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Patient Transitions Between Acute and Post-Acute Care Organizations: Can Nursing Communication Prevent Patient Readmission?

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Patient Transitions Between Acute and Post-Acute Care Organizations: Can Nursing

Communication Prevent Patient Readmission?

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By

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ABSTRACT

Background and Review of Literature: Communication is the foundation of patient safety. As patients move from the acute to post-acute care setting, risk for insufficient communication rises. Research demonstrates a vast array of communication hand-off tools currently exist for and between different care arenas. No one tool has been standardized for patients transitioning from acute to post-acute care settings. The Institute of Medicine (IOM) and The Joint Commission (TJC) have published multiple documents discussing communication plagues within health care resulting in readmission.

Purpose: The purpose of this project is multifaceted: 1) identifying current nursing communication practices between a large quaternary care, academic medical center and post-acute in-patient physical rehabilitation hospital; 2) capture nursing perceptions of transitional care communications quality and timeliness; 3) hand-off communication tool creation; and 4) pilot implementation of communication tool with analysis of pre- and post-project findings.

Methods: This is a quasi-experimental research approach using quantitative data for two distinct groups. Retrospective data comparative analysis evaluating patient readmissions was obtained at the start of the project to determine baseline readmission rate for previous three-months followed by one-month post-implementation medical record review of patients transferred from an academic medical center to inpatient rehabilitation hospital (IRF). Patients were included based on age and discharged location (age18 years or greater; only transferred to Methodist Rehabilitation Hospital). Exclusion criteria included less than 18 years of age, transferred to location other than identified IRF,

discharged against medical advice, deceased during IRF admission, non-cooperative or non-compliant with care or admission status other than inpatient.

Second distinct group was registered nurses surveyed within one-month pre-implementation of new hand-off communication tool and immediately post-project completion for comparative analysis of survey responses related to nursing perception of hand-off communication processes: 1) time it takes to complete hand-off communication process; 2) communication elements are appropriate to prevent patient readmission; 3) process of patient hand-off is consistent (no variation from patient-to-patient); 4) identifies use of a current patient hand-off process; 5) identifies if there is a personal belief hand-off communication prevents patient readmission; and 6) if the receiving facility has questions concerning the patient post-transfer, how does the nurse respond to these queries. Inclusions were registered nurses with any level of nursing degree, working on trauma or neurology type unit or in care coordination. Exclusions were those employed less than 90-days.

Implementation Plan/Procedure: The Iowa Evidence-Based Model was utilized to guide implementation and evaluation of the project.

Results: The study identified statistically significant difference in readmission events occurring in patients transitioned from acute to post-acute IRF when a new nursing hand-off communication tool (*POST-ACUTE*) is utilized, standardized and consistent.

Conclusion: A 22% reduction in patient readmission is identified between patient populations of pre- and post-project implementation, indicating standardized nursing communication statistically impacts (reduces) readmission.

Keywords: Adverse events; patient safety; nursing hand-off communication.

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I want to recognize my DNP committee members who have walked me through many aspects of receiving this degree and sometimes had to drag me forward to prevent me from stopping in my tracks. These individuals are strong, intelligent and resilient. Without them I would not have made it to this point.

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This project is dedicated to my father, Ernest Gilbert, Jr., who passed away January 23, 2017. My father was to some uneducated, as he only held an eighth-grade education, but to me he knew everything. He often would tell my sister and me our family history, where everyone in the family originated and how everyone was related. He could go back generations in time. My sister and I often thought he could not possibly know all the history he would share with us. It was only after his death we discovered he was correct on everything he told us.

My father knew names of world leaders, what countries they led and political issues arising from various countries. He understood political sciences better than most political scholars. He noticed things in nature that most overlooked. Trees, where they were tallest and shortest, especially over roadways. He noticed how things looked on the ground, in the woods, and what to expect with animal behavior.

He worked two and often three jobs to assure his children, and some that were not his children, had everything needed and more. During my time as a single parent with a young boy, he acted as a father figure to my son. My father taught him values that only a man can teach a boy. He loved his children, grandchildren and great-grandchildren. My father was not seen as a great man by many, but he was a great man to me, and I will forever miss him.

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Communication Matter?

Background and Significance

Patient transition between levels of care is one of the most opportune times for

adverse events to occur (Santana, et al., 2017). According to Dunn et al., (2011), end of

transfer process revealed 8-24% of 101 simulated patient transfers experienced

misidentification and infection control scenarios. In a study by Usher et al., (2016),

observation of 335 patient transfers resulted in 58.3% of documentation inadequacies.

Adverse events occurred in 42% within 24 hours of transfer and 17.3% resulted in

mortalities (p. 240). In a two-arm randomized controlled trial within a tertiary care center,

1399 randomized participants were included, 23% experienced death or readmission due

to communication or documentation inadequacies within the transfer paperwork

(Santana, et al., 2017).

Nursing communication during patient hand-off is lacking between acute and

post-acute care organizations as demonstrated through research. The Joint Commission

(TJC) describes inadequate communication as a major precursor of adverse events,

accounting for 60% of cases (TJC, 2020). The Institute of Medicine (IOM) describes the

unsafe healthcare environment calling for national healthcare reform. The IOM denotes

between 44,000 and 98,000 unnecessary deaths occur in our healthcare system annually

(IOM, 1999).

Communication, when conducted, between acute and post-acute organizations, is

often rapidly performed and provides limited opportunity for questions and answers

during communication processes (Mueller et al., 2018). While transfer documentation

may be completed, various receiving facilities identify the information as cumbersome (Mueller, 2018). Patient involvement in transfers is limited due to health status situations, e.g., stroke, traumatic head injury, etc. The SBAR (situation, background, assessment, recommendation) tool is one best-practice processes for transition communication. Yet, it is often confusing to those attempting to complete the form and continues to result in important information being eliminated from the report (Mueller, 2018).

In addition to patient safety, there is an organizational financial impact. Centers of Medicare and Medicaid (CMS) implemented the Hospital Readmission Reduction Program through the Affordable Care Act (ACA) according to Ryan et al., (2017). The program sets target goals based on historical data resulting in reduction in hospital reimbursement when goals are not met, such as readmission rates (Ryan et al., 2017). There are also what is known as 'soft-dollar' losses related to readmission. Readmission and other adverse events utilize bed days creating bottlenecks in patient flow throughout the system. Due to bottlenecks in flow, patients often board in less-than-optimal settings, e.g., emergency department(s) and increase numbers of left without being seen (LWBS). Data were collected from UMMC regarding transfers to-and-returning from IRF facility.

University Mississippi Medical Center (UMMC), a 717-bed quaternary care, academic medical center, transferred 595 patients to an inpatient rehabilitation hospital (IRF) Methodist Physical Rehabilitation, calendar year (CY) 2021 (January 1, 2021- December 31, 2021). The rate of patients returning to acute care due to an adverse event where readmission is tied to the index admission, ranges from 1.9% to 17.4% during CY 2021, with linear trend line revealing a downward trend during the latter part of the year

yet displays an unstable process (see Figure I).

The importance of communication prior to and post patient transfer is a major factor creating returns to acute care setting. Currently there is limited standardization in communication between the two organizations. A standard EPIC electronic medical record summary is provided often without a hand-off telephonic call. Post-transfer no additional communication occurs between the two organizations unless the patient is readmitted. Rehabilitation liaisons do have access to EPIC electronic health record, which is not consistently utilized.

Problem Statement

Context and Scope

Communication inaccuracy, inconsistency, and lack of completeness with patients transferring from acute to post-acute care settings negatively impact patient safety and outcomes. Theoretically, standardization of communication should result in reduction of readmission. Question: Can standardized nursing communication prevent patient readmission in patients transferred from acute to post-acute care settings? UMMC transfers moderate numbers of patients (~50/month) to Methodist Inpatient Rehabilitation Hospital (IRF). Some patients are subsequently returned to UMMC due to changes in physical condition resulting in readmission for UMMC.

Project scope evaluation includes goals and deliverables of development of nursing hand-off communication tool titled *POST-ACUTE*, tool implementation, nurses' perception of hand-off communication processes via survey, analysis of *POST-ACUTE* tool utilization and prevention of patient readmissions. Stakeholders include patients; staff; organizations identified; medical providers; third-party payers; and community.

Consequences of the Problem

Consequences of the problem include patient readmission resulting in additional hospitalization, longer recovery periods and potential mortality. There are also financial impacts: 1) patients with co-payments or loss of income; 2) organizational due to reimbursement penalties related to readmission, decreased hospital bed capacity; and 3) third-party payers due to excessive costs related to readmission. This project focuses specifically on patient readmission prevention.

