group	
Post-acute care setting				
Inpatient rehabilitation	-0.20	0.25	1.22	0.75, 2.00
Skilled nursing	-0.31	0.28	0.73	0.42, 1.28
Home health			Reference Group	
Per capita income, in dollars	0.00001	0.000009	1.00	1.00, 1.00
Percentage high school education or greater	0.45	1.08	1.58	0.19, 13.22

*p<.05; **p<.01; ***p<.001

2.3.5 Post Hoc Analysis

Patients diagnosed with a total hip or knee joint replacement were the only population reflecting an elective admission. All other admissions were due to unplanned emergent medical needs. Given that this elective admission population was associated with lower odds of 30-day readmissions when compared to other diagnoses, post hoc analyses were conducted to examine differences with other patient populations. The post-hoc analysis showed patients with total hip or knee joint replacement were significantly younger, had fewer comorbidities, were less likely to have ICU utilization, had shorter lengths of hospital stay, received fewer therapy disciplines, were less likely to be Black/African American compared to White, and were most likely to use home health (Table 7).

Table 7: Differences Between Patients with Total Hip or Knee Joint Replacement and All Other Diagnoses

	Point Estimate	Standard Error	Odds Ratio (B)	95% Confidence Interval
Intercept	1.87	0.96		
Age, in years	-0.12***	0.008	0.88***	0.87, 0.90
Female	0.25*	0.12	1.29*	1.02, 1.63
Race				
Black or African American	-0.70*	0.23	0.50*	0.32, 0.78
Other[a]	-0.52	0.47	0.60	0.24, 1.49
White			Reference group	
Length of hospital stay (days)	-0.38***	0.04	0.68***	0.64, 0.74
Elixhauser comorbidity score	-0.17***	0.03	0.84***	0.80, 0.89
Intensive care utilization, yes	1.54***	0.32	4.66***	2.50, 8.68
Number of therapy disciplines received				
0	-11.40	350.7	<.001***	<.001, >999.9
1	4.06***	0.30	57.80***	32.04, 104.29
2	2.13***	0.25	8.39***	5.12, 13.73
3			Reference group	
Post-acute care setting				
Inpatient rehabilitation	1.44***	0.24	4.21***	2.64, 6.71
Skilled nursing	2.18***	0.28	8.82***	5.09, 15.29
Home health			Reference group	
Social determinants of health by post-acute care site zip code				
Per capita income, in dollars	-0.00004**	0.000001	1.0**	1.0, 1.0
Percentage high school education or greater	4.98***	0.90	146.1***	24.91, 857.29

*p<.05; **p<.01; ***p<.001

Logistic regression fit statistics: Wald chi square test, x^2=679.6, df=14, p<.001; R square=.46, Max Rescaled R square=.62; AIC=3446.0

[a]includes American Indian or Alaska Native, Asian, declined, or not specified

2.4 Discussion

This study revealed inconsistent patterns of cognitive screening across disciplines and post-acute setting. Documentation of any cognitive screening or assessment differed based on admitting diagnosis, but there was no significant relationship with 30-day readmissions.

Passage of the Improving Medicare Post-Acute Care Transformation Act in 2014 facilitated heightened awareness and prioritization of data standardization in post-acute care, including uniform methods to assess cognition.[3,108] Results of this study found inconsistent documentation of cognitive screening and assessment across therapy disciplines and post-acute settings. This could be in part due to differences in the electronic health record platform across post-acute care settings (e.g., no field for physical therapy to document cognitive screening in home health). Thus, it is unclear from these data if provider behaviors or documentation structure drove differences in cognitive screening. Findings support the need for standardized data elements for therapy providers across post-acute settings.[5]

The analysis revealed significantly higher odds of cognitive screening for patients with stroke compared to total hip or knee joint replacement, aligning with evidence that cognitive impairment remains a significant source of disability post stroke.[109] Yet, there were significantly lower odds of cognitive screening documentation for patients with pneumonia and urinary tract infection. One rationale for this difference may be that post-operative delirium or cognitive impairment is common for older adult patients post total hip or knee joint replacement.[110,111] However, post hoc analyses revealed patients in this sample with total hip or knee joint replacement were younger with fewer comorbidities, shorter lengths of stay, and less use of ICU,

making them appear to have less risk of cognitive impairments.[110,111] Given this finding, further investigation is warranted to understand the degree to which therapists screen for cognition based on diagnosis.

There were no significant differences in 30-day readmissions and documentation of cognitive screening or assessment. Given the hypothesized relationship between care processes and outcomes, further studies are warranted to examine relationships with other stakeholder prioritized outcomes.

The strength of this study is it is one of the first to capitalize on documentation data across post-acute settings to examine cognitive screening and assessment documentation. Yet, there are several limitations. First, the sample was predominantly white (91%) from one health system in one geographic region. Results may not generalize given that the population of Medicare beneficiaries self-identifies as 75% non-Hispanic White and 10% Black/African American.[112] Second, variables representing social determinants of health were measured at the post-acute site level by the zip code of the facility or office. This proxy variable may not truly represent the social determinants of health of patients in the sample.[105] Third, some variables had some cell sizes resulting in large bands around the confidence intervals, limiting precision of results. Fourth, acute care notes were not reviewed for pre-existing cognitive impairments. Finally, electronic health record data may not represent actual care delivery, as documentation patterns across clinicians may vary.[113] However, the trend for providers to document consistently across discrete fields has implications for reimbursement and policy development.[114,115] Accordingly, policy makers have prioritized data standardization across post-acute settings to drive care coordination and improve patient outcomes.[108]

Future research could move beyond examining 30-day hospital readmissions to include stakeholder prioritized outcomes (e.g., functional improvement, successful community discharge) to determine which prioritized practices contribute to improved outcomes.[114,115] To strengthen conclusions, future analyses could expand the sample to represent multiple health systems across geographic regions to improve generalizability. These analyses could be paired with qualitative work to understand how therapy providers make decisions and perceive the health record to drive practice patterns.[67] This could lead to enhanced understanding regarding how and why providers are engaging in cognitive screening and assessment, and the degree to which documentation platforms support consistent, uniform documentation across settings and disciplines.

2.5 Conclusion

Standardized assessment and documentation of cognitive impairments aligns with national post-acute policy priorities to promote improved care coordination and understanding of practices. Cognitive screening was inconsistently documented across therapy disciplines and post-acute settings, while standardized assessments were rarely documented. Patient diagnosis was significantly associated with documentation of cognitive screening and assessment. However, documentation of screening or assessment was not related to 30-day readmissions. Further research is warranted to understand barriers and facilitators of integrating and consistently documenting cognitive screening and assessment into practice to align with policy priorities and promote positive outcomes.

3.0 Exploring Therapists' Experiences Identifying Cognitive Impairments in Post-Acute Care

3.1 Introduction

The Improving Medicare Post-Acute Care Transformation Act of 2014 prioritized standardization of common data elements across post-acute care settings to promote care coordination and ultimately improve patient outcomes.[5,108,116] Cognition is one prioritized data element and can be assessed by multiple care team members, including therapy providers.[3,5,47,93]

Despite prioritization, preliminary data show therapy providers inconsistently document cognitive screening and assessments.[94] Thus, there is a need to understand the discrepancy between policy priorities and current practices from the perspective of therapy providers.

Qualitative methods enable holistic examination, which can lead to a greater understanding of provider behaviors, including cognitive screening, assessment and documentation.[117,118] To inform efforts to improve care, this study explored current post-acute care therapy providers' perspectives and experiences identifying cognitive impairments. Findings highlighted provider experiences across post-acute care sites with respect to the (a) process of cognitive screening, assessment, and documentation and (b) factors influencing their approaches.

3.2 Methods

3.2.1 Design

The qualitative study was part of a larger sequential mixed methods design study

examining current practices of cognitive screening and assessment in post-acute care. Data from the quantitative aim of the study (Chapter 2) informed sampling and recruitment for the qualitative study.

The qualitative study used a multiple case study design to understand phenomena across contexts, which calls for maximum variation across organization contexts.[118-123] Best practice for this methodology guided the choice to recruit two sites from each post-acute setting. Within each setting, the study team recruited sites that varied in the patient populations served.

3.2.2 Conceptual Framework

Donabedian's healthcare quality framework and the Systems Engineering Initiative for Patient Safety guided the study. The frameworks conceptualize how processes of care, the healthcare context, and outcomes influence each other (Figure 2).[73,75] Processes include actions taken by the provider, such as cognitive screening, assessment, documentation, and communication with other providers. The healthcare context includes patient characteristics, provider characteristics, technology and tools, organizational characteristics, and policy. Outcomes refer to patient outcomes in the study, such as care transitions and safe discharge.

