Interhospital Transfer Timeliness

Evaluation of a Standardized Transfer Process

by

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EVALUATION OF A STANDARDIZED TRANSFER PROCESSS

by

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Abstract

Objective: The transfer of patients between acute care settings is a frequent occurrence in healthcare for patients needing high-level care or specialized services not offered at the current facility. Patients benefit from an interhospital transfer, but the process is risky and encounters delays. Poorly conducted transfers lead to poor outcomes. Variabilities in interhospital transfer exist across healthcare organizations. Standardizing the transfer process can minimize risks and improve the quality and safety of transfers. The purpose of this quality improvement project was to evaluate the use of the emergency medical condition protocol as a standardized method used to guide the timeliness of interhospital transfers.

Methods: A retrospective comparative study was conducted in which interhospital timeliness as measured before and after the implementation of the emergency medical condition protocol. Interhospital transfer measurements were achieved using the assigned emergency medical condition protocol, from the time of transfer request to the time of patient arrival at the receiving facility. The protocol, currently in place at an academic medical center, was not consistently used by transfer center nurses. The project was exempt from institutional review board approval.

Results: Transfer data collected for two periods reflect the frequency of use for the protocol and does not reflect the timeliness of interhospital transfers. Non-significant differences were detected for the time to physician call for transfer request, time to bed assignment, and time of arrival after acceptance.

Conclusions: The project's findings showed that use of a standardized protocol was associated with improved transfer acceptance time as patients transitioned between healthcare organizations.

Keywords: *interhospital transfer, transfer standardization process, and transfer protocol.*

Introduction

A substantial number of admissions to academic medical centers (AMCs) are the result of interhospital transfers (IHTs). Approximately 3.5% (about 1.5 million) of all hospital inpatient admissions are the result of IHTs (Hernandez-Boussard, Davies, McDonald, & Wang, 2017). An interhospital transfer (IHT) is defined as the movement of a patient outside a primary care hospital to a facility with the capabilities and resources needed for definitive care (Emergency Nurses Association, 2015). Basically, an interhospital transfer is often required when the diagnostic and therapeutic facilities necessary for patient care are not available where patients are currently located (Sethi & Subramanian, 2014). IHTs have become an essential component of safe patient care because of an increased need for specialized treatment in areas such as trauma, cardiology, and neurosurgery (Sethi & Subramanian, 2014).

The emergency department (ED), intensive care unit or medical/surgical units may initiate an IHT (Sethi & Subramanian, 2014). In some IHT cases, patients require off-shift emergent consultations that are only available at an AMC. Some patients are transferred for reasons beyond medical necessity. Some cases are transferred for reasons where the indications are not clear. Also, patients and families may request a transfer for continuity of care or may be dissatisfied with care at the current facility (Herrigel, Carroll, Fanning, Steinberg, Parikh, & Usher, 2016). Regardless of the frequency of IHTs, the implementation of the transfer process is mainly non-standardized and without clear guidelines (Bosk, Veinot, & Iwashyna, 2011).

The Emergency Medical Treatment and Active Labor Act (EMTALA) (2012), requires a hospital to transfer a patient to a facility where the services are available or when the benefits of transfer outweigh the risks to the patient (Centers for Medicare & Medicaid Services, 2012). This policy is often applicable to a patient who has an emergency medical condition (EMC). As set forth in the Public Health and Welfare Act (2018), specifically in the provision on Health Insurance for the Aged and Disabled, an EMC is a condition manifesting itself by acute and severe symptoms of enough severity that the absence of immediate medical attention could result in placing an individual's health in serious jeopardy, severe impairment to bodily functions, or acute dysfunction of any bodily organ or part.

Although providing immediate medical attention for an EMC might require an IHT, IHTs are complicated, risky, and a significant source of avoidable medical errors (Herrigel et al., 2016). In addition, more resources, higher healthcare costs, and longer length of stay are associated with transfer patients than with nontransferred patients (Golestanian, Scruggs, Gangnon, Mak, & Wood, 2007). Furthermore, adverse events have been reported for up to 30% of IHTs (Ligtenberg et al., 2005). Minimizing errors during the transfer process is necessary. According to the Agency for Healthcare Research and Quality (AHRQ; 2003), the development and implementation of safety procedures and processes are ways to reduce medical errors and improve patient safety. Implementing a standardized IHT process has been shown to reduce medical errors and improve patient safety (Herrigel et al., 2016). Lack of uniformity may lead to variations in the quality of the transfer

process and poor patient outcomes. Thus, IHT standardization is necessary to improve the quality and safety of the transfer process (Gupta & Mueller, 2015).