Current Evidence-Based Interventions/Strategies Targeting the Problem

Interventions and strategies used to reduce readmission included participation by nursing staff who transitioned patients from acute to post-acute settings as previously described. Nursing educational sessions were provided identifying research findings and the importance of standardized hand-off communication. Development of nursing hand-off tool *POST-ACUTE* was created by the principal investigator based on current research and nursing survey results completed pre-implementation of a new nursing communication hand-off tool. Introduction and implementation of the new hand-off tool *POST-ACUTE*, occurred with information on use (see Appendix I).

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Purpose and Objective

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Overview of Project Purpose and how it addresses the Problem

The purpose of this project was to evaluate the effects of standardized nursing hand-off communication in the prevention of readmission for patients transitioning from acute- to post-acute inpatient rehabilitation organizations. Key objectives include:

1. Determining baseline readmission rate for identified population through retrospective review of medical records prior to start of project;

2. Development with implementation of new hand-off communication tool titled *POST-ACUTE*;

3. Evaluate the effects of standardized hand-off communication in the prevention of patient readmission via retrospective review of patients transitioned during project timeframe; and

4. Develop and implement nursing survey to identify nursing perception of hand-off communication processes and new hand-off tool titled *POST-ACUTE* (satisfaction with use).

This project addresses current gaps in communication related to nursing hand-off communication during patient transition from inpatient to post-acute inpatient physical rehabilitation. Implementation on a larger scale may significantly reduce unplanned readmissions and provide greater information between clinical care facilities.

Theoretical/Conceptual Framework or Model

Framework

The Iowa Evidence-Based Model was utilized for this project. The Iowa Model is widely recognized according to Buckwalter et al., (2017), as evidence to guide best clinical practice. The model is further described by Buckwalter et al., (2017), as a tool that has stood the test of time for pragmatic methodology to infuse appropriate process changes (see Figure III). The Iowa Evidence-Based Model is comprised of five (5) steps: 1) assess, 2) decide, 3) plan, 4) intervene, and 5) evaluate.

Evaluation of patient transition from UMMC to IRF followed by readmission from IRF back to UMMC was determined through review of monthly readmission data with medical record review for the identified population. Retrospective review of three

months of data to determine baseline readmission rate pre-project and assessment of current communication practice occurred. A literature review was conducted in an effort of identifying current tools and potential practice gaps.

Culture weighs heavily on change at UMMC and was one of the greatest challenges, in addition to nursing shortages. Thus, planning was extremely important to achieve nursing 'buy-in' for practice change. COVID-19 stressors also surfaced as clinical staff have been extended well beyond what normal work processes would create physically and mentally. Data collection and analysis were evaluated based on readmission rates and nursing perception of: 1) time it takes to complete nursing hand-off communication; 2) communication elements are appropriate to prevent patient readmission; 3) process of patient hand-off is consistent (no variation from patient-to-patient); 4) identifies use of a current patient hand-off process; 5) identifies if there is a personal belief hand-off communication prevents patient readmission; and 6) if the receiving facility has questions concerning the patient post-transfer, how does the nurse respond to these queries.

Project topic was chosen as knowledge-based concern and aligns well with the model. The Iowa Evidence-Based Model permits multiple research designs (quantitative, qualitative); and guides the user in methods "to find and evaluate the evidence" (Godshall, 2019). The pragmatic methodology of this tool was used to guide each step of project implementation in conjunction with World Health Organization (WHO) Gap Analysis tool (see Figure II).

Review of the Literature

Review and Synthesis of Literature with Identified Gaps in Practice

A review of the literature relevant to this project was conducted. Databases of CINAHL, ClinicalKey, Ebscohost and EZproxy were used to identify current practice, gaps and project changes utilized for improvement. Keywords included adverse events, readmissions, communication, patient transition and hand-off tools. There has been limited research on hand-off communication between acute and post-acute settings, specifically between acute and inpatient rehabilitation hospitals.

There are a variety of communication interventions utilized in patient transition. Patient hand-off occurs face-to-face or via telephone for intra-transfers, however, this has not been the common practice for external transfers. Knight et al., (2019) describes risks associated with patient transition from acute to post-acute care settings, noting trial and implementation of video conferencing revealed new issues with patient transition such as time to be present and ability to weave the process within a heavy workload.

Shalini et al., (2015) discusses SBAR (situation, background, assessment, recommendations) tool utilization noting the tool assists staff in processing information and plan of care. The study by Shalini et al., (2015), reveals communication improvement with use of SBAR, yet gaps remain. Kear (2016), identifies the best-practice hand-off methods as, "SBAR, I PASS the BATON (Introduction, patient, assessment, situation, safety concerns, background, actions, timing, ownership, next), Five Ps (Patient, plan, purpose of plan. Problem, precaution) or Five Ps (Patient, precautions, plan of care, problems, purpose)," p. 340. All of which appear to enhance information sharing, still gaps are identified and vary from tool-to-tool.

There are four peer reviewed articles evaluating the use of communication tools during patient transition for various arenas. Dunn, et al., (2011) conducted 500 simulations with 345 completions, identifying 24.3% of simulations experienced inadequate communication. Clanton, et al., (2017) conducted a randomized control study involving 5157 subjects using SBAR and APACHE scoring. Results suggest formal handoffs offer no significant advantages in patient care and may be unnecessarily time consuming compared to a minimalistic approach. Ryan, et al., (2017) and Santana, et al., (2017) each conducted a combination of retrospective and randomized control studies both concluding the importance of adequate and accurate handoff to assure patient safety. Santana, et al., (2017) identified in the absence of appropriate hand-off communication, the primary outcome was composite of death or readmission to any acute-care hospital patient within three months of discharge.

All four articles demonstrate need for standardized communication during patient hand-off with various degree of information required to prevent adverse events such as readmissions (see Table 1; Dunn et al., 2011; Clanton et al., 2017; Santana, et al., 2017; Ryan et al., 2017). Two of the four articles discuss the potential effects interruptions during hand-off communication activity may create, such as a failure to identify key elements to prevent adverse events (Dunn et al., 2011; Clanton, et al., 2017). Three of the four articles demonstrate reduction in complexity reduces adverse events occurrence (Dunn et al., 2011; Clanton et al., 2017; Ryan et al., 2017). Santana, et al., (2017) evaluated use of an electronic communication tool finding no difference between study groups with or without e-tool use, concluding no significant differences in mortality or negative events among patients.

Identified Gaps in Practice & How Proposed Project Addresses Gaps

Gaps in practice include limited research on hand-off communication between acute- and post-acute care settings. Although multiple variables have been assessed for impact on communication accuracy and staff time utilization, relevant research regarding communication opportunity to enhance patient safety is lacking. Current best-practice tools are often described as cumbersome, confusing and create time hurdles.

This investigator recognized gaps related to nursing hand-off communication, developed and implemented a new communication hand-off tool titled *POST-ACUTE* intended to reduce current gaps in practice and incorporates active communication methods resulting in lower readmission rate during project period.

Methods

Project Design

This was a quasi-experimental research approach using qualitative data for two distinct groups. Data collection from University Mississippi Medical Center (UMMC) was completed. Retrospective data, comparative analysis evaluating patient outcomes occurred at the start of the project with retrospective review of medical record data for three-months prior to hand-off communication tool titled *POST-ACUTE* implementation (baseline readmission rate) and one-month post-implementation of patients transferred from UMMC to Methodist Rehabilitation Hospital. Inclusion criteria were 18 years of age or older, hospitalization status of inpatient, physician order to transfer to acute inpatient physical rehabilitation hospital (transfer completed) and located on a neurologic or trauma unit.

Exclusion criteria included less than 18 years of age, transferred to location other than Methodist Rehabilitation Hospital, noncompliant with care, leaving against medical advice, deceased during IRF admission or admission status other than inpatient.

Second distinct group was registered nurses surveyed within one-month pre- new hand-off communication tool implementation and immediately post project completion for comparative analysis of survey responses related to nursing perception of patient hand-off communication: 1) time it takes to complete hand-off communication process; 2) communication elements are appropriate to prevent patient readmission; 3) process of patient hand-off is consistent (no variation from patient-to-patient); 4) identifies use of a current patient hand-off process; 5) identifies if there is a personal belief hand-off communication prevents patient readmission; and 6) if the receiving facility has questions concerning the patient post-transfer, how does the nurse respond to these queries (see Appendix II). Inclusions were registered nurses with any level of degree, working on trauma, neurology units or in care coordination. Exclusions were those employed less than 90-days or working on various other clinical units.

Project included educational presentation, process improvement and program evaluation utilizing identified tools. Analysis occurred through standard statistical methodology using descriptive and logistic regression. This project used data to identify opportunities for enhancement of nurse-to-nurse; facility-to-facility communication during patient hand-off, resulting in optimal patient outcomes. Through pre-project survey, evaluation of nurses imperative sharing of key clinical information was completed. This information assisted with development of a new hand-off tool, *POST-ACUTE*. Nursing staff evaluation of the new hand-off tool was unable to be assessed due

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to zero post-project nursing surveys completed.