3.2.3 Sampling and Recruitment

3.2.3.1 Post-Acute Care Sites

Purposive and maximum variation sampling were used to recruit six post-acute sites (n=2 per setting).[75,124-126] The study team recruited sites within each setting that varied by (a) diagnosis and (b) racial representation of the aggregate patient population served.[75,120-122,127,128] This decision was guided by literature suggesting that prevalence and severity of cognitive impairments vary by

clinical diagnosis and patient race.[11-14,19-26]

3.2.3.2 Rehabilitation Providers

Within each of the six sites, one physical therapist, one occupational therapist, and one speech-language pathologist were recruited. Eligible participants were therapy providers who (a) provided therapy within one of the six targeted sites at the time of the study, (b) reported at least six months of experience working with older adults at their site and (c) reported conducting evaluations as part of their job description. Existing networks between the study team and sites were leveraged to facilitate warm handoffs to ensure successful recruitment.

3.2.3.3 Stakeholder Advisory Committee

A four-member Stakeholder Advisory Committee provided feedback on data collection and analysis to promote relevance and generalizability of findings, as well as contribute to a shared understanding of research.[84,85] The committee represented diverse perspectives across demographic characteristics (e.g., age, race, gender identity) and experiences with post-acute care. Specific roles included a health system administrator, frontline clinician, informal caregiver, and patient perspective. The committee provided feedback on the (a) development of the interview guide, (b) comprehensiveness of the initial qualitative codebook, and (c) triangulation of findings over the course of three synchronous meetings. Committee members were sent materials two weeks in advance to review for one hour of asynchronous time and then discussed findings as a group during the one-hour synchronous meeting. All four stakeholders were present at all meetings, which facilitated dynamic group discussions and building from each other's ideas. Stakeholders were compensated $50/hour for a total of six hours.

3.2.4 Interview Guide Development

The Interview guides were developed using the study framework**.** The study team refined the wording of interview questions and probes based on study team feedback and the Stakeholder Advisory Committee.

3.2.5 Procedure for Participants

Study engagement included an (a) initial survey, (b) semi-structured interview, and (c) member-checking survey. The initial survey included demographic information and experience. Semi-structured interviews were used to gain an in-depth understanding of provider perspectives of identifying cognitive impairments.[122,129-131] Initial themes and sub-themes were shared with participants asynchronously. Participants completed a 10-question open-ended Qualtrics survey to indicate their agreement or disagreement with themes, or add additional context.[132,133] All responses were incorporated into data analysis.[122,130]

3.2.6 Data Analysis

Three trained study team members engaged in independent coding and team discussion to draft the initial codebook. In line with best practice and building on previous experience, the study team used a combination of inductive and deductive coding.[120,122,130,133,134] Deductive codes informed by the framework represented barriers, facilitators, and opportunities.[135] Examples of inductive codes included the intersection of organizational requirements (e.g., productivity) and patient needs as it related to identifying cognitive impairments. The codebook was iteratively refined through internal feedback from the study team and Stakeholder Advisory Committee. Once the codebook was finalized, all interviews were coded by two study team members, and discrepancies were resolved through asynchronous review and team meetings to achieve consensus

on all codes.[136,137] Data were analyzed (a) within each case and (b) across cases using thematic analysis to explore similarities and differences across contexts and engage in a high level synthesis of themes.[120,130]

3.2.7 Ethics and Rigor

3.2.7.1 Informed Consent and Compensation

The research study was exempt from written informed consent by the university institutional review board. Verbal informed consent was obtained from all study participants. The study team read all participant rights and approved information about the study prior to the interview process. Participants provided verbal consent prior to recording the interview. Stakeholders and participants earned $50/hour for all study activities.

3.2.7.2 Trustworthiness

To ensure the trustworthiness of results, the study team engaged in reflexivity and triangulation.[132,138] For example, the study team used data-memos to maintain a paper trail of reflections throughout coding interviews.[135,139] Data triangulation occurred through (a) the member-checking session with participants and (b) feedback on initial themes from the Stakeholder Advisory Committee.[132,138]

3.3 Results

Participants included occupational therapists (n=6), physical therapists (n=6), and speech language pathologists (n=6). Five of the six targeted sites had intended representation from each therapy discipline. Due to staffing shortages in skilled nursing, two additional sites were contacted to seek equal therapy representation across settings. Figure 3 illustrates providers from each site. Direct quotes in subsequent sections will refer to occupational therapists (OT), physical therapists (PT), and speech language pathologists (SLP) from inpatient rehabilitation facilities (IRF) 1 and 2, home health (HH) offices 1 and 2, and skilled nursing facilities (SNF) 1 through 4 (Figure 3).

		Patient populations served			
		Highest quartile African American representation			Highest quartile representation for primary diagnoses that are not stroke or total hip or knee joint replacement
Post-Acute Care Setting	Inpatient rehabilitation	IRF1			IRF2
	Home health	HH1			HH2
	Skilled nursing	SNF1	SNF2	SNF3	SNF4

Figure 3: Sampling Frame

Participants were on average 39.7 (±8.7) years old. The majority of participants self-identified as White, non-Hispanic female (n=14). Participants had on average 14.7 (±8.3) years of total clinical experience, ranging from three to 32 years, and an average of 7.6 (±6.1) years of experience at their current setting (Table 8).

Table 8: Participant Characteristics

	Full sample (n=18)	Skilled nursing (n=6)	Inpatient rehabilitation (n=6)	Home health (n=6)
Age in years, M (SD)	39.7 (8.7)	40.5 (8.7)	37.5 (10.2)	41 (8.2)
Female, n (%)	14 (77.8)	5 (83.3)	5 (83.3)	4 (66.7)
Self-identified race, ethnicity, n (%)				
White, non-Hispanic	17 (94.4)	5 (83.3)	6 (100)	6 (100)
Other	1 (5.6)	1 (16.7)	0 (0)	0 (0)
Education				
Bachelor's	1 (5.6)	1 (16.7)	0 (0)	0 (0)
Masters	14 (77.8)	4 (66.7)	5 (83.3)	5 (83.3)
Clinical doctorate	3 (16.7)	1 (16.7)	1 (16.7)	1 (16.7)
Clinical experience in years, M (SD)				
Overall	14.7 (8.3)	16.2 (9.0)	10.9 (8.1)	8.1 (8.8)
At current site	7.6 (6.1)	7.2 (3.3)	17.1 (7.6)	7.7 (6.1)

All participants provided feedback on initial themes via the member-checking survey. 17 of 18 participants agreed or strongly agreed with all initial themes. All feedback was integrated into final results.

Six over-arching themes emerged from the interviews. (1) Therapists routinely conducted cognitive screening on initial evaluation through *task performance* and *informal observation,* prior to or in place of standardized assessments. (2) Documentation habits varied due to multiple conflicting goals and lack of guidelines. (3) Therapists' approach to cognitive screening and assessment was honed on the job through clinical experience and trial and error. (4) Patient diagnosis, emerging medical conditions, and goals most strongly influenced therapists' approach to cognitive screening and assessment. (5) Roles and responsibilities for conducting and communicating cognitive screening and assessment were implicit. (6) The end goal of cognitive screening and assessment was determining patient's degree of *safety* in their environment. Similarities and differences across post-acute care settings and disciplines are explored within each

theme. Figure 4 illustrates how themes connected to the sub-domains in the conceptual framework guiding the study.