Problem Statement

A Nurse manager working in a transfer center of a 495-bed AMC witnessed variations in the transfer process across service lines. Some transfers were more efficient, allowing for timely transfer and bed placement, whereas others were extended and delayed. Some transfers required specialized services and timely access for a better patient outcome. In addition, healthcare partners of the AMC had expressed concerns regarding delays in the transfer process. These frustrations put the AMC in jeopardy of losing its status as the institution of choice for transfers for some of these partners. Partners have threatened to pursue other facilities as collaborative associates. To maintain the relationships and to ensure that the organization continues to provide safe and effective care to the community, the AMC needed to improve the timeliness of the current transfer process. The lack of timeliness of IHTs is a problem that transfer nurses can address. The emergency medical condition (EMC) protocol, which was already in place at the AMC but not used consistently, had the potential to be a standardized transfer method. Thus, it was used for the quality improvement project.

Purpose

The purpose of this quality improvement project was to evaluate the use of the EMC protocol, established by the AMC, as a standardized method used to guide the timeliness of IHTs. The evidence-based practice question addressed during this project was the following: “In the interhospital transfer of patients, how might use

of the protocol for emergency medical conditions improve transfer timeliness?" The minor hypothesis is the following: "There is no relationship between the use of the protocol for emergency medical condition and the timeliness of interhospital transfers.

Objectives

The objectives for this quality improvement project were the following:

- To explore the relationship between EMC and transfer timeliness before and after mandatory use of the EMC protocol.
- To determine an association between the use of the EMC protocol and transfer timeliness.
- To identify gaps in performance that cause delay and impact the transfer process.
- To adopt the EMC protocol as the standardized transfer method

The expected outcomes were the following:

- Consistency in using the EMC protocol to drive the transfer process.
- A decrease in delays from transfer request to patient arrival time.

Emergency Medical Condition Protocol

As outlined in the AMC's transfer policy, the EMCs were categorized as emergent, urgent, or non-urgent (University of Illinois Hospital & Health Sciences System (UIH), 2015). Emergent transfers were considered for patients who required removal and admission within 90 minutes or less from the initial request. Patients needing an urgent transfer were not faced with life-threatening conditions but

required transfer and access within 24 hours or less from the initial request. Non-urgent patients required transfer and admission within 48 hours or less from the initial application.

Background and Significance

The transfer center (TC) is the hub of organizational throughput. Use of TCs increase access to care across organizations (TeleTracking, 2014). The TC is a direct access point for IHTs. It receives calls through the Illinois Provider Access Line (IPAL) from all geographical areas within the state of Illinois. It is designed to ease the transfer of patients needing care at the AMC and to provide service to referring physicians. The TC operates 24 hours a day, seven days a week . It is run by registered nurses (RNs) who are responsible for coordinating and implementing safe and timely transfers of patients needing a higher level of care (TeleTracking, 2012).

As a patient-centered organization, the AMC is committed to providing safe, high-quality, and cost-effective care to patients. The organization prides itself on prioritizing the patient. As a tertiary care center, the organization also has an obligation to the providers and patients to have the capacity to provide care when needed. The decision to accept and admit a patient is dependent on several factors, including current ED capacity, hospital occupancy, and changes in the level of care of admitted patients.

RNs in the TC improve the efficiency of resource utilization by ensuring the timeliness and appropriateness of each transfer. RNs operate intending to accept patient transfers with one phone call. They make quick decisions regarding patient care and are competent and qualified to collaborate with relevant care partners to ensure the optimal level of patient transfers. RNs are empowered to auto-accept time-sensitive cases of patients whose

severity of symptoms requires an immediate transfer. Attending physicians are made aware of an auto-accept at the end of the transfer process.