Setting

Agency Description

The project site is Mississippi's only academic medical center, University Mississippi Medical Center (UMMC). The hospital system is a quaternary care center comprised of seven health science schools and 717 staffed clinical beds inclusive of the Jackson campus, including a 250 bed children's hospital. Additional campuses include Grenada and Lexington, Mississippi locations, more than 30 clinics and greater than 200 telehealth sites across the state. UMMC has in excess of 10,000 individual employees with an annual $1.6 billion budget.

The organizational mission is three parts to drive improvement of Mississippians lives: 1) educating tomorrow's health care professionals; 2) conducting health sciences research; and 3) providing cutting-edge patient care. A major goal, based on mission, is the elimination of social, racial, and economic disparities. UMMC vision statement is to become a nationally recognized premier academic health sciences system.

Congruence of Project to Selected Agency's Mission/Goals/Strategic Plan

The project aligns well with UMMC mission/goals and strategic plan for FY 2022. The UMMC mission statement is the dedication to the pillars of 1) academia, including research; 2) clinical care dedicated to the health of the people of the state, providing the most advanced patient care; and 3) Goals include becoming a nationally recognized quality academic medical center in the country with effectiveness in care. Strategic plan is based on five strategic pillars: 1) maximize value in quality; 2) drive strategic clinical growth; 3) expand health care services statewide; 4) position academic

programs for the next generation of learners; and 5) strengthen research programs. This project aligns well with the first pillar, maximize value in quality.

The IRF mission statement is religious based dedicated to the restoration and enhancement of lives served. Goals are similar to UMMC, patient safety, efficiencies and effectiveness of care. The IRF provides two on-site rehabilitation non-nursing liaisons for UMMC, acting as assessors of patient appropriateness and readiness for transfer. Liaisons communicate directly with accepting IRF health care providers. Gaps continue to occur with accuracy of patient appropriateness, readiness, preparations for transfer, and general communication hand-off. Written, electronic, limited and sporadic telephonic communication randomly occurs between IRF providers and liaisons.

Description of Stakeholders

Stakeholders include patients, families, significant others, providers, staff, organizations, and third-party payers (insurance companies). Third-party payers include the state of Mississippi (state Medicaid), commercial insurances such as blue cross/blue shield of Mississippi, Medicare and worker's compensation agencies.

Potential Site-Specific Facilitators and Barriers to Implementation

A preliminary assessment of facilitators included case management, providers, and nursing and rehabilitation liaisons. Barriers also included a group of identified potential participants which had the right to refuse, and some did so related to: 1) no interest in change, 2) feelings of overworked and under resourced, related to COVID-19 cases or nursing staffing shortage, and 3) lack of understanding research and purpose of project.

Sample

Sample population included previous patients at UMMC rate (October 1-Decmeber 31, 2021), 1) deemed inpatient status by utilization review authorization; 2) transferred to identified IRF (Methodist Rehabilitation Hospital); and 3) 18 years or older, one-three months previous-to-project start to set baseline readmission rate. Fifty (50) of 157 individuals were randomly selected and reviewed. Sixteen of those readmitted within thirty-days of discharge, creating a baseline readmission rate of 32% (16/50*100%). Thirty (30) qualifying patients were transferred to specified IRF within the first thirty-days of project period. Exclusions were patients 1) placed in an out-patient status (outpatient or observation); 2) patients who did not transfer to the identified IRF or who were transferred to other post-acute care settings; 3) inpatients that were under the age of 18 years; 4) signed-out of the system against medical advice; 5) documented as uncooperative with care; or 6) those that were deceased during IRF admission. The sample population of patients transferred included 80 patients, 50 pre- and 30 post-project intervention.

Fifty (50) registered nurses were invited to participate in the survey. Registered nurses with any level of nursing degree employed greater than ninety-days, were identified through Chief Nurse Officer of adult hospitals and nursing directors, followed by invitation to participate in the study via emails.

Procedure

IRB Approval and Evidence-Based Intervention

This project was approved by University of Kentucky IRB on 09/06/2021 and University Mississippi Medical Center on 10/22/2021. IRB approval number 70465

(UK) and IRB approval number 2021-1025 (UMMC) was entitled "Patient Care

Transitions from Acute to Post-Acute Care Organizations: Can Nursing Communication

Prevent Patient Readmission?"

Evidence-Based Intervention

An open-source tool was used from the World Health Organization (WHO). The

WHO gap analysis tool provides a process to drive pragmatic actions closing gaps in

current process and desired future process (see Figure II). This tool aligns well with the

Iowa Evidence-Based Model-Revised which was used with permission from the

University Iowa Hospitals and Clinics, copyright 2015 (see Figure III). Widely used,

validated Iowa Evidence-Based Model-Revised directs the user(s) to work with best-

evidence, ultimately resulting in best-practice (Iowa Model Collaborative, 2017).

Implementation of a new communication hand-off tool titled *POST-ACUTE* was used to

identify potential changes in readmission rate with tool completion and use.

Measures and Instruments

Measures and instruments included patient counts, demographics, readmission

events occurring within IRBs approved timeline, nursing perception of hand-off practice:

1) time it takes to complete hand-off communication process; 2) communication elements

are appropriate to prevent patient readmission; 3) process of patient hand-off is consistent

(no variation from patient-to-patient); 4) identifies use of a current patient hand-off

process; 5) identifies if there is a personal belief hand-off communication prevents patient

readmission; and 6) if the receiving facility has questions concerning the patient post-

transfer, how does the nurse respond to these queries (see Appendix II). Project timeline

was December, 2021 through March, 2022.

Data Collection

Approval from the University of Mississippi Medical Center and University of Kentucky Institutional Review Board (IRB) was obtained prior to data collection. Phase I data collection began with retrospective medical record review. A report was created for primary investigators by UMMC informatics specialist, identifying all qualifying patients, age 18 years or older, transferred to Methodist Rehabilitation Hospital (IRF) for 10/01/2021-12/31/2021 and qualifying nurses, registered nurses with any level of nursing degree employed greater than ninety-days, were identified through Chief Nurse Officer of adult hospitals and nursing directors, 12/15/2021.

Readmission is defined using Centers of Medicare and Medicaid Services (CMS) definition: "An admission to an acute care hospital within 30 days of discharge from the same or another acute care hospital." For the purpose of this project a diagnosis related readmission occurs when, 1) the readmission diagnosis is associated with the inpatient discharge diagnosis; and 2. a) the patient is initially admitted to UMMC as an inpatient; 2. b) followed by transfer to Methodist Rehabilitation Hospital; and 2. c) Methodist Rehabilitation Hospital transfers the patient back to UMMC for inpatient status readmission within thirty-days of initial transfer.

Phase II of the project included ten (10) nurses involved with patient transition from UMMC to Methodist Rehabilitation Hospital that 1) agreed to project participation and completed an informed consent; 2) provide patient hand-off communication to IRF receiving primary care nurse: and 3) work in predetermined clinical areas of trauma or neurology as bedside nurse or case manager. Phase II included the following: 1) primary co-investigator(s) meeting with nursing staff, identified by CNO and directors, to discuss

project elements and identifying nurses agreeing to participation with project (signed informed consent) and 2) provided fifteen-minute education sessions to nursing staff for new communication hand-off tool (*POST-ACUTE*) use and importance of hand-off communication standardization and completion of initial nursing surveys, maintained in REDCap secure web-based software.

Phase III consisted of retrospective medical record review of patients discharged from UMMC and transitioned to Methodist Rehabilitation Hospital during project period (12/16/2021-02/28/2022). These data were used to determine diagnosis related readmission rate after *POST-ACUTE* hand-off tool education and implementation. Post-project data were compared to the pre-project readmission benchmark rate.

Each medical record was assigned a unique identifier that was de-identified to maintain confidentiality and necessary data for the study were documented directly into University SPSS software. All nursing survey de-identified data are stored within REDCap software. The collected demographic variables included race, age, gender, nursing communication completeness, while patient outcome variable included hospital readmission.

Nursing communication hand-off tool survey, a less than fifteen-minute survey of nurses was not completed by nurses in Phase III to determine nursing satisfaction with hand-off communication tool titled *POST-ACUTE*. Due to lack of completed surveys by subjects, comparison data are unavailable. Surveys occurring in Phase II, were conducted through REDCap software and were anonymous per de-identifier of individual participant eight-digit identifier created by user. REDCap is a secure, web-based application designed exclusively to support data capture for research studies, providing 1)

an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources. Data are housed in a HIPAA compliant environment and encrypted during transmission. Data are securely kept on Biomedical Informatics servers, in the secure data center run by the Institute for Pharmaceutical Outcomes and Policy (IPOP) physically located in the new Biological and Pharmaceutical Complex building on University of Kentucky campus.