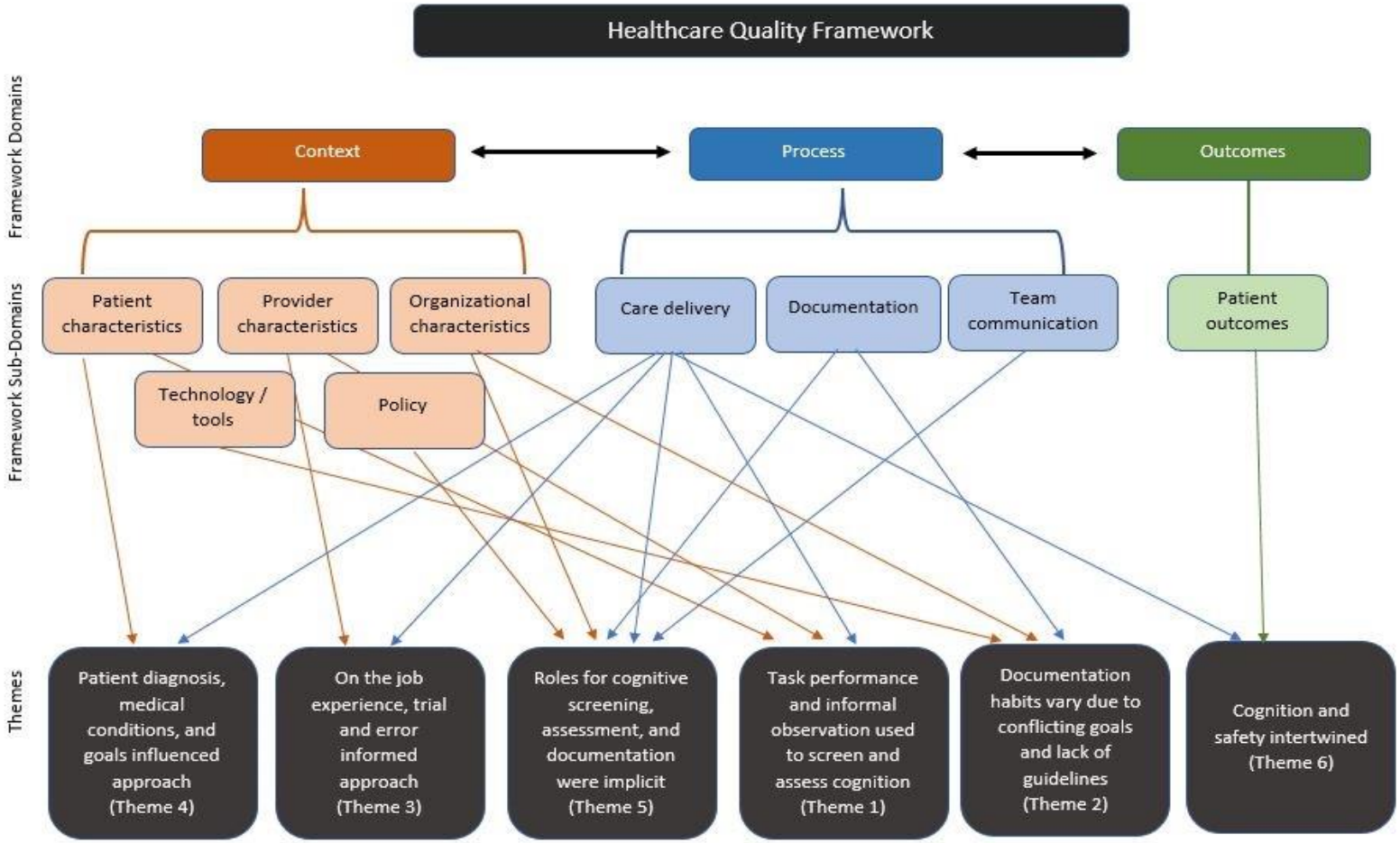

Figure 4: Relationship Between Conceptual Framework and Themes

3.3.1 THEME 1: Therapists routinely conducted cognitive screening on initial evaluation through *task performance* and *informal observation*, prior to or in place of standardized assessments.

Across settings, all participants relied on informal observation to gauge cognition and inform next steps. While therapists saw the value of standardized assessments, barriers to systematic and standardized implementation of these assessments included patient endurance, productivity, and time constraints.

Discipline specific patterns were evident. Occupational therapists frequently used activities of daily living or other functional assessments to initially determine the patient's level of cognition. Occasionally, they followed up with brief standardized cognitive assessments but reported time and patient endurance limited routine implementation. "Time constraints are a big deal…and the endurance of our patients might not be the best…sometimes there's other more important things to work on, like transfers and things like that, versus a standardized assessment" (OT in IRF1).

Physical therapists did not report conducting standardized cognitive assessments given this is not part of their role, but they frequently used orientation questions to gauge cognition. "I start with asking them all of the orientation questions….what is your name, where are you, and what's the name of this place" (PT in IRF2).

Speech language pathologists frequently started with informal observation in order to build rapport and guide assessment choice. Following the initial observation, they used formal assessments to identify specific cognitive deficits. However, these assessments were often done in an unstandardized manner to maintain patient rapport and stay within time constraints.

We are a little bit limited….with time constraints…So, I oftentimes will do like a BIMS… which is really just that quick snapshot of orientation…I think there are portions of the

> RIPA and RIPA-G that are helpful and useful…but for time constraint purposes, if you have somebody that is cognitively struggling, they feel put on the spot with all these questions… if they start failing at question three, and you still have 17, you're gonna lose them, the rapport that you've just built is gone. (SLP in SNF1)

See Table 9 for full a description of patterns across disciplines and settings.

Table 9: Practice Patterns Across Disciplines and Settings

	Occupational therapists	Physical therapists	Speech language pathologists
Inpatient Rehabilitation	Focused on activities of daily living; conducted the Montreal Cognitive Assessment (MoCA) if any cognitive deficits were noted during task performance. Other assessments occasionally used were Performance Assessment of Self-Care Skills (PASS), Motor Free Visual Perception Test (MVPT), or Trails-Making Assessment.	Screened for orientation and safety through interview and observation.	Routinely used Brief Interview for Mental Status (BIMS), Montreal Cognitive Assessment (MoCA), St. Louis University Mental Status (SLUMS) for initial screen. Frequently followed up with Cognitive Linguistic Quick Test (CLQT), Rivermead assessment, or Assessment of Language-Related Functional Activities (ALFA) over multiple sessions depending on needs.
Skilled Nursing	Infrequently conducted standardized assessments, primarily the Montreal Cognitive Assessment (MoCA), but preferred using task performance to understand patient's functional cognition.	Routinely screened for orientation. Reviewed chart for specific results of speech language pathologist's assessments to help guide treatment.	Conducted St. Louis University Mental Status (SLUMS), Mini-Mental Status Exam (MMSE), and Brief Interview for Mental Status (BIMS) frequently. Longer assessments, including the Ross Information Processing Assessment (RIPA-G) and Western Aphasia Battery, were done in an unstandardized manner to maintain rapport with the patient and stay within time bounds.
Home Health	Focused on task performance in real-world environment. Inconsistently used standardized assessments, including Montreal Cognitive Assessment (MoCA), St. Louis University Mental Status (SLUMS), Mini-Mental Status Exam (MMSE). Coordinated with speech language pathologist to avoid duplication of services.	Screened for cognition every session through observation and interview. Considered cognition as it relates to orientation, safety, and carryover of learning.	Began with informal observation of everyday conversation and interviews with the patient and caregiver. When warranted used the St. Louis University Mental Status (SLUMS), Ross Information Processing Assessment (RIPA-G), and Boston Aphasia measure for more specific cognitive and language deficits.

3.3.2 THEME 2: Documentation habits varied based on multiple conflicting goals and lack of guidelines.

There were no overarching variance patterns across disciplines or sites. Rather, habits varied within and across individual providers based on the multiple conflicting goals of documentation. When the goal of documentation was to guide evaluation approach, therapists perceived the current electronic documentation platform to align with their approach. Within inpatient rehabilitation and skilled nursing, the platform updated in the last two years and was described as "streamlined and straightforward" (OT in IRF2), "perfect the way it is" (PT in SNF4), and "vastly improved, compared to what it was before" (SLP in IRF1). Because of the recent updates, most therapists (n=16) did not perceive the platform structure to strongly influence their approach to cognitive screening and assessment.

However, therapists commented in the member-checking survey that the platform structure for cognition was still limited with high variation across providers, which challenged clear communication with team members. "It's not a topic that is very often in the forefront of discussions or audited for consistency and accuracy. There is a lot of room for individual preference for documenting cognition" (PT in IRF1). While narrative text allowed for providers to use their best judgment in what to report to the team, it made chart review and team communication more cumbersome. "A free text box is great, but I think it also allows for a lot of deviation off the path of what's intended" (PT in HH1).

Finally, therapists discussed the need to document cognitive deficits to ensure compliance and reimbursement from insurance companies. "The importance is to relay [cognitive deficits] to insurance companies and…to watch out for certain safety issues" (OT in SNF2).

3.3.3 THEME 3: Therapists' approach to cognitive screening and assessment was honed on the job through clinical experience and trial and error.

Across settings and disciplines, therapists reported they learned about their *role* in identifying and treating cognitive impairments in school. To successfully implement cognitive screening and assessment approaches, job experiences were critical. "In school, you learn about how to evaluate the orientation questions and safety in general. But…as I became a more experienced clinician, you learn more questions to ask about safety in the home and what they need to do to safely get home" (PT in SNF3). Trial and error was fundamental to the process of learning the best approaches. "There's definitely a large trial and error because there's so many factors that come into play…you have to being able to think on the fly and change what you're doing" (SLP in IRF2).

3.3.4 THEME 4: Patient diagnosis, emerging medical conditions, and goals most strongly influenced therapists' approach to cognitive screening and assessment.

Across settings, stroke, TBI, and dementia were diagnoses therapists looked out for in their chart review. "It first starts…getting their past medical history and seeing if they have any diagnosis of Alzheimer's, dementia or any cognitive issues" (PT in SNF4). Speech language pathologists also discussed reviewing the chart in depth for diagnostic details, as different brain lesions for stroke and traumatic brain injury (TBI) correspond to specific expected deficits. "For me, it's all about placement within the brain" affected by the TBI or stroke (SLP in HH2).

In addition to admitting diagnosis, urinary tract infection and delirium were the two biggest changes in medical history to be tracked across post-acute care settings. "If anybody spent time

and dealt with delirium…I go in suspecting that there could be deficits" (PT in IRF1). Individualized patient goals, including cognitive and other goals, were also taken into consideration as therapists decided their approach to screening and assessment. "Even if every patient I see has a stroke are all different, they all have different symptoms, they all have different needs levels of impairment. So, I do it on an individual basis" (SLP in IRF2). Age, function, social support, education, language, past living environment were inconsistently considered across settings and disciplines at it related to cognitive screening and assessment.

3.3.5 THEME 5: Roles and responsibilities for conducting and communicating cognitive screening and assessment were implicit.