Highly autonomous decisions made by nurses require them to be clinical scholars to ensure best practices for implementing a successful patient transfer. Nurses guide the transfer process and ensure consistency of the transfer acceptance procedure. Other responsibilities of the RN include, but are not limited to, the following:

- Determine appropriate service-line contact to facilitate and accept a transfer
- Navigate the electronic database in real-time to document healthcare information.
- Corroborate with attending physicians for the proper level of care, diagnosis, and EMC status.
- Coordinate efforts between facilities to organize safe transfer by dispatching an appropriate-level ambulance.
- Collaborate with the unit charge nurse to ensure proper patient placement.
- Ensure safe patient hand-off by providing the bed assignment and number to call the nurse-to-nurse report.
- Monitor all activities associated with the transfer to minimize delays.
- Obtain administrative transfer approval when needed.

In critical, time-sensitive cases where bed access is not immediately available, transfer center nurses (TCNs) at the AMC use the ED as an intermediate destination. The TCN directly communicates with the ED attending physician and charge nurse to coordinate retrieval efforts. Nurses in the TC, through consultation with the hospital operation's administrator and staffing personnel, ensure that a critical care resource RN is available to provide safe and quality care to patients while in the ED. The critical care resource nurse is

used to minimize patient risk for adverse events, thereby improving patient outcomes (Pappas, Kowalski, & Denholm, 2016). TCNs ensure that the right patient is placed in the right bed, at the right level of care, without delay (TeleTracking, 2014).

A factor that contributes to the timeliness of IHT is the availability of beds. When transfers are delayed due to capacity issues, TCNs provide follow-up communication and feedback to the outside facility waiting to complete a transfer. Follow-up calls occur every 4 to 6 hours with documentation of delay and patient status. TCNs provide input to the service line physicians and unit charge nurses regarding the state of the transfer.

Collaborative agreements are arranged with various hospitals to receive patients requiring a higher level of care or needing specialized services not offered at the current facility. Patients are transferred for further evaluation and treatment. A request for transfer is evaluated and prioritized based on the patients' EMC and the availability of resources. Multiple services and subspecialties utilize the TC to facilitate patient care. Significant variations exist between service lines. TCNs navigate through various process maps to facilitate timely transfers based on service-line acceptance. However, the lack of standardization among services can lead to patient and family dissatisfaction or even harm (Lloyd, 2018).

Before the implementation of the quality improvement project, there was no standardized method used to prioritize a transfer. Transfers were arranged based on the service-line request, process maps, and the TCN initiating the procedure.

Review of Literature

A literature review was conducted on IHTs to determine whether researchers had found that a standardized protocol improved the timeliness of the transfer process. A search of the literature was conducted between January 2018 and March 2018 using Medline (EBSCO), Medline (Ovid), Cochrane, CINAHL, Google Search engine, and the Institute for Healthcare Improvement (IHI). The following search terms were used: *interhospital transfer*, *transfer standardization process,* and *transfer protocol*. A manual search of the article bibliographies was performed to identify other studies for review. Also, to rate the selected articles, a critical appraisal was conducted using the following levels of evidence, as described my Melnyk and Fineout-Overholt (2015).

- Level 1V: Evidence from well-designed case-control and cohort studies. (One study was within this evidence level.)
- Level V: Evidence from systematic reviews of descriptive and qualitative studies. (One study was within this evidence level.)
- Level V1: Evidence from single descriptive or qualitative studies. (Two studies were within this rating scale.)
- Level V11: Evidence from the opinion of authorities and reports of expert committees. (One study was within this rating scale.)

Many studies conducted on IHT examined the complexity of transfers and the associated mortality rate. Of the five articles that were selected and included for the literature review, three were original research articles. The materials consisted of the following: a qualitative descriptive investigation about the communication

hand-off practices of TCs, a qualitative observational (nonparticipant) study about the best practice recommendations for TCs, and a quantitative retrospective cohort study about the effect of a universal handover tool on IHT patients. Finally, one result of the literature search was a practice-related article on how high-reliability organizations (HROs) replicated in a healthcare setting can improve throughput by creating a centralized TC.