Data Analysis

Data analysis included retrospective review of transferred patient medical records pre- and post-implementation of hand-off communication tool, from UMMC to IRF. Registered nurses were requested to complete a pre- hand-off communication tool implementation and post-project survey, comparing initial practice patterns in communication with post-education and project practice. Demographic medical record data were analyzed using descriptive statistics. Direct logistic regression was performed to assess the impact of numerous factors on the likelihood standardized hand-off nursing communication would prevent patient readmission. SPSS version 26 was used to perform statistical analysis and statistical significance was considered a p-value less than or equal to .05.

Results

Population Demographics

Descriptive statistics including frequency, distribution, means and standard deviations were used to describe patient demographics. Pre-project 50 medical records

were reviewed. Of these, 52.0% were Black (African American) of non-Hispanic descent and 52% were female. The mean age was 64.2 years. The majority (84%) of medical records reviewed were non-traumatic diagnoses and 32% resulted in unplanned readmissions (see Table 2). Nursing survey pre-implementation of new hand-off tool, included ten (10) individual registered nurses. Of surveys completed (N=10), 50% chose 15 minutes or less as total time required to provide hand-off communication; 70% established they believe some of the elements provided during hand-off communication prevent patient readmission; 60% recognized use of the same process during hand-off is sometimes consistent, while 40% determined they use the same process each time; 40% responded they do not respond to IRF when questions occur post-transfer; and 30% confirmed a standard process for hand-off communication exist, however only 10% use it consistently (see Figures IV-VI).

Post-project 30 medical records were reviewed post-project, 100% of patients transferred from UMMC to IRF during January 2022. Of these, 56.7% were Black (African American) of non-Hispanic descent and 46.7% were female. The mean age was 68.8 years. The majority (80.0%) of medical records for this group were non-traumatic diagnoses and 10% resulted in unplanned readmissions (see Table 2).

Readmitted Patients

All medical records reviewed N = 80, 23.8% (19) resulted in readmission. Of those, 32.0% (16) occurred pre-project (n = 50) and 10.0% (3) post-project implementation (n = 30). Black (African American) = 11.3% (9) and White = 12.5% (10); age ranges: 36-55 years = 3.0% (2); 56-70 years = 15% (12) and 6.3% (5) were 71

years or older; and gender: 11.3% (9) were male and 12.5% (10) were female. There was no statistical significance between race, age, or gender with readmission (see Table 3).

Direct Logistical Regression

Direct logistical regression was performed, model contained four (4) independent variables (race, gender, age, and nursing hand-off communication). The full model containing all predictors was statistically significant, X^2 (4, N=80) = 13.86, < .01, indicating that the model was able to distinguish between pre- and post-project populations not readmitted with nursing hand-off communication. The model as a whole explained between 16.0% (Cox and Snell R square) and 24.0% (Nagelkerke R squared) of the variance in populations for those that were and were not readmitted, and correctly classified 73.80% of cases.

Two of the independent variables made a unique statistically significant contribution to the model (completed and 'other' nursing hand-off communication). The 'other' category for nursing hand-off communication included telephonic hand-off or partial completion of tool titled *POST-ACUTE*. This indicated that patients transitioned from UMMC to IRF with hand-off communication (*POST-ACUTE* hand-off tool utilization) were over eight (8) times less likely to experience readmission, than those transitioned without *POST-ACUTE* tool communication, controlling for all other factors in the model. The odds ratio of .04 for nursing communication is less than one (1), indicating that 96% of patients transitioned from UMMC to IRF without *POST-ACUTE* hand-off tool, were more likely to be readmitted than those with *POST-ACUTE* hand-off communication, (see Table 3).

Nursing Survey

Ten (10) nurses participated in completing a nursing pre- new hand-off tool implementation survey, zero completed the post-project survey. Participating nurses completed new communication hand-off tool *POST-ACUTE*, for a total of 30 patients. Of these, 73.3% were fully completed, 26.7% were partially completed. As identified through nursing survey, a standardized process for sharing patient information during transition from UMMC to IRF is not consistent with practice (see Figure V). Nursing survey completed prior to new hand-off communication tool implementation reveals the following based on Likert scale where one (1) equals never and five (5) equals always:

1) Hand-off communication takes less than 15 minutes: 10% never; 30% sometimes; 10% almost always; and 50% always;

2) Hand-off communication are appropriate to prevent patient readmission: 30% never, 70% sometimes;

3) Process of patient hand-off communication is consistent (no variation from patient-to-patient): 40% never, 60% sometimes

4) There is a current standard process in place for patient hand-off communication and it is used: 10% never, 20% almost never, 20% sometimes, 20% almost always, 30% always

One survey question was yes or no responses with the following results: I believe nursing hand-off communication is necessary to prevent patient readmission, 70% yes, 30% no. One survey question was multiple choice: If the receiving facility has questions concerning the patient's care post-transfer, I:

A. Do not follow up the patient has been transferred, 40%

B. Do not follow up as this would be a HIPAA violation, 10%

C. Follow up and provide any additional information requested, 20%

D. Other, 30%

(see Figures IV-VI).

Discussion

Findings

This study was aimed at evaluating the effectiveness of nursing hand-off communication in the prevention of patient readmission. Of the four independent variables evaluated in this study, two were found to have statistically significant ability in prevention of patient readmission: completed and 'other' nursing hand-off communication during patient transition. The importance of communication prior to and post patient transfer is a factor creating patient returns to University Mississippi Medical Center.

Readmission for patients returning from selected IRF to UMMC have ranged as high as 17.4% (CY 2021), 32% for three months pre-project (*POST-ACUTE* hand-off tool implementation) and 10.0% post-project review, a readmission reduction of 22%. This does not include patients who return to the emergency department, not admitted or placed in an observation status. No one hand-off tool had previously been implemented and identified as standardization for nursing, which may have the largest impact of patient safety or lack thereof.

Ten nurses completed a total of thirty (30) new hand-off communication forms titled *POST-ACUTE,* for thirty (30) individual patients. Of these, 73.3% were fully completed, 26.7% were partially completed. Nursing survey findings from pre-

implementation of the new hand-off tool revealed practice in hand-off communication is inconsistent between individual nurses and varies from patient-to-patient with 40% identifying communication process is never consistent and 60% stating process is sometimes consistent. Due to zero post-implementation nursing survey completion, no comparative data are available.

Study findings confirm the importance of nursing hand-off communication in the prevention of patient readmission and confirm some form of communication is a key factor. The *POST-ACUTE* tool was not conducted electronically, therefore no comparison for previous research findings related to this type of communication was available.

Discussion of Findings as it Relates to Existing Literature

The four literature review articles discuss various degrees of communication needed to prevent patient adverse events. However, the articles are unable to identify the specific elements to share during patient transition and do not include patient transition from acute to post-acute arenas. This study aligns with the literature review findings and confirms hand-off communication is a precursor to preventing readmission.

How Project Impacted Clinical Site and Next Steps

This project demonstrated patient hand-off communication can improve patient readmission (reduction of events). This creates an opportunity to establish optimal outcomes for patients transferring from acute to post-acute care settings such as IRFs, thereby reducing financial costs to patients, payers and the organization. Staffing shortages and COVID-19 have directly impacted staff resilience and therefore practice change at any level may be difficult to create, implement and sustain.

Implications for Practice, Education, Policy and Research

UMMC case management staff and IRF liaisons believe there are opportunities
for enhanced communication prior to, during and post-patient transfer. Occurrence of
increased patient transition delays develop due to rehab liaisons or IRF providers
requesting additional testing or updated notes. Providers have voiced concerns with a
lack of understanding related to transparency of care and ability to transfer patients
safely, efficiently and effectively. Readmission may occur due to lack of patient
information. As identified through nursing survey, a standardized process for sharing
patient information during transition from UMMC to IRF is not consistent with practice
(see Figure V).

The World Health Organization (WHO) patient safety tool kit was used in
conjunction with the Iowa Evidence-Based Model, allowing for the creation of an
evidence-based gap analysis that was utilized when attempting to identify opportunities
for process improvement related to patient safety. As evidence demonstrates, there are
opportunities for improvement related to patient outcomes with identification of
readmission rate instability (see Figure I).

UMMC readmission rates vary with highs and lows from month-to-month
suggesting variations in practice for transition of patients from acute to post-acute care
settings. When implemented for a short project period, consistent use of *POST-ACUTE*
hand-off tool appears to statistically impact (reduce) readmission events. Implications for
practice include continuous education for nursing practice with regards to the importance
of standardized and accurate nursing hand-off communication. Implementation and
hardwiring of communication practices will create a greater patient safety environment

and the process of hand-off should not be rushed nor interrupted as this may prevent sharing of important patient care factors.