All participants reported being implicitly responsible for routine screening to ensure safety, while speech language pathologists had the most responsibility for identifying specific deficits. "Every discipline is 100% responsible for it, but as far as who might go into the most depth, with their documentation, and standardized tests and reports, I would say the speech therapist" (PT in HH2). Occupational therapists systematically considered cognition in inpatient rehabilitation and skilled nursing, though there was evidence of siloed roles in home health. "I don't do very in-depth cognitive testing, because the speech therapist typically does the cognitive assessments and sets goals and works with cognition. So, I defer to her so there's not an overlap of service being provided" (OT in HH1). Speech language pathologists across settings confirmed they are the cognition expert. "Due to my training…I can make the better connection between communication and cognition and how it influences their daily life" (SLP in SNF4).

Therapists worked as a team to communicate patients' cognitive status regularly and informally. While the COVID-19 pandemic challenged the ability to informally discuss patients

on a daily basis in the same space, therapists adapted. “The PT might call me or the OT and say, ‘oh, I just evaluated this person that you're going to be getting on your schedule. This is what I noticed about their cognition’” (SLP in HH1). Despite the close communication and working relationships, there was still a desire for greater understanding of how providers come to the conclusions they do.

> One thing that I think would be really beneficial is for speech therapy and occupational therapy to know a little bit better each other's understanding of cognition and how we each individually assess cognition and interpret it, because I don't know what OTs do in school… I have a general idea, but I don't know what they understand about cognition versus what I am understand...I think having a bridge of that understanding would be very helpful to me and to our whole team. (SLP in IRF1)

3.3.6 THEME 6: The end goal of cognitive screening and assessment was determining patient’s degree of *safety* in their environment.

Across settings, cognition and safety were intertwined. Therapists across disciplines described cognition as central for patients to carry out daily tasks “accurately and safely without putting themselves in any kind of safety or jeopardy” (OT in HH2). The synergistic nature of cognition and safety were also considered during discharge planning. “Cognition really is taking a look at how a person is able to keep themselves safe in their current and planned discharge environment” (SLP in SNF1).

3.4 Discussion

This qualitative study explored therapy providers experiences and influences of cognitive screening, assessment, and documentation across settings. Two key findings were that (a) providers preferred informal methods of cognitive screening to maintain rapport with patients and stay within productivity bounds and (b) habits for documenting cognitive screening and assessment varied. These findings offer possible explanation for the discrepancy between policy prioritization and actual practices of routine documentation of cognitive screening.

Indeed, providers in this study found value in standardized assessments and specifically appreciated assessments with a functional component. Yet, occupational therapists and speech language pathologists discussed that informally engaging in everyday conversation or tasks was more useful initially for maintaining rapport with the patient and gaining a true sense of their abilities. This finding is consistent with international survey studies showing therapists prefer informal observation over standardized assessment.[50,51] However, it conflicts with studies prioritizing use of standardized assessments to identify subtle cognitive impairments that may not otherwise be observed.[39,140] Rehabilitation researchers have created and refined task-based functional cognition assessments that use everyday tasks and can identify subtle cognitive impairments.[3,22,141-144] Including current providers in the development and implementation of standardized functional cognition assessments could lead to enhanced clinical relevance of uptake of these assessments.[83]

Along with the perception of assessments detracting from patient rapport, time constraints was an additional barrier to consistent delivery of standardized assessments. As policy continues to evolve towards value-based care over volume, healthcare leadership and therapy providers have

an opportunity to integrate high quality care practices, including implementing systematic functional cognition assessments into the care plan.[4]

In addition to consistent delivery of standardized cognitive assessment, documentation of cognitive screening and assessment would benefit from standardization. Research has found that failure to document cognitive impairments is associated with greater risk of readmissions.[39] The electronic health record was expected to make clinical practices more efficient and effective by providing the opportunity to document on standard items and coordinate across settings.[145,146] However, this study demonstrated how the electronic health record platforms varied across sites, even within the same health system. Further, provider interaction with those platforms added another level of variation. All providers in the study described documenting their approach to cognitive screening and assessment, but the location and content of their documentation were inconsistent. When applying solutions to standard documentation, is critical to address both electronic health record platforms and provider documentation practices. Information systems could be streamlined to reduce variance in behavior caused by competing priorities for documentation, which threatens data standardization within and across settings. Engaging clinicians in the development and refinement of basic electronic health record structures is critical for ensuring clinical utility, which can lead to standard reporting practices.[147]

There are several limitations to the study. First, while there was an effort to gain variation across organizational contexts, all post-acute sites were within one health system. This may limit the generalizability of results across geographic regions.[122] Second, the study did not include a measure of implicit bias. Over 94% of the sample self-identified as non-Hispanic White (n=17), which means any provider biases were not reflected in the themes.[148] To address provider characteristics as it relates to health equity, studies could explore measures of provider bias and

how to promote cultural humility.[149] These could inform efforts to educate providers on the benefit of taking increased care in screening and assessing cognition for vulnerable patient populations, in a manner that is culturally sensitive and patient-centered.[150,151] In summary, given the known racial and ethnic disparities in prevalence of cognitive impairments and implicit biases present for healthcare providers, future studies would benefit from samples that represent patients and providers identifying as members of racial or ethnic minoritized populations.[148,152]

3.5 Conclusion

Therapy providers across post-acute settings routinely screened for cognition, and speech language pathology frequently performed standardized cognitive assessments. However, documentation of these practices varied across settings and disciplines. Future work can build from these findings to explore how to improve documentation platforms, guide increased uptake of standardized cognitive assessments, and enhance standard documentation of these assessments across settings.

4.0 Examining Similarities and Differences Between Documentation and Therapist Perspectives of Identifying Cognitive Impairments in Post-Acute Care

4.1 Introduction

The prevalence of older adults with cognitive impairments receiving post-acute care is estimated to be thirty to sixty percent of the patient population.[11,13,14,17,18,38] Cognitive impairments are associated with poor outcomes for these older adults, including increased falls and failed care transitions.[38,87] Addressing these impairments during the post-acute care stay can lead to improved outcomes.[11]

Therapy providers, including occupational therapy, physical therapy, and speech language pathology can address impairments during the post-acute stay to promote a safe and effective discharge.[92] Impairments must first be identified through cognitive screening and assessment to inform the plan of care and discharge disposition.[3] Indeed, identification of cognitive impairments is prioritized by stakeholders and health system leaders as a way to improve care coordination and outcomes.[3,5,144] However, current therapy practices of identifying cognitive impairments is unknown.

Mixed methods provides an opportunity to gain a holistic understanding of current practices by leveraging insights gained from quantitative and qualitative data.[70-72] To comprehensively understand current practices of identifying cognitive impairments, this study synthesized quantitative and qualitative findings on the process and influences of cognitive screening and assessment. Findings identified similarities and differences of electronic health record documentation data and provider reports of their approaches and influences to identifying

cognitive impairments. Results provide a foundation for quality improvement efforts at systematically addressing cognitive impairments for older adults in post-acute care.[70-72]

4.2 Methods

4.2.1 Conceptual Framework

The Donabedian healthcare quality framework and Systems Engineering for Patient Safety framework guided the research question and approach to data analysis by examining the relationships between the healthcare context, process, and outcomes, which are referred to as the meta-inference domains in this study (Figure 1).[73,75] Quantitative and qualitative findings were analyzed according to the actions providers took around cognitive screening, assessment, and documentation, corresponding to *process* in the framework. The degree to which the *healthcare context* - including patient, provider, technology, organizational, and policy characteristics – influenced processes of care was explored. Finally, the relationship between process and patient *outcomes* was examined.

4.2.2 Design

Sequential mixed method design was used to holistically understand current practices.[71] The principal method was the qualitative data collection and analysis, while the complementary method was quantitative data collection and analysis.[71,153] Figure 5 shows the sequential process of collecting, analyzing, and integrating both quantitative and qualitative data.