Communication Hand-off Practices

Effectively communicating the need for transfer requires reporting of a patient's clinical information. Specifically, it involves verbalization of a client's condition, plan of care, and continuity of care (Iwashyna, 2012). Authors of each article explored the role of communication or hand-off during an IHT. How clinical personnel was informed of an IHT acceptance was either by a mandatory three-way recorded discussion, a handover tool, or through the transfer center nurse (TCN). TCNs spearhead timely patient transfers. In one study, a three-way recording of the transfer process was nearly uniform in the 32 academic medical centers that participated in the study (Herrigel et al., 2016). In 38% of the hospitals, the TC used a registered nurse (RN) trained in critical care as the point of contact. Also, a standardized system was in place for providing feedback to the referring facility. According to Herrigel et al. (2016), a standardized intrahospital hand-off prevents medical errors and reduces near misses, yet no universal standardized processes exist for IHT handovers. In the same study, a recorded nurse-to-nurse hand-off report was conducted in 23% of the hospitals. In a survey of 10 TCs, it was the

standard practice for the transfer nurse to receive and disseminate the clinical information as needed. This process allowed for rapid access to the AMC.

Another study focused on a 626-bed quaternary care academic center that received transfers from more than 350 facilities (Theobald, Choma, Ehrenfeld, Russ, & Kripalani, 2016). A completed handoff tool was noted in the records of 85% of transferred patients at the time of transfer, and 15% had incomplete or no forms. The transfer tool was developed because the discharge summaries previously had been used as a handoff tool. Discharge summaries are frequently incomplete. Documentation was not standardized, thus increasing the risk of communication errors and transfer delays. Analysis of the literature shows how standardized processes reduce risk and improve patient outcomes.

Coordination of the Transfer Process

The literature search revealed that variations exist in the coordination of the transfer process. IHTs are challenging to coordinate, and efforts are made to improve management of the transfer. Coordination is necessary to ensure that the care provided at the current facility is maintained at the same level or higher during the transfer process (Sethi & Subramanian, 2014). In a multicenter study (Herrigel et al., 2016), the process and quality control for coordinating a transfer was highly variable. Of the hospitals included in the survey, 81% required a clinical update to the TCN from the time of acceptance to the time of arrival. The acceptance time varied from 2 to 4 hours (13%) to 24 hours (38%). The authors of the article did not identify the reasons for the delays. No standard process existed between hospitals.

In a study of 10 TCs (Newton & Fralic, 2015), 70 % of the hospitals used some form of a workflow process. According to Newton and Fralic (2015), workflow pathways provides standardization to phases of a procedure, clarify tasks, define input and output, and establish expectations. Staff in the study by Newton and Fralic (2015), had a clear understanding of their roles. Processes were consistent, and uniformity led to highly- reliable service and improved outcomes. Also, an auto-accept policy of time-sensitive cases was in place at several sites. (Auto- accept allows for expedited patient acceptance.) Finally, all of the sites had performance data in various formats, and the information technology systems used in the transfer process were fragmented.

In another study (Theobald et al., 2016), completion of a hand-off tool was mandated before the patient's transfer. The instrument was not only used to communicate patient information but also used to measure the timeliness of the transfer. According to Theobald et al. (2016), timeliness is one of the Institute of Medicine's six aims for care delivery.

Standardization:

Standardization involves developing and implementing processes that direct people to do the same thing the same way each time. People are trained on procedures and areas needing improvement are easily identified when steps are standardized (Institute for Healthcare Improvement Multimedia Team, 2017). The authors of one practice-related article (Davenport, Carter & Echternach, 2018), examined how HROs performed successfully because of standardized processes, collaborative efforts, and operational sensitivity. A healthcare organization

mimicked the principles of high-reliability in its journey to create a TC to improve throughput. When departments function in isolation, goals and priorities are misaligned. A lack of coordination of transfers, patient placement, and hospital operations jeopardizes patient safety, quality care, and patient outcome (Davenport et al., 2018). The principles of HROs were used to implement change and integrate efforts through the development of an operation center. The operation center is the hub where information is acquired, decisions are made, and workflow processes are aligned to improve patient outcome and throughput (Davenport et al., 2018).

Remaining Findings

Other articles included in the literature review were examinations of the importance of timely IHT and the effect of IHT delays on patient outcome. Ward et al. (2014), conducted a quantitative, retrospective descriptive analysis of a secondary data set to improve the timeliness of IHT of patients with ST-elevation myocardial infarction (STEMI) requiring percutaneous coronary intervention (PCI). STEMI is a time-sensitive condition that requires immediate response, without delay, to preserve the cardiac muscle (AHRQ, 2013). When hospitals cannot manage care for patients with a STEMI, an IHT is initiated to a PCI capable facility (National Institute for Healthcare Excellence, 2013). In their study, Ward et al. (2014), examined the effects of the delayed transfer on patient outcomes. They hypothesized that transferred patients rarely achieve timely perfusion due to delays in the transfer process. Two process measures were used to quantify the timeliness of care:

1. Door-in-door out (DIDO). DIDO measured the length of stay in the emergency department (ED) of the referring hospital.
2. Medical-contact-to-balloon (MCTB). MCTB measured the time from the contact at the transferring facility, through re-perfusion at the PCI center.