Culture for each organization must be evaluated with determination of best process for clinical staff involvement. While this project was well received by nursing leadership, it would be difficult to implement on a larger scale to assure success, due to current environmental stressors (COVID-19 and nursing shortages). Future steps will be slow implementation with monitoring and celebration of success.

Limitations

Limitations include small number of patients transferred from UMMC to Methodist Rehabilitation Hospital (30) and participating nurses (10), completing pre-project survey but failing to complete post-project survey. This was potentially related to current health care environment of COVID-19 pandemic surges and nursing shortages that have occurred since the initial inception of the pandemic. Nurses have been forced to increase patient ratios in addition to patient acuity being higher as demonstrated through a case mix index of greater than two (2). A larger nursing sample is needed to determine nursing satisfaction with the process.

Project was limited to one organization (UMMC) which carries a unique environment of patient populations with high poverty rates, low numbers of insured individuals, and limited access to health care. Mississippi was declared the poorest state in the nation for 2022 by World Population Review. Median household income is $45,792 and a poverty level of 19.6% and does not offer expanded Medicaid (see Figure VII). Further limitations include a short time span of three months for hand-off tool implementation, evaluation, data collection and analysis in addition to staff's manual

completion of hand-off tool.

Conclusion

The purpose of this study was to evaluate the impact of nursing hand-off communication, between acute and post-acute care settings, with implementation of a new hand-off communication tool (*POST-ACUTE*) for the prevention of patients readmission. The completion of *POST-ACUTE* communication hand-off tool demonstrated statistical significance in the prevention of patient readmission when the hand-off tool is used. More research is needed on nursing hand-off communication and the *POST-ACUTE* hand-off tool with larger populations and additional post-acute care organizations such as skilled nursing homes, long-term care, home care and others. To prevent additional manual work in the current environment of COVID-19 and nursing shortages, the tool should also be studied electronically with auto completion based on data available at time of transition within each individual medical record.

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TABLES

Table 1: Literature Review & Synthesis

Table I. Literature Review Table

Author Year	Study Design & Purpose	Sample Characteristics & Setting	Variable Independent/ Dependent	Data Analysis	Main Findings	Level of Evidence
Dunn, et al., 2011	**Design:** Agent-based simulation design model. **Purpose:** model the risk of adverse events in a clinical process	**Sample:** n = 101 individuals in-patient transfers with process using four human agents, six objects, and 186 activities, of which 31 are driven by an empirically defined likelihood. **Setting:** acute care hospital setting	IV 1. Patient identification confirmed (DOB, ID) IV 2. Transfer form was completed IV 3. Misidentification identified or caught IV 4. adequate infection control processes were followed DV1. Adverse event	500 simulations were conducted, 345 were completed, 24.3% did not ensure adequate infection control precautions as a result of receiving misinformation	Distribution of trajectories for the misidentification scenario indicates the gradual amelioration of risk for a patient with incorrect details during transition or transfer. The inter-ward patient transfer process simulations resulted in 97.4% with misidentification and 96.4% for infection control scenario.	II, B
Clanton, et al., 2017	**Design:** Randomized Trial, multivariate stepwise regression	**Sample:** n= 5157 unique patient-admissions stratified into two study groups. 47.3 % male formal handoff group	IV 1. SBAR completion IV 2. APACHE II Score IV 3. GCS IV 4. APR-DRG	Modified APACHE II score 8.06 and 8.31, formal and focused handoff groups respectively. APR-DRG severity	No significant differences in mortality or negative events among patients. Results suggest formal handoffs offer no significant advantages in	I, B

	analysis was conducted for all groups.\n\n**Purpose:** compare the effect of a rigorous formal handoff approach to a minimize handoff process	46.8 male focused handoff group; Age mean 58.1 and 59.1 (formal and focused handoff groups, respectively)\n\n**Setting:** 572-bed teaching hospital	IV 5. LOS\nDV 5. Adverse Event	of illness mean 2.34 and 2.36 (formal and focused handoff groups, respectively). There were no statistically significant differences ($p < 0.05$) between the two handoff groups.\n\nA negative event occurred 23.2% of patient admissions; an adverse event occurred 16.7% of patient admissions.	patient care and may be unnecessarily time consuming compared to a minimalistic approach.	
Ryan et al., 2017	**Design:** Retrospective, longitudinal study\n\n**Purpose:** Evaluate hospital participation with value-based reforms to improve Medicare's	**Sample:** Hospital readmissions for n=2837 hospitals from 2008-2015\n\n**Setting:** Acute care hospital settings	IV 1. Participate in meaningful use\nIV 2. Participate in ACO\nIV 3. Participate in BPCI program\nDV1. Readmission	Meaningful use participation -0.76 ↓ (AMI 95% CI); HF -1.30% ↓(95% CI); -9.56% ↓for PN, (95% CI).\n\nACO -.094↓ (95% CI)	Hospitals participating in meaningful use, ACO or BPCI programs demonstrated a reduction in readmissions.	II, B

	Hospital Readmission Reduction Program.					I, B
Santana, et al., 2017	**Design:** Two arm RCT **Purpose:** To assess the efficacy of an electronic discharge communication tool (e-DCT) for preventing death or hospital readmission	**Sample:** 1953 randomized participants **Setting:** Canadian tertiary care center's internal medicine medical teaching units.	IV 1. Gender IV 2. Ethnicity IV 3. Race IV 4. Marital status IV 5. Education level IV 6. Employment status IV 7. Has a family physician IV 8. Lives alone IV 9. History of ETOH abuse IV 10. History of SUD IV 11. Number of comorbid conditions IV 12. Health Status Score IV 13. LOS DV. Readmission	23% of patients discharged were readmitted; 80% power and a type 1 error rate of 5%, required 6868 participants to allow detection of a 25% relative reduction in primary outcome in the intervention group. t-test compared LOS All analysis were conducted using SAS v 9.2	The primary outcome was a composite of death or readmission to any provincial acute-care hospital within 3 months of discharge. Secondary outcomes were the occurrence of patient-reported adverse outcomes (any undesirable health issues reported by the patient after hospital discharge within 30-days). There were no statistically significant variations between groups of 30-60- and 90-days post hospital discharge.	

DOB = date of birth; SBAR= situation, background, assessment, recommendation tool; APACHE = acute physiology and chronic health evaluation tool; GCS = Glasgow coma scale tool; APR-DRG = all patient refined diagnosis related groups; Ami = acute myocardial infarction; HF = heart failure; ACO = accountable care organization; LOS = length of stay; BPCI = bundled payment care improvement; ETOH = ethanol alcohol; SUD = substance use disorder; ↓ = reduction. (Melnyk, et al., 2019)

TABLES

Table 2: Demographic of Sample Patients with Descriptive statistics of Independent Variables.

	Medical Records Pre-Project Reviewed (n=50) Mean (SD), n (%)	Medical Records Post-Project Reviewed (n=30) Mean (SD), n (%)
Age, years (mean, SD)	64.2 (14.4)	66.8 (14.1)
Gender		
Male	24 (48.0%)	16 (53.3%)
Female	26 (52.0%)	14 (46.7%)
Race		
Black	26 (52.0%)	17 (56.7%)
Caucasian	24 (48.0%)	13 (43.3%)
Nursing Communication		
Completed	0 (0.0%)	22 (73.3%)
Other	50 (100.0%)	08 (26.7%)
Readmitted		
Yes	16 (32.0%)	3 (10.0%)
No	34 (68.0%)	27 (90.0%)

Nursing communication "Other" includes partial forms of written documentation or verbal communication to receiving facility.

TABLES

Table 3: Logistic Regression Predicting Likelihood of Readmission Prevention.