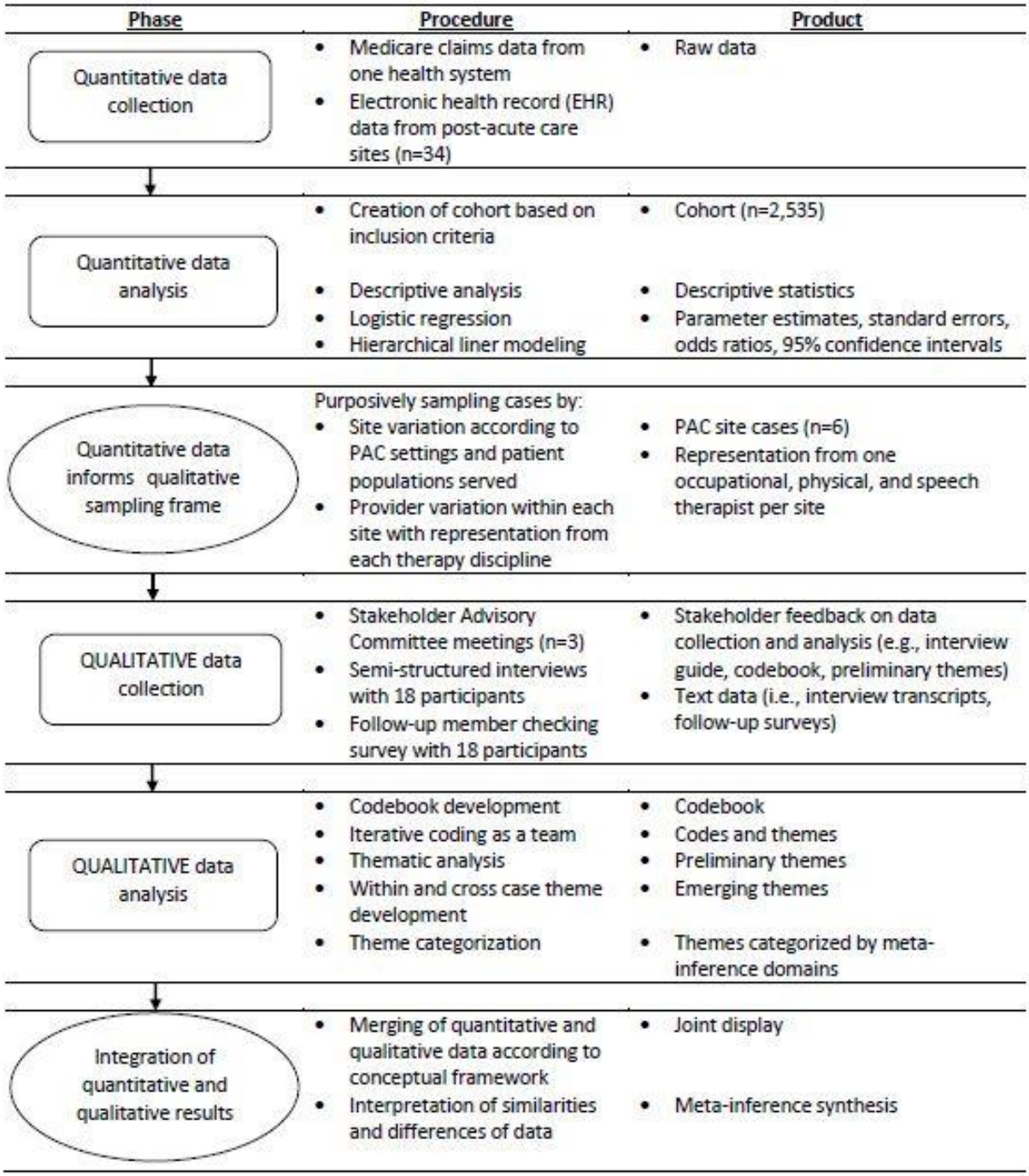

Figure 5: Sequential Mixed Methods Design

4.2.3 Participants and procedures

4.2.3.1 Data Collection

Quantitative. Data collection procedures are described in Chapter 2. Briefly, Medicare claims data and corresponding electronic health record data were collected from August 31, 2016 to October 31, 2018 within one health system. Claims data included any admissions to one of 13 hospitals, and electronic health record data included one of 34 post-acute care sites across inpatient rehabilitation (n=14 facilities), home health (n=12 agency offices), and skilled nursing (n=9 facilities). In addition, public data from the U.S. Census Bureau from 2017 were merged with these data according to the site location zip code for social determinants of health variables. The study sample included older adults admitted to the hospital between October 1, 2016 and October 1, 2018 for one of the top ten Centers for Medicare and Medicaid Services diagnoses that use post-acute care, who subsequently were discharged to inpatient rehabilitation, skilled nursing, or home health. Only the first qualifying index event hospitalization was included for the study sample. The primary variable of interest was therapist documentation of cognitive screening and assessment. This variable was operationalized as any documentation of cognition using discrete cognitive behavioral fields (e.g., problem solving, memory), or documentation of completion of common standardized assessments in narrative cognition comment fields (e.g., MoCA completed).

Qualitative. Full details of data collection are described in Chapter 3. A multiple case study design was used to understand the processes and influences of cognitive screening and assessment across varying organizational contexts. The study team used quantitative data to target post-acute sites that differed with respect to post-acute setting and patient populations served. In total, two sites per post-acute setting were targeted that varied by the aggregate patient populations served according to race and diagnosis. Within each site, one therapist from each therapy discipline was

recruited, including occupational therapy, physical therapy, and speech language pathology. Semi-structured interviews with 18 therapy providers equally distributed across post-acute settings and therapy disciplines were conducted.

4.2.3.2 Data Analysis

Quantitative. Three analyses were conducted corresponding to the study framework representing processes of care, context, and outcomes. First, descriptive analyses of cognitive screening and assessment were stratified by therapy discipline and post-acute setting to understand processes of care (Table 2). Next, logistic regression was used to understand the relationship between contextual variables (e.g., patient factors, organizational characteristics) and documentation of cognitive screening or assessment (Table 3). Finally, hierarchical linear modeling was used to understand the relationship between any documentation of cognitive screening and assessment and 30-day readmissions, corresponding to outcomes in the framework (Table 4).

Qualitative. Inductive and deductive coding were applied by three study team members to inform a codebook, which was vetted by mentors and the Stakeholder Advisory Committee. Once the codebook was finalized, all interviews were coded by two study team members and discrepancies resolved through team consensus. Thematic, within case, and cross case analysis were conducted to understand similarities and differences of the process and influences of cognitive screening and assessment across therapy disciplines and post-acute care settings. Emergent themes were developed and discussed in Chapter 3. For the purposes of data integration, the study team re-categorized themes according to the meta-inference domains in the conceptual framework. Themes are presented according to process, context, and outcomes.[70]

Synthesis. Quantitative and qualitative data were merged together according to meta-inference domains of the study framework for *process, context*, and *outcomes*. Using work by Kinney et al. (2022), the study team created joint display tables according to the meta-inference domains.[154] The first author subsequently drew interpretations based on the merged quantitative or qualitative data. The interpretations, or meta-inference syntheses, were categorized as *confirmation, conflicting information*, or *emergent information*.[154]

Confirmation was indicated when the quantitative and qualitative data aligned. *Conflicting information* represented opposing interpretations from the two data types. *Emergent information* referred to when qualitative data provided information outside the scope of quantitative data. Meta-inference syntheses are presented in the joint displays and narrative form according to the meta-inference domains of process, context, and outcomes.

4.3 Results

Quantitative data included a patient cohort of 2,535 patients admitted to inpatient rehabilitation (n=235), skilled nursing (n=574), and home health (n=1726) after acute index hospitalization. The qualitative interviews included occupational therapists (n=6), physical therapists (n=6), and speech language pathologists (n=6) evenly distributed across aforementioned post-acute settings. Qualitative themes categorized by meta-inference domains are presented in Table 10. The synthesis of quantitative and qualitative data produced meta-inferences for each domain of the framework. Joint displays are provided for the meta-inference domains of process (Table 11), context (Table 12), and outcomes (Table 13).

Table 10: Qualitative Themes

Meta-Inference Domain	Qualitative Theme	Qualitative Theme Description
Process		
Processes of care – actions taken by providers	Variances of cognitive screening and documentation by post-acute setting and discipline	Within SNF, OT used task performance to understand patient's functional cognition and documented in cognitive behavioral discrete fields and in activities of daily living performance notes. PT routinely screened for orientation through interview and reviewed chart for specific results of SLP assessments to help guide treatment. SLP initiated care with informal conversation to build rapport. PT and SLP documented screening using cognitive behavioral discrete fields. Within IRF, OT focused on activities of daily living tasks to screen for cognition and documented using discrete cognitive behavioral fields and in activities of daily living performance notes. PT screened for orientation and safety awareness through interview and observation, documented in discrete cognitive behavior fields. SLP routinely used the BIMS, MoCA, and SLUMS for initial screening, and documented in "outcomes" tab and narrative text. Within HH, OT focused on task performance in real-world environment and frequently documented screening in discrete cognitive behavioral fields. PT screened for cognition every session through observation and interview, and considered cognition as it relates to orientation, safety, and carryover of learning. PT did not have a specific place to document cognition so uses narrative text. SLP began with informal observation of everyday conversation and interviewed the patient and caregiver. SLP documented using cognitive behavioral discrete fields.
	Variances of standardized cognitive assessment and documentation by post-acute setting and discipline	Within SNF, OT infrequently conducted standardized assessments, but productivity and patient endurance limited systematic implementation. OT documented findings using narrative text. PT did not perform standardized assessments. SLP conducted SLUMS, MMSE, BIMS frequently. Longer assessments (RIPA-G) were done in an unstandardized manner to maintain rapport with the patient and stay within time bounds. SLP documented using narrative text to interpret scores and communicate findings with team members.