The goal was to have 90% of the patients to achieve re-perfusion within 120 minutes. The authors identified 41 EDs that transferred 620 patients with a STEMI between 2008 and 2012. As part of the methodology for the study, a clinical nurse collected data from documents scanned in the electronic health record. The nurse completed a data dictionary and case report form with Research Electronic Data Capture (REDCap). REDCap is a workflow tool that uses software designed for rapid development and distribution of electronic data to support clinical research (Harris, Taylor, Thielke, Payne, Gonzalez, & Conde, 2009). For unavailable data, the nurse contacted the referring facilities and transporting agencies in an attempt to retrieve the information. Both operational and clinical data were extracted. Findings from the study revealed that patients were transferred between 60 and 210 miles to a PCI center. The median overall MCTB was 135 minutes. The median DIDO was 74 minutes, the median total transportation time was 31 minutes, and the central catheter (Cath) laboratory time was 30 minutes. Delays were identified in the time taken to activate the Cath lab, to coordinate patient care, and to deploy the emergency medical service. Stemming from the study was a recommendation to empower the ED staff and physicians to activate the Cath Lab to improve re-perfusion timeliness. Ideas expressed by the authors indicates improving the care coordination between facilities and standardizing the interactions with emergency

medical service can also minimize time delays. Use of a standardized transfer process among all services may improve transfer timeliness. Coordinating and implementing an IHT are complex. Standardization is challenging to achieve when methods lack effective communication and consistency. Optimizing the timeliness of IHT for PCI re-perfusion can improve patient outcomes (Ward et al., 2014).

In an improvement project, Iwashyna (2012), conducted a qualitative review of IHT from the perspective of the requesting facility, which usually initiates the transfer process. According to Iwashyna (2012), a transfer involves four components:

- Identifying eligible transfer patients.
- Identifying a destination.
- Negotiating the transfer.
- Accomplishing the transfer

The author examined the basic structure and safety of IHT. The proposed improvement project studied not only the underlying composition of the IHT process but also the organization of the fundamentals of the process into a standardized method of operation.

Iwashyna (2012), conducted several interviews at community hospitals and gathered data from a narrative review of the medical and organizational literature. The findings revealed the following:

1. Moving a critically ill patient is not without risk.
2. Patient information is lost during a transfer.

3. Substantial differences exist in patient outcomes between hospitals of the same level.
4. The process of arranging a transfer is more complicated than picking up a phone.
5. Interorganizational relationships shape transfers.
6. System barriers hinder transfers.
7. Community hospitals have difficulties obtaining an ambulance crew qualified to transport the patient.
8. ICU bed capacity may be limited.
9. Patients are sometimes transferred for reason of location rather than hospital performance and capabilities.
10. Because of capacity issues, care facilities may deny patients who may benefit from a transfer.

Theoretical Framework

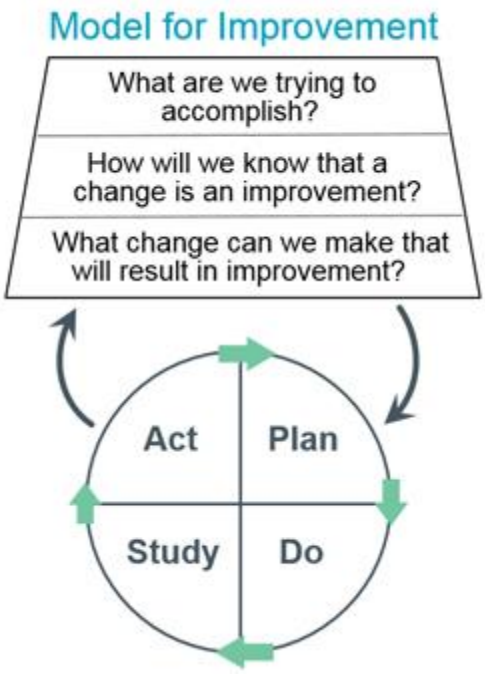
The Model for Improvement (MFI), developed by Associates in Process Improvement, was used to implement the change and analyze the results in the quality improvement project. It has been used successfully by many healthcare organizations to improve processes and outcomes (Institute of Health Improvement, 2018). The model has two parts:

A set of fundamental questions addressed in any order were

1. What are we trying to accomplish? (A timely IHT process.)
2. How will we know that a change is an improvement? (An increase in meeting EMC protocol metrics.)