	B	S.E.	Wald	df	p	Odds Ratio	95.0% C.I. for Odds Ratio	
							Lower	Upper
Race (Black)	-.58	598	933	1	.33	.56	.17	1.81
Gender (Female)	-.164	.61	.07	1	.79	.85	.26	2.79
Age (years)	.09	.39	.05	1	.82	1.09	.51	2.33
Nursing Communication			9.974	2	**.01**			
Completed	-3.27	1.15	8.12	1	**.01**	.04	.00	.36
Partially Complete	-1.48	.65	5.23	1	**.02**	.23	.06	.81

*a. Variables(s) entered on step 1: Race, Gender, Age, and Nursing Communication. **Bold** font variables indicate statistical significance p < 0.05.*

FIGURES

Figure I: Graph 1. Readmissions, IRF to UMMC CY 2021
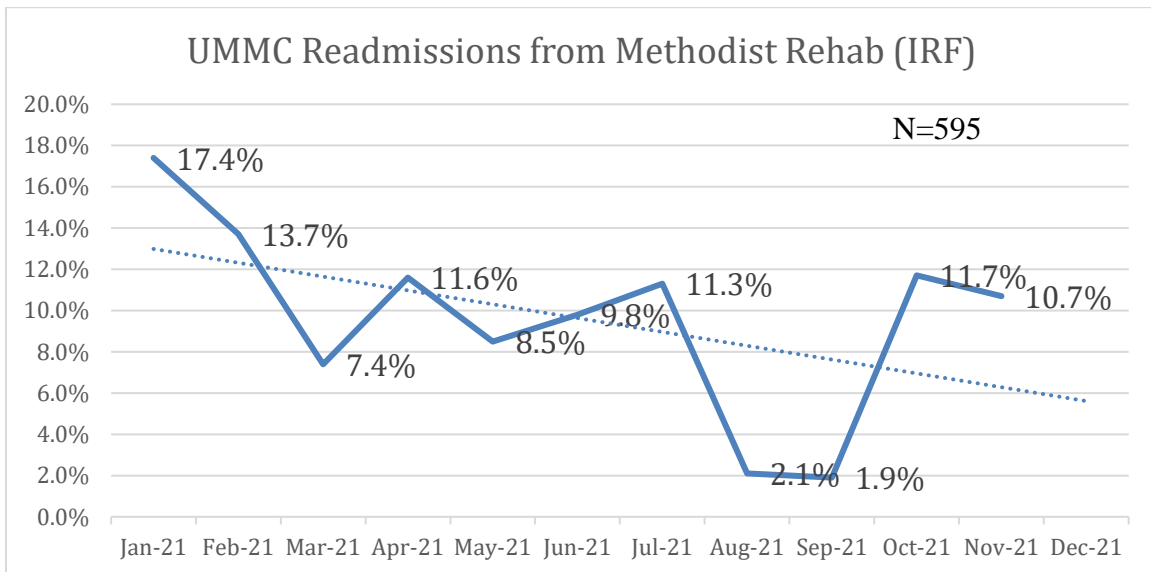
GRAPH 1. *Linear trend line reveals a downward trend in readmissions, patients admitted to Methodist Physical Rehabilitation (IRF) from UMMC, then returning from IRF to UMMC for readmission. The graph further demonstrates unstable control of readmission adverse patient events, requiring intervention to prevent highs occurring within the process.*
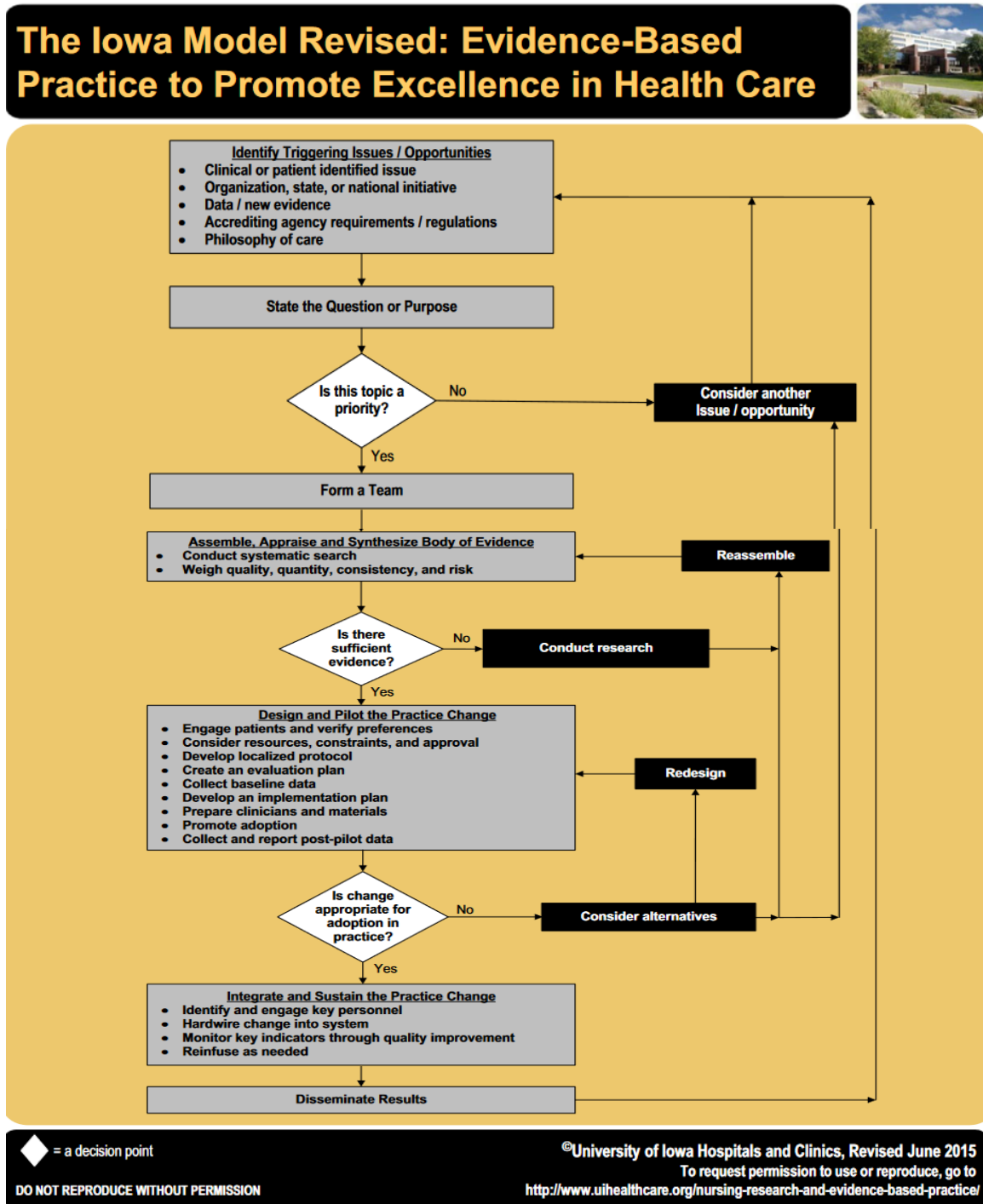
Figure II: WHO Gap Analysis Tool
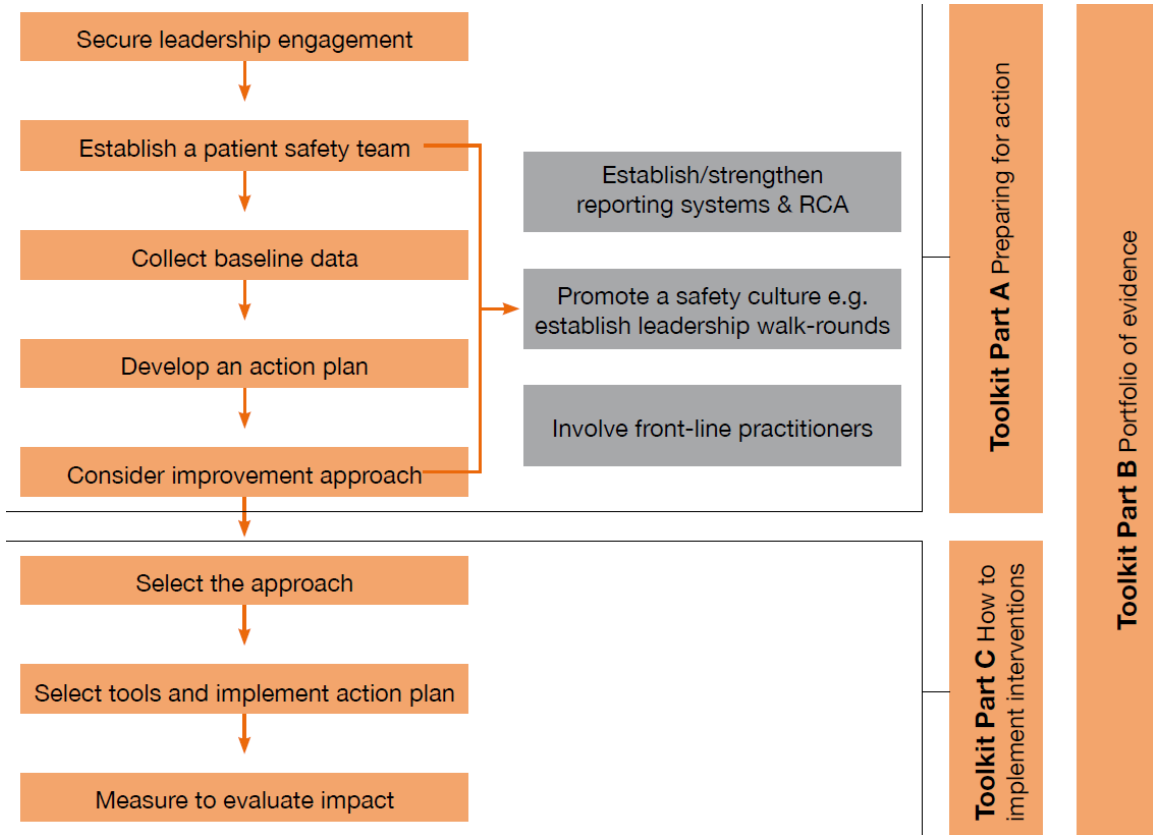
Figure III: Iowa Evidence-Based Model
Iowa Evidence-Based Model