		Within IRF, OT conducted the MoCA if any cognitive deficits were noted in functional task performance, and occasionally used PASS, MVPT, Trails. OT documented assessments in specific "outcomes" tab that was added to electronic health record within last two years. PT did not perform standardized assessments. Depending on screening results, SLP followed up with CLQT, Rivermead, or ALPHA over multiple sessions depending on patient endurance to perform assessments. SLP documented in specific "outcomes" tab, as well as in narrative form to interpret assessments for benefit of other team members. PT and OT both reported relying on SLP specific assessment results to help guide their treatment. Within HH, OT inconsistently used standardized assessments, including MoCA, SLUMS, MMSE, coordinated with SLP to avoid duplication of services, documented using narrative text to interpret scores. PT did not perform standardized assessments. SLP routinely performed SLUMS, RIPA-G, or Boston Aphasia measure, and preferred to document assessment findings using free text to communicate nuances with team.
Healthcare Context		
Patient Characteristics	Diagnosis	Therapists discussed that admitting diagnoses of stroke and traumatic brain injury and a history of dementia resulted in automatic cognitive screening.
	Emerging medical conditions	Therapists looked out for emerging medical conditions, such as urinary tract infection and delirium. They also looked into the chart to see if the patient had an extended stay on the intensive care unit.
	Socio-demographic characteristics	Age, function, social support, education, language, past living environment were inconsistently considered across settings and disciplines at it relates to cognitive screening and assessment. Therapists, especially in HH, strongly considered the availability of caregivers as it related to conducting in-depth cognitive screening and assessment.
Provider Characteristics	Experience	Therapists described learning and refining their approach to cognitive screening and assessment on the job. Trial and error, observing other colleagues, and learning from fieldwork students were the primary drivers of their approach to cognitive screening and assessment.

Technology and tools	Electronic health record	Most therapists did not perceive the documentation structure to influence their approach, and many felt the structure was aligned with their processes. They documented the same information in multiple places to ensure compliance. However, personal preference and autonomy in the electronic health record platform made chart review more cumbersome.
	Resources	Therapists perceived they have sufficient physical resources to engage in standardized assessments, while time was the biggest barrier.
Organizational characteristics	Culture and expectations	All therapists reported having a responsibility to screen for cognition, with SLP had the most formal role. Expectations for cognitive screening, assessment, and documentation were implicit. SLP in IRF desired to have a greater understanding of OT training and process for cognitive screening and assessment.
Policy	Influence of national policy	Therapists did not perceive national policy to influence their approach, considering any requirements put forth by recent policies were already incorporated into the care they provided.
Outcomes		
Patient outcomes	Discharge disposition and planning	Therapists considered cognitive status in their discharge disposition recommendations and planning to promote a successful discharge home. Particularly in skilled nursing facilities, therapists performed standardized cognitive assessments to justify their recommendations to colleagues and family members if they did not feel discharge home was safe or appropriate.

ALFA = Assessment of Language-Related Functional Activities; BIMS = Brief Interview for Mental Status; CLQT = Cognitive Linguistic Quick Test; HH = home health; IRF = inpatient rehabilitation facility; MMSE = Mini-Mental Status Exam; MoCA= Montreal Cognitive Assessment; MVPT = Motor Free Visual Perception Test; OT = occupational therapy; PASS = Performance Assessment of Self-Care Skills; PT = physical therapy; RIPA-G = Ross Information Processing Assessment; SLP = speech language pathology; SLUMS = St. Louis University Mental Status; SNF = skilled nursing facility

4.3.1 Process (Table 11)

Confirmation. Documentation data revealed variation in cognitive screening documentation across therapy disciplines and settings. Qualitative interviews aligned with this finding through exploring that all therapy disciplines routinely screened for cognition though inconsistently documented it. For example, some therapy providers relied on narrative text to document findings, while others used discrete cognitive behavioral fields. Thus, the variation in documentation data aligns with qualitative data that documentation patterns around cognitive screening varied.

Conflicting information. Documentation data found limited evidence of standardized assessments in the cognitive comment location. Specifically, the data showed no evidence of standardized assessments by any therapy provider in inpatient rehabilitation and very limited evidence in skilled nursing and home health, which was exclusive to speech language pathology. However, qualitative interviews revealed standardized cognitive assessments were frequently conducted by occupational therapy and routinely conducted by speech language pathology across settings. Further, therapists in inpatient rehabilitation and skilled nursing reported documenting standardized assessments in a designated field. However, these fields were reportedly updated in the electronic medical record platform after the time of the data pull for the quantitative study.

Emergent information. There was no evidence of cognitive screening for physical therapy in home health, as they did not have designated cognitive behavioral discrete fields available to document. Qualitative interviews reveal physical therapists consistently screened for cognition and documented findings using narrative text.

Table 11: Joint Display for the Process of Care

Meta-Inference Domain	Qualitative Theme	Quantitative Data				Meta-Inference Synthesis
		Variable	IRF	SNF	HH	
Processes of care – actions taken by providers	Variances of cognitive screening and documentation by post-acute setting and discipline	Cognitive screening, n (%)* OT PT SLP	 174 (30.3) 200 (34.8) 390 (100)	 187 (84.6) 78 (35.6) 56 (53.3)	 311 (71.8) 0 (0.0)[a] 42 (65.6)	*Confirmation*: Documentation data revealed therapy disciplines across settings, with the exception of physical therapy in home health, documented cognitive screening for roughly a third to all of their patients. Qualitative interviews confirmed the varying documentation patterns across disciplines and settings. *Emergent information*: Physical therapy had no place to document cognitive screening in home health, but qualitative interviews revealed they routinely screen for cognition.
	Variances of standardized cognitive assessment and documentation by post-acute setting and discipline	Cognitive assessment, any discipline, n	0	5[b]	24[c]	*Conflicting information*: There was no evidence of documentation of standardized assessments for occupational therapy and limited evidence for speech language pathology in skilled nursing and home health, but qualitative interviews revealed occupational therapists and speech language pathologists conduct standardized assessments. They documented these assessments either in designated fields or narrative text to interpret scores for team members. *Emergent information*: There was no evidence of standardized assessments in

						inpatient rehabilitation, but qualitative interviews revealed the electronic health record platform was updated after the data pull for the study with a specific outcomes tab, which occupational therapy and speech language pathology frequently used.

All quantitative results are from a descriptive analysis.

*Percentage of patients is based on the denominator of the number of patients receiving that therapy discipline.

[a]Physical therapy did not have available discrete fields in home health to document cognitive screening

[b]indicates documentation of the Global Deterioration Scale, documented by speech language pathology only

[c]indicates documentation of the St. Louis University of Mental Status assessment, documented by speech language pathology only

4.3.2 Context (Table 12)

Confirmation: Logistic regression from the quantitative data found patients with stroke had a significantly higher likelihood of documentation of cognitive screening. Qualitative interview data also confirmed stroke as the admitting diagnosis automatically signaled for therapists to screen for cognition.

The logistic regression did not find any significant relationships between age, sex, and race with documentation of cognitive screening. Similarly, in the qualitative interviews, therapists inconsistently reported that socio-demographic characteristics influenced their approach to cognitive screening.

Finally, the logistic regression found a significantly higher likelihood of documentation of cognitive screening with each additional discipline. Qualitative interviews showed all therapy disciplines were responsible for cognitive screening, and they communicated regularly about patients. As more disciplines are working with a patient, therapists have more opportunity to work as a team to identify and address cognitive deficits.

Conflicting information: Logistic regression found patients with total hip or knee joint replacement had a significantly higher likelihood of documentation of cognitive screening compared to patients with urinary tract infection and pneumonia. However, qualitative interviews found urinary tract infection, as well as delirium, commonly resulted in increased attention to a patient's cognitive status.

Emergent information: Information about caregiver and social supports and therapist years of experience implicit therapist roles was not available in the documentation data. Qualitative interviews revealed both factors were influential to their approach to cognitive screening and

assessment. Therapists expressed that while they learned about their role in cognition in school, on the job exposure was necessary to refine their approach.

There was no quantitative data surrounding the acceptability and use of the electronic health record platform, resources available, the organizational culture, or the role of policy in therapist approach to cognitive screening and assessment. Qualitative interviews provided emergent information about how conflicting goals of electronic health record documentation- which include guiding therapist actions, communicating with the team, and ensuring compliance - created variation in therapists' documentation. Further, lack of time due to competing priorities and poor patient endurance limited their ability to conduct standardized assessments as frequently as desired. Regarding organizational culture, qualitative interviews revealed roles were implicit and therapists routinely communicated through informal methods about patient status. Yet, there still was confusion about discipline-specific expertise which may have exacerbated siloed approaches to care delivery. Finally, qualitative data revealed therapists did not perceive policy to influence their actions, as they addressed cognition more in-depth than what policy requires.