3. What change can we make that will result in improvement? (Adopt the EMC protocol as the standardized IHT process.)

The Plan-Do-Study-Act (PDSA) cycle to test changes in real work settings. PDSA cycle guides the test of a transformation to determine whether the modification is an improvement.



(IHI, 2018)

The model guides the improvement process, which consists of the following:

- Forming the team: Teams vary in size and composition. The team is built to suit the needs of the organization. (A task force of TCNs.)
- Setting aims: The aim should be time specific and measurable, and should define the particular population of patients or a system that will be affected. (Patients 18 years and older accepted for IHT.)

- Establishing measures: Use quantitative tests to determine whether the specific change leads to improvement. (Consistent use of the EMC protocol metrics.)
- Selecting changes: Ideas for the transformation may come from those working in the system, or from the experience of others who have successfully improved. (Use ideas from the interview summaries of TCNs.)
- Testing changes: PDSA, plan it, try it, observe the results, and act on what is learned (action-oriented learning). (Use the busiest time of day for IHTs to monitor TCNs use of EMC protocol.)
- Implementing changes: Test the change on a small scale, learn from each test, and refine the difference through several PDSA cycles. (Pilot the amendment for three months, review the results, and revise the plan as needed.)
- Spreading change: After successful implementation of a modification, spread the method to other parts of the organization. (Solidify use of the EMC protocol as the standardized transfer method.)

Project Design

A single-center retrospective comparative study design used for two-time frames (January 2017 through March 2017 and January 2018 through March 2018), to predict the association between the EMC protocol and transfer timeliness. The primary independent variable was the EMC protocol. The dependent variable was the timeliness of IHTs as determined by measuring the time from the transfer request to the time of patient arrival. A secondary dependent variable was bed availability. The unavailability of beds delayed the transfer process. Any change in the patient's condition from the initial request required further stabilization of the situation

and, a request for a higher level of care, which delayed the transfer process. In some instances, the requesting facility canceled the transfer after acceptance, at the patient's and family's request. Control of this threat was minimized by asking whether the patient and family agreed to the removal before making a request. A threat to eternal validity occurred when TCNs acquired and assigned a bed to a more recent transfer; although, transfers with longer wait times and similar EMCs remained outstanding. Once a transfer was completed and closed, the logs converted to the inactive files. TCN s could re-activate the files and input additional data. To reduce the risk of validity threat on instrumentation, and to attempt as unbiased an implementation as possible, the principal investigator (PI) consulted with the department's nursing resource director to discuss eliminating the manipulation of data. An inadequacy in obtaining data can lead to information bias. The associate chief nursing officer provided support for the project and trained the PI on data retrieval (Appendix A).

Data Collection

The TC averaged 360 transfers requests per month. The organization's electronic database was used for logging accepted transfers requested through IPAL. Patient identifiers were removed, and the TCNs' identification was coded to maintain confidentiality (Appendices B - C).

The PI reviewed second-hand data retrospectively. The AMC initially obtained the data at pre- EMC implementation (January 2017 to March 2017) and post- EMC implementation (January 2018 to March 2018). The PI identified the EMC status, and the following time-stamped information:

1. Time of transfer request.

2. Time of transfer acceptance.
3. Time of bed assignment
4. Time of patient arrival

Methods and Materials

This project was conducted for two periods (January 2017 through March 2017 and January 2018 through March 2018), on IHTs accepted through IPAL at an AMC. Using EXCEL, random numbers were generated for each year to randomly select transfers that were eligible for inclusion in the project. The study included patients 18 years and older accepted for IHT. Excluded were pediatric, psychiatric, maternal/fetal transfers, and transfers with incomplete transfer logs. Except for the listed exclusions, there were no restrictions related to gender, diagnosis, service line, level of care, or demographic. The PI matched the first 200 randomly selected numbers with the transfer case number for each year. Of the total cases, 81 transfers for 2017 and 74 cases for 2018 met exclusion criteria; therefore, the sample included 119 transfers for 2017 and 126 for 2018. The project was exempt from Institutional Review Board (IRB) approval (Appendices D-E).