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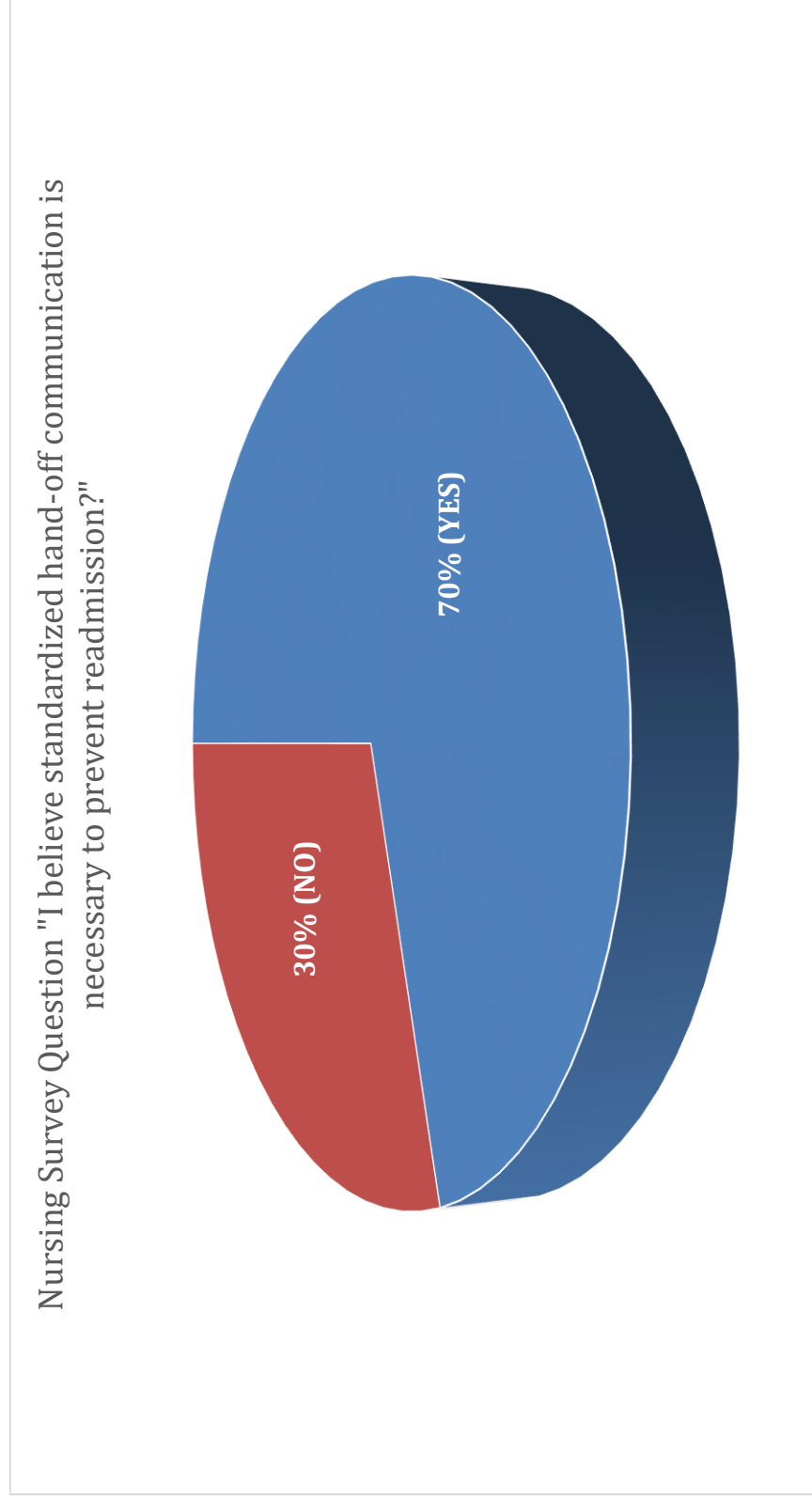
Figure IV: Graph II: Nursing Survey Perception of Hand-Off Communication, Likert Scale 1-5.

Nursing Survey Results
Questions on Likert (pre-project)

N = 10

- 15 minutes or less is all the time required to provide hand-off communication
- Hand-off elements reported are appropriate
- I use same process for each patient transferred
- Standard hand-off tool or process is currently in place
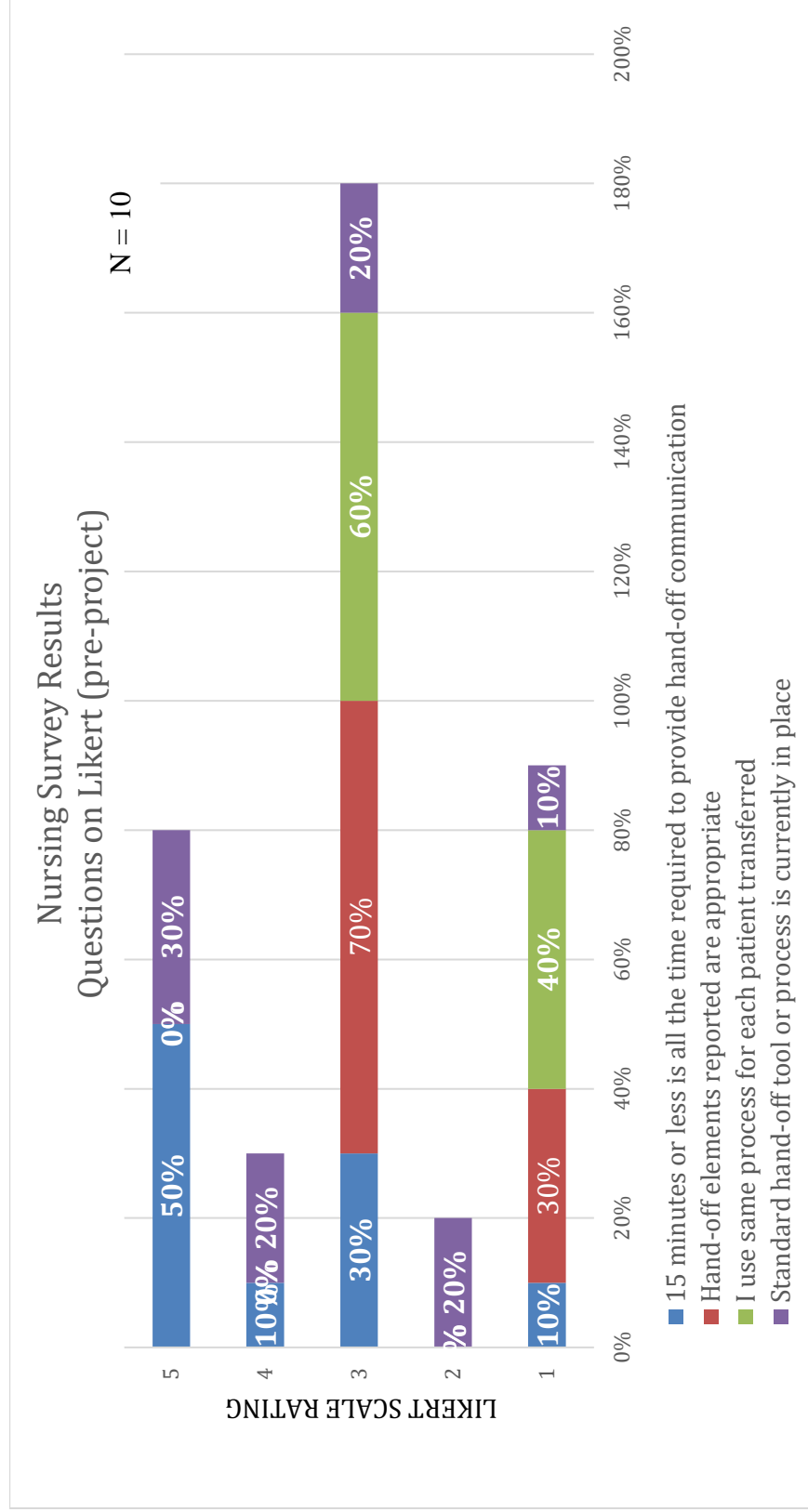
The above graph demonstrates Likert scale use 1-5 where 1 = Never; 2 = Almost Never; 3 = Sometimes; 4 = Almost Always; and 5 = Always

FIGURES

Figure V: Graph III: Nursing Survey Perception Regarding Hand-Off Communication and Prevention of Readmission.