Table 12: Joint Display for Context

Meta-Inference Domain	Qualitative Theme	Quantitative Data			Meta-Inference Synthesis
		Logistic regression	Odds Ratio	95% CI	
Patient Characteristics	Diagnosis and emerging medical conditions	Stroke Heart failure Septicemia Pneumonia Hip or femur Renal failure Kidney, UTI COPD Cellulitis THA/TKA	2.07* 0.86 0.64 0.53* 0.85 0.91 0.52* 1.39 1.12 RG	1.13, 3.82 0.48, 1.53 0.34, 1.20 0.27, 0.999 0.49, 1.49 0.47, 1.77 0.28, 0.97 0.67, 2.88 0.40, 3.01	*Confirmation:* Stroke was significantly associated with increased likelihood of documentation of cognitive screening. Qualitative interview data also confirmed stroke as the admitting diagnosis automatically signaled for therapist to screen for cognition. *Conflicting information:* Total hip or knee joint replacement had a significantly higher likelihood of documentation of cognitive screening compared to urinary tract infection and pneumonia, yet qualitative interview data revealed that therapists frequently screened for cognition when a urinary tract infection was present.
	Socio-demographic characteristics	Age Sex Race African American Other White	0.99 1.13 1.51 0.98 RG	0.98, 1.01 0.82, 1.56 0.80, 2.83 0.28, 3.50	*Confirmation:* Age, sex, and race were not associated with documentation of cognitive screening. In the qualitative interviews, socio-demographic characteristics inconsistently influenced approach to cognitive screening. *Emergent information:* Information about caregiver and social supports was not available in the documentation data. Therapists reported in interviews that this was an important factor in their approach to cognitive screening and assessment.

Provider Characteristics	Experience	n/a			*Emergent information:* While the documentation data did not include years of experience, therapists expressed on the job exposure was necessary to refine their approach to cognitive screening and assessment.
Technology and tools	Electronic health record Resources	n/a			*Emergent information:* Qualitative interviews revealed barriers to systematic implementation and documentation of cognitive screening and assessment, including conflicting goals of the electronic health record, time, and patient endurance.
Organizational characteristics	Culture and expectations	Number of therapy disciplines 0 1 2 3	 0.002*** <.001*** 0.09*** RG	 <.001, 0.02 <.001,<.001 0.06, 0.15	*Confirmation:* Data showed that there was a significantly higher likelihood of documentation of cognitive screening with each additional discipline. Qualitative interviews showed how therapists routinely communicated and collaborated about safety needs, including cognition. *Emergent information:* Qualitative interviews revealed interdisciplinary approaches to care delivery.
Policy	Influence of national policy	n/a			*Emergent information:* Qualitative data revealed therapists did not perceive policy to influence their actions.

Logistic regression controlled for patient age, sex, race, admission diagnosis, length of acute hospital stay, Elixhauser comorbidity score, intensive care utilization, number of therapy disciplines received during post-acute stay, post-acute setting type, and average income and education level of the community where the post-acute care site was located.

*p<.05; ***p<.001; CI = confidence interval, HH = home health, IRF = inpatient rehabilitation facility, OT = occupational therapy, PT = physical therapy, RG = reference group, SNF = skilled nursing facility, SLP = speech language pathology, THA = total hip arthroplasty, TKA = total knee arthroplasty

4.3.3 Outcomes (Table 13)

Conflicting information: Hierarchical linear modeling did not find a significant relationship between documentation of cognitive screening by any therapy discipline and 30-day patient readmissions. However, qualitative interviews revealed therapists across settings and therapy disciplines all consider cognition as a key aspect of their discharge plan of care and discharge recommendations. Therapists discussed how cognitive impairments prompted (a) caregiver training in home health, (b) tailored education and intervention approaches in home health and inpatient rehabilitation to promote safe discharge, (c) delivery of standardized assessments in skilled nursing to justify discharge disposition, and (d) recommendations for discharge disposition that take into account cognitive status. These themes suggest cognitive screening and assessment by therapy providers in post-acute care all have the goal of promoting a safe and effective discharge, which includes getting home and staying home.

Table 13: Joint Display for Outcomes

Meta-Inference Domain	Qualitative Theme	Quantitative Data			Meta-Inference Synthesis
		Variable	Odds Ratio	95% CI	
Outcomes	Discharge disposition and planning	Relationship between any documentation of cognitive screening by any discipline with 30-day readmissions*	0.81	0.53, 1.28	*Conflicting information:* Quantitative data did not find a significant relationship between documentation of cognitive screening or assessment by any discipline with 30-day readmissions. However, qualitative interviews found therapists strongly considered cognition as it related to creating a safe discharge plan and recommendations.

*Hierarchical linear model controlled for patient age, sex, race, admission diagnosis, length of acute hospital stay, Elixhauser comorbidity score, intensive care utilization, number of therapy disciplines received during post-acute stay, post-acute setting type, and average income and education level of the community where the post-acute care site was located.

4.4 Discussion

The study merged quantitative and qualitative data to create a holistic understanding of the cognitive screening and assessment by therapy providers in post-acute care according to process, context, and outcomes. This most important finding of this study was misalignment between clinical documentation and provider reports of conducting standardized cognitive assessments. There was no evidence of documentation of standardized assessment in the electronic health record by occupational therapy and limited evidence for speech language pathology. Yet, qualitative interviews revealed occupational therapists occasionally conducted standardized cognitive assessments and speech language pathologists systematically conducted these assessments. This

misalignment appeared to be due to the structure of the electronic health record, organizational guidelines or lack thereof, and personal preferences and habits of documentation from each provider.

Misalignment due to the structure of the electronic health record platform aligns with literature that has found substantial variation and complexity in electronic health record platforms across settings.[147,155] A variety of stakeholder groups have interest in using electronic health record data for different purposes, which appears to further drive variation.[147] Examples include researchers capitalizing on electronic health record data for observational studies or clinical trials, policy makers using data to drive future policy decisions, administrators using data to drive staffing and financing decisions, and payers using data to determine reimbursement.[147,155-158] The priorities of all these stakeholder groups can impact the specific electronic health record platform adopted by a healthcare system or organization.[155]

Further, organizational guidelines for how and where to document cognition were unclear in the study. This is consistent with literature that showing explicit and implicit organizational expectations for how providers should engage with the electronic health record platform differ.[155] Indeed, because of the significant variation in post-acute settings due to lack of standard documentation system, the Centers for Medicare and Medicaid Services has prioritized standardizing common data elements across post-acute settings.[5]

This study found therapists reported multiple purposes of the documentation data. The varied and conflicting goals for therapy providers included guiding therapist approach, communicating with the care team, and compliance. These conflicting goals may have produced different documentation habits. For example, therapists routinely discussed the need to use narrative text to interpret and clearly communicate findings of standardized assessments with the

broader team. This conflicts with documenting in designated fields that can be used for clinical research or by policymakers to determine future policies.[147] Findings suggest post-acute care would benefit from engaged research with multiple stakeholders to design documentation platforms that meet priorities of key stakeholder groups without placing undue burden on the provider.[147]

Limitations to the study include that the electronic health record data were sourced from 2016 to 2018, while the qualitative interviews were conducted in 2022. Providers discussed changes to the electronic health record made after the data pull, which challenged the ability to do a complete merge of the two data sources. Additionally, the patient sampling in the quantitative study and provider sample in the qualitative study identified as over 90% White, which limits generalizability of findings to minoritized populations. In summary, future studies should include patients and providers identifying as members of racial or ethnic minoritized populations given the disparities in prevalence of cognitive impairments and implicit biases of healthcare providers.[148,152] The dependent variable of 30-day readmissions was limited to one health system. Thus, the conflicting information between provider reports and quantitative analyses revealing no significant relationship between identification of cognitive screening or assessment with 30-day readmissions may be due to data limitations.

4.5 Conclusion and Future Directions

There was misalignment between clinical documentation and provider reports of their approach to cognitive screening and assessment. All therapy providers reported consistently screening for cognitive impairments, though it was inconsistently documented in the electronic

health record due to conflicting goals of documentation. Larger scale studies with greater variation in patient populations and organizational context across the United States can leverage themes from this study to further explore how therapy providers screen, assess, and document cognition. Future studies then can (a) identify and test how to modify contextual variables (e.g., documentation platform, organizational culture) to enhance delivery of standardized cognitive assessments and (b) explore the influence of these efforts on patient and health system outcomes.

5.0 Discussion

At least thirty to sixty percent of older adults in post-acute care experience cognitive impairments that co-occur with their index diagnosis.[11,13,14,17,18,38] There is a need to address quality of care for this population given existing disparities in the prevalence and outcomes associated with cognitive impairments.[159-161] As a first step in improving care quality, this dissertation study characterized current practices of identifying cognitive impairments in post-acute care.[62,63]

This dissertation applied sequential mixed methods to understand current practices. Through merging Medicare claims and electronic health record data, the study team examined the processes of cognitive screening and assessment, as well as its relationship with patient factors and outcomes (Chapter 2). The study team then explored therapy provider experiences across post-acute settings of the processes and influences of identifying cognitive impairments (Chapter 3). Finally, the study team integrated data to identify similarities and differences between clinical documentation and provider reports of cognitive screening and assessment (Chapter 4). This chapter presents a synthesis of findings according to the conceptual framework domains. Based on this synthesis and limitations of the studies, future directions for research are presented to improve the quality of care for older adults with cognitive impairments.