Statistical Analysis

Frequency and descriptive statistics were run on variables to describe the sample characteristics. Chi-square analysis was used to compare the independent groups based on categorical outcomes. The unadjusted odds ratios (OR) with 95% confidence intervals were reported for significant findings as a measure of the strength of association. The non-parametric Mann-Whitney *U* tests were used to compare ordinal variables across independent groups. Medians and interquartile

ranges were reported for the non-parametric analyses. Statistical significance was assumed at an alpha value of 0.05, and all analyses were conducted using SPSS version 25 (IBM Corp. 2017).

Results

Table 1 presents the clinical characteristics of the sample. Non statistically significant differences existed between the time groups (2017 vs. 2018), for the time of day for transfer request, (p = 0.37) and level of emergency care, (p = 0.70). However, significant differences did exist between the time periods for use of the EMC protocol, ($p < 0.001$), documentation of transfer delay, (p = 0.012), and department chief notification within 13 minutes, (p = 0.04). See Table 1 for frequencies associated with the chi-square comparisons. The difference between 2017 and 2018 periods for EMC reflects the frequency of use for the protocol and does not reflect the timeliness of IHTs based on EMC metrics. The significance of the department chief's notification within 13 minutes falls within the established guidelines of the AMC.

For group comparisons of ordinal outcomes, non-significant differences were detected for the time to physician call for transfer request, (p = 0.99), time to a bed being assigned, (p = 0.17), time of arrival after acceptance, (p = 0.06), time to completion to bed/ER/CATH lab/Neuro-angio, (p = 0.51), and date of arrival beyond EMC metrics, (p = 0.59). Statistically significant differences were found between the timed groups for physician's call back time, (p = 0.04) and transfer acceptance time, (p = 0.04). See Table 2 for the descriptive statistics associated with the non-parametric group comparisons.

With data from 2017 and 2018 combined, 79 healthcare facilities engaged in the transfer of patients through the IPAL request line. The levels of emergency care provided at the referring facilities were comprehensive services (67.9%), Level I trauma (15.2 %), Level II trauma (16.0%), and Level III trauma (0.4%). Missing data and data not applicable accounted for 0.4%. Findings were not statistically different between the periods. However, in 2018, the level of care provided reflect a 12% increase in request from hospitals providing comprehensive services. Demand from level l and Level II service facilities decreased in 2018 (Table 3). The top five facilities requesting an IHT were Mercy Chicago (6.9%), Mt. Sinai, (5.7%), St. Anthony Chicago (5.7%), St. Mary of Nazareth (4.9%), and West Suburban (5.3%). The top five reasons for transfer request were identified using descriptive statistical frequency analysis. Of the patients transferred, 40.0% required a higher level of care, 22.0% were patients of the AMC, 15.1% occurred because service was not available at the current facility, 12.2% happened because a specialist was not available, and 3.3% because of incarceration at a state facility. Although findings were not statistically different, 2018 reflects a 40% increase in IHTs for services not available and a 31% increase for specialized services. (Table 4). These findings support the literature that patients are often transferred for a higher level of care and specialized services not available at the current facility. The top five service-lines accepting a transfer were neurosurgery (33%), medical intensive (10%), neurology (5%), ophthalmology (5%), and organ transplant (4%).

Results of the chi-square tests were used in a comparison of the groups by categorical outcomes. The correlation between the two periods (i.e., 2017 and 2018), reflects both the

increased use of the EMC protocol post-mandate and the consistent use of the EMC metrics to drive the transfer process. Also, 46% of urgent transfers and 54% of non-urgent transfers, were identified in 2017. There were no emergent transfers reflected. Furthermore, 22% of emergent transfers, 62% of urgent transfers, and 16% of non-urgent transfers were categorized in 2018. (Table 5).