Nursing Survey Question "I believe standardized hand-off communication is necessary to prevent readmission?"

Figure VI: Graph IV: Nursing Survey Response, Multiple Choice Question.

Nursing Survey Question: "If receiving faclity has questions concerning the patient after patient transfer, I (A) Do not follow-up with facility, patient has been trasnferred; (B) Do not follow-up with facility, HIPAA violation; (C) Follow-up with facilit

D. ■ None of the Above

C. ■ I follow up with facility and provide additional information requested

B. ■ I do not follow-up with facility as this would be a HIPAA violation

A. ■ I do not follow-up with facility, patient has been transferred

If receiving faclilty has questions concerning the patient after transfer, I...

FIGURES

Figure VII: Graph V: Represents National household income, 2022, obtained from World Population Review.

2022 Household Income per State
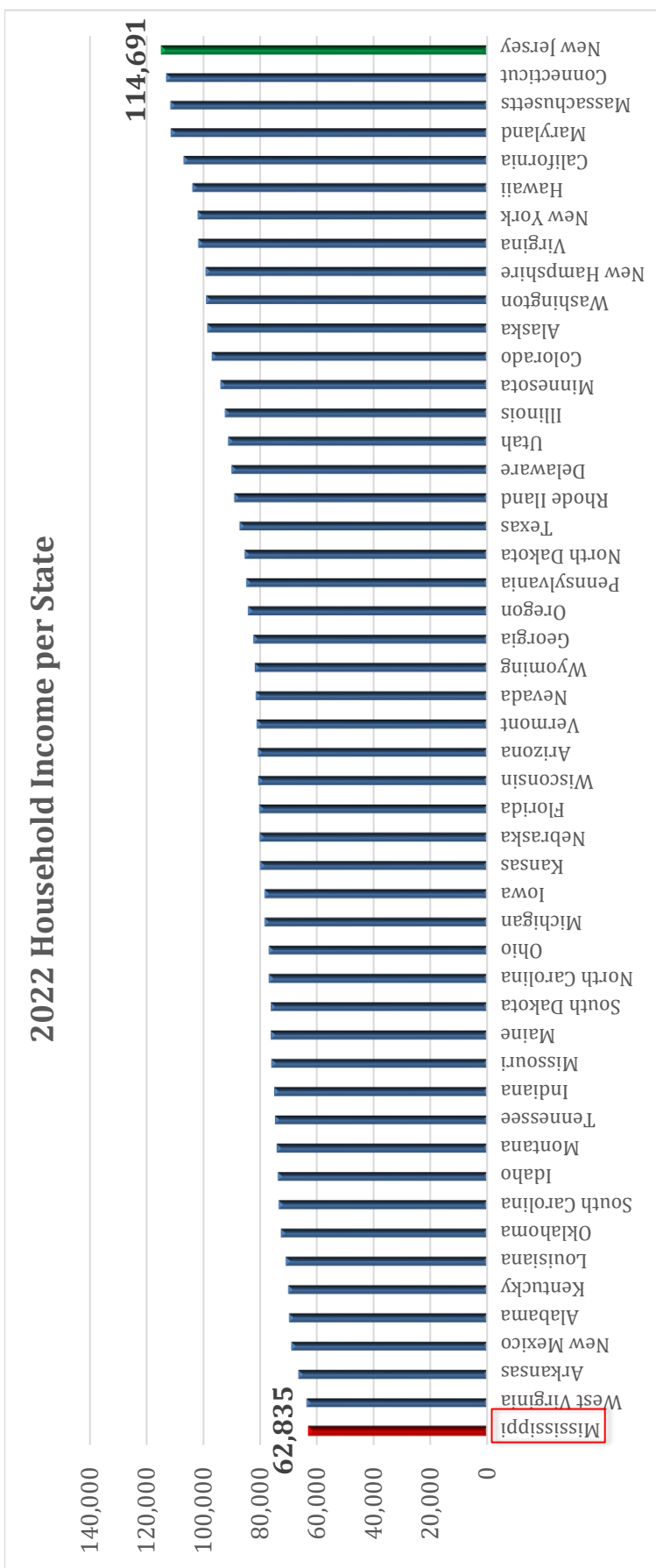
The above graph demonstrates the level of household income for Mississippi, which also demonstrates the inability for Mississippians to obtain needed healthcare due to cost (lack of extended Medicaid) and access. Lower household income results in lower taxes, less monies to attract employers into the state, build solid roadways and public transportation.

FIGURES

Figure VIII: POST-ACUTE Hand-Off Communication Tool

POST-ACUTE Hand-Off Communication Tool   Designed by: Penny Gilbert

Plan:

Observation:	**T**herapy Notes: Will be sent w/ Patient
☐ **Pain Scale:** 1 2 3 4 5 6 7 8 9 10 Pain Med/Last Dose:_____ _____ **SKIN**: ☐ Pink ☐ Jaundice ☐ Pale ☐ Cyanotic ☐ Other:_____ ☐ Skin Integrity:_____	☐ PT ☐ OT ☐ Speech Therapy Highlights:

Assessment: list recent assessment	**C**ognizance/Capacity:
☐ T:_____ P:_____ R:_____ BP:_____ ☐ Skin:_____ Last BM: _____ Lung Sounds: ☐ Clear ☐ Bilateral ☐ L : ☐ Upper ☐ Lower _____ ☐ R : ☐ Upper ☐ Mid lobe ☐ Lower ☐ Rhonchi ☐ Bilateral ☐ L : ☐ Upper ☐ Lower _____ ☐ R : ☐ Upper ☐ Mid lobe ☐ Lower ☐ Rales ☐ Bilateral ☐ L : ☐ Upper ☐ Lower _____ ☐ R : ☐ Upper ☐ Mid lobe ☐ Lower ☐ Wheezing ☐ Bilateral ☐ L : ☐ Upper ☐ Lower _____ ☐ R : ☐ Upper ☐ Mid lobe ☐ Lower ☐ Strider ☐ Bilateral ☐ L : ☐ Upper ☐ Lower _____ ☐ R : ☐ Upper ☐ Mid lobe ☐ Lower ☐ Oxygen:_____	☐ Alert & Oriented x 4 ☐ Alert: Not Oriented to:_____ ☐ Lacks Capacity ☐ Guardian:_____ ☐ Contact #:_____ ☐ Healthcare POA:_____ Contact #:_____ ☐ State Guardian:_____ Contact #:_____ **U**nderstands Transfer Need: ☐ YES ☐ NO ☐ N/A

Treatment/Mobility☐ additional information on reverse of this form.
☐   MARs will be sent with Patient   ☐   Special Tx/Therapy:_____   ☐   Dressing/Changes:_____   ☐   Wound Vac (Location):_____   ☐   Walker   ☐ W/C   ☐ Assistance ☐ 1 person ☐ 2 person ☐ More than
Expectation of readmission: _____**HIGH**_____**MODERATE**_____**LOW**

Instructions for completion:

Plan: Provide the general history & plan for care/discharge. Example: (57 y.o. female admitted with pneumonia; has responded well to treatment, experiences deconditioning and requires rehabilitation therapies. DC home with family upon IRF completion.

Figure IX: Nursing Survey

Nursing Communication Study Survey

Record ID: Please enter an eight (8) digit

Identification number that only has meaning

to you and that you will easily remember: _____

---

15 minutes or less is all the time needed to provide hand-off communication for safe patient transition

O 1= Never

O 2= Almost Never

O 3= Sometimes

O 4= Almost Always

O 5= Always

I feel hand-off information elements reported are appropriate to prevent patient readmission?

O 1= Never

O 2= Almost Never

O 3= Sometimes

O 4= Almost Always

O 5= Always

I use the same process for each patient transferred to Methodist Rehabilitation Hospital?

O 1= Never

O 2= Almost Never

O 3= Sometimes

O 4= Almost Always

O 5= Always

If the receiving facility (Methodist Rehabilitation Hospital) has questions concerning the patient after the patient has transferred, I do the following:

A. I do not follow up with the receiving facility as the patient has been transferred.

B. I do not follow up with the receiving facility because it would be a HIPAA violation.

C. I follow-up with the receiving facility and provide any additionally requested information.

D. None of the above.

O A

O B

O C

O D

A standardize hand-off tool or process is currently in place and used consistently.

O 1= Never

O 2= Almost Never

O 3= Sometimes

O 4= Almost Always

O 5= Always

I believe standardization of hand-off communication is necessary to prevent patient readmission.

OYes

ONo

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