5.1 Synthesis of Findings

Synthesis of findings across the three studies are presented below according to the meta-domains of the conceptual framework: *process*, *context*, and *outcomes* (Figure 1).

5.1.1 Processes

The main *process* takeaway from the mixed methods study was that actions providers take around cognitive screening and assessment were not consistently reflected in their documentation. One rationale for the misalignment may be that there were varying goals for documentation. At times, therapists reported the discrete or standard fields for documenting screening and assessment were not sufficient for fully communicating their findings of assessments with team members, so they used their clinical judgment to illustrate findings in narrative text fields. At other times, therapists used the structure of the documentation to guide their evaluation approach, where documenting on the discrete fields aligned with their workflow. While therapists appreciated the individualized approach as it related to their own documentation of cognition, they discussed that the lack of standardization decreased the usefulness of other providers' notes, as the content and location of cognitive status varied so greatly.

Findings are consistent with broader literature that has identified multiple purposes of electronic health record documentation. For example, literature has identified goals of documentation may include ensuring high quality care, determining reimbursement, driving quality improvement and clinical research studies, and influencing policy decisions on how care will be paid for in future.[147,156]

Indeed, the healthcare system has become reliant on electronic health records as a means of coordinating care, obtaining reimbursement, and informing treatment approaches.[147,156] The Improving Medicare Post-Acute Care Transformation Act of 2014 has required the implementation of standard data elements across post-acute care settings to promote care coordination and measurement of patient outcomes across settings, including for cognitive status.[4,5] Colloquially, the phrase "if you didn't document it, it didn't happen" reinforces the importance of accurate documentation for reimbursement, accountability, and quality assurance purposes.[162] Given the varying goals of documentation, it is unsurprising to find varying habits across therapy disciplines and settings. Findings have important implications for reimbursement, standardization of data elements for cognition, and care coordination as efforts are made to improve quality of care for older adults with cognitive impairments.

5.1.2 Context

The main *context* takeaway was that factors beyond patient diagnosis influence therapists' approach to cognitive screening and assessment. Across all studies, diagnosis and medical conditions were consistently associated with documentation of cognitive screening. Diagnosis of stroke was associated with documentation of cognitive screening in the quantitative study. In the qualitative study, stroke, urinary tract infection, history of dementia or delirium, or intensive care unit stay were consistently endorsed by therapists as factors that alerted them to screen for cognitive impairments. There were also important factors at the provider, organizational, and environmental level providers reported influenced their approach in the qualitative study. Consistent with other mixed method studies, qualitative data provided insights beyond what was

measured or available in quantitative data in terms of what factors influenced cognitive screening or assessment.[154]

Specifically, the involvement of informal caregivers, provider years of experience, or organizational culture all influenced therapists' approaches to cognitive screening and assessment. Yet, these factors were not measured in the quantitative study. Indeed, these factors have also been linked to uptake of evidence-based practice and promotion of improved patient outcomes. For example, the presence, availability, and engagement of informal caregivers has important implications for discharge disposition and outcomes for older adults with cognitive impairments.[163,164] Provider educational and work experiences have been shown to influence their attitudes and uptake of evidence-based practices.[164,165] Organizational management and culture also may have a strong influence on the degree to which processes of care are implemented that promote improved outcomes.[164,165] To promote data standardization of documentation of cognition in post-acute care in a manner that promotes improved patient outcomes, availability of informal caregivers, provider years of experience, and organizational culture are all important contextual factors to consider for future studies and quality improvement efforts.[164]

5.1.3 Outcomes

The relationship between cognitive screening and assessment documentation with patient outcomes from these studies was unclear. Specifically in the quantitative study, there was not a significant relationship between documentation of cognitive screening or assessment with 30-day readmissions. However, lack of precision in the independent variable and dependent variable limited the strength of this analysis. Specifically, the independent variable of documentation of cognitive screening or assessment was collapsed into a binary variable by any therapy provider.

Differences in discipline-specific practices and follow up treatments once cognition was screened or assessed were not measured. The dependent variable of 30-day readmissions was limited to one health system, so could not capture any utilization outside that health system. In the qualitative study, therapy providers stressed the importance of screening and assessing cognition to determine discharge disposition and inform discharge planning. Thus, qualitative reports suggest therapy providers conducted cognitive screening and assessment to inform a safe discharge plan.

The overall results of the three studies suggest that one cannot assume there is not a relationship between documentation of cognitive screening or assessment with patient outcomes. Indeed, 30-day readmissions has been shown to be a problematic quality metric depending on how rules are applied to determine readmissions.[166]

5.2 Limitations

These studies aimed to examine health disparities in both the quantitative and qualitative studies. Specifically, the quantitative study included an examination of the relationship between documentation of cognitive screening with (a) patient race and (b) social determinants of health (e.g., education) measured at the facility level. The qualitative study sampling frame included recruiting sites with variation in patient populations served by including sites with the highest quartile of representation of Black/African American patients within this health system. These decisions were driven known disparities by race and ethnicity in cognitive status for adults and older adults in post-acute care.[159-161] These studies did not find any differences in documentation of cognitive screening or assessment by age, race, or average education status or income of the county where the post-acute care site was located. Further, therapy providers did not report that

social identities influenced their approach to cognition. Yet, the patient population in the quantitative study was over 91% White, which is less diverse than the national averages of Medicare patient populations.[112] Small sample sizes for patients identifying as African American or "other" may have limited the possibility to capture any differences in care delivery or outcomes. The qualitative sample included providers self-identifying as over 94% non-Hispanic White, also limiting generalizability of results. Given that data were from one health system, in one health region, and with limited variation in race and ethnicity, results may not generalize to minoritized populations, who experience cognitive impairments at higher rates.

5.3 Future Directions

Given the main points and limitations across the three studies, future directions according to process, context, and outcomes are presented.

5.3.1 Process

Patients with cognitive impairments, their caregivers, and providers need to be engaged as policymakers and researchers implement standard measures of cognition across post-acute settings.[167] Engaging the triad of patients, caregivers, and providers can help identify priorities for screening, assessing, and addressing cognitive impairments in post-acute care.[167-169] Researchers have used a Delphi approach as a strategy to identify overlapping care priorities across stakeholder groups.[170] This approach involves a data gathering phase which can involve a combination of qualitative interviews with patients, caregivers, and providers, as well as literature searches.[170-172]

Iterative rounds of feedback with transparency on how others are responding can be used to identify care priorities.[170-172] Results can inform efforts to standardize data assessment elements as well as treatment protocols for older adults with cognitive impairments in post-acute care.[170]

5.3.2 Context

Given the national disparities that exist for patients with cognitive impairments and the limited variation in patient race for this sample, more research to understand care delivery and outcomes for adults with cognitive impairments is warranted. There are multiple avenues for future research. First, future quantitative studies could include more geographic regions with greater diversity by race and ethnicity.[173] These studies could prioritize collecting patient-level data on social determinants of health.[174] Further, studies for older adults tend to use age 65 or older as an inclusion criteria, aligning with Medicare beneficiaries. For adults identifying as members of racial or ethnic minority groups, cognitive impairments may occur earlier due to weathering.[31] Thus, excluding individuals who do not meet the age criteria cutoff may further exacerbate disparities.[31]

Qualitatively, including patient perspectives and experiences who identify as members of vulnerable populations is a critical next step.[175,176] Given mistrust in the healthcare system, there is often underrepresentation of vulnerable populations in the research, which could exacerbate disparities.[175,176] Using stakeholder and community engagement to intentionally recruit vulnerable populations is critical.[175,176]

5.3.3 Outcomes

To advance understanding of care processes that lead to optimal outcomes, there are two main strategies for future research. First, studies could include additional measures of patient outcomes beyond 30-day hospital readmissions. Specifically, community discharge and function are two key outcomes prioritized by stakeholders.[77,177] Community discharge, or "getting home and staying home", is an outcome prioritized by patients and caregivers that may be a more optimal measure of effective post-acute care processes.[77,177] Additionally, with the implementation of standard data elements for function across post-acute care settings, there is an opportunity to measure the relationship of functional outcomes (e.g., self-care, mobility) with documentation of cognitive screening and assessment.[108,116]

Secondly, studies could benefit from including a mediating variable of delivery of cognitive intervention. [178,179] This is due to the expectation that cognitive screening or assessment by therapy providers would result in interventions to address those impairments (e.g., metacognitive training, caregiver training), which ultimately would improve patient outcomes.[47,56] Including a mediating variable of cognitive intervention could strengthen the meaningfulness of analyses examining the relationship between documentation of cognitive screening and assessment.[178,179]

5.4 Conclusion

This dissertation used mixed methods to examine current therapy practices of cognitive screening, assessment, and documentation. The findings uncovered misalignment between therapists' actions and documentation in post-acute care. Next steps can explore how to equitably improve systematic implementation of cognitive assessment and documentation in post-acute care. Future implementation efforts should include a health equity lens and stakeholder engagement to identify priorities for cognitive impairments with representative patient and provider populations. This research can inform efforts that improve care quality and equity for older adults with cognitive impairments.

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