These findings regarding the established transfer metrics correlate with the transfer acceptance time (p = 0.04) but do not associate with the time of bed assignment (p = 0.17) and time of arrival after acceptance (p =0.06). Also, transfer delays decreased because of bed capacity at 22.6% in 2018 in comparison to 41.0% in 2017. (Table 6). The number of acceptable transfers increased in 2018 to 124 in comparison to117 in 2017. Findings that were not statistically different (p =0.37*)* between the periods was the time of day of the transfer request. Most transfers occurred between 12:00 PM and 11:59 PM; the number of IHTs increased by 6% in 2018.

Mann-Whitney U tests were used to compare the groups on ordinal type outcomes. The findings were mixed. Between the periods of the transfer request, the time of physicians' notification of a transfer request, time of bed assignment, time of arrival after acceptance, and time of bed completion were not significantly different. However, significant differences existed in the physicians' call-back time after notification of a transfer request, and in the transfer acceptance time. The findings were within established guidelines of the TC.

Discussion

One of the most surprising findings from the study was the lack of association between the use of the EMC protocol and IHT timeliness. However, the implementation of a standardized EMC protocol improved transfer efficiency and acceptance time of patients needing a transfer. Patients were accepted within minutes of the transfer request, but there was a delay in the time of arrival

from the acceptance time due to lack of bed availability. Gupta and Mueller (2015), supports standardizing protocols to improve the quality, safety, and efficiency of the transfer process, but they do not address timeliness. Also, Herrigel et al., (2016), speaks on IHT standardization in reducing medical errors and near misses, but do not associate transfer timeliness with having a standardized protocol. However, Herrigel et al., (2016), identified how a standardized method of communication allows for rapid transfer to an AMC.

The impact of the results and the evidence from previous studies imply how the use of a standardized protocol as best-practice could improve transfer timeliness. As observed in other studies, systems that used communication hand-off (23%), centralized TCs, uniformity in the transfer process (38%), use of communication tools for documentation purposes (85%), and use of workflow process (70%) provide standardization. When used consistently as the standardized method to drive the transfer process, the EMC protocol could improve IHT timeliness. The timely transfer of patients is a process that TCN can achieve. Patients rely on healthcare organizations to provide care that is safe, effective, and timely. The Model for Improvement (MFI) was used to guide the process improvement project. The fundamental questions address how adoption and consistent use of the EMC protocol as the standardized IHT method can improve transfer timeliness. The findings fall within the MFI framework for implementing a change in process to accomplish improvement.

Limitations

The study was subject to several limitations. First, it was limited by the number of research articles available that directly relate to the use of protocol metrics as a standardized transfer method. Although much research was available on the effectiveness of safe patient transfers when processes were standardized, many of the studies were not time- related. Second, the exclusion

criteria constituted another limitation of the study. The study did not address IHT for psychiatric services. Lack of bed availability for this population sometimes delays transfers for an extended time. Third, bias could be related to the exclusion of different service-lines. Perhaps the inclusion of all transfers regardless of age or service-line would improve the study results. Fourth, data collection was retrospective and secondary, which could lead readers to question the reliability and validity of the results. Lastly, because the IHT process varies across institutions, the findings from this single-site study cannot be generalized to other organizations. The replication of this study in a different setting with a larger sample inclusive of all IHT populations may reveal better results. Another TC replicating this project can attempt to guard against the threats to validity by ensuring that TCNs are not biased in their selection of transfers.

Dissemination Plans

The PI submitted an email to the associate chief nursing officer and the director of bed control, informing both of the project completion. The director requested a presentation to the bed control staff at the next monthly staff meeting. A power point presentation of the study is the method of dissemination. Upon approval by department leaders, the PI will disseminate the results of the study to the hospital policy and procedure committee for approval and inclusion into the current transfer policy. According to IHI (2018), MFI is used to change ideas within and between organizations. Upon approval, the results will spread throughout the organization.

Conclusions

The results of this quality improvement project indicate that standardization can improve the efficiency of the IHT process. The EMC protocol currently used at the AMC yielded high use,

as noted in the results from two periods observed in the study. The PI recommends consistent use of the EMC protocol as the standard of practice within the TC. The protocol currently in place is sustainable and workable, but it requires reinforcement by TCNs. A recent update of the TC policy outlines the EMC protocol guidelines to reflect its use. Adopting the procedure as the standard of practice requires a statement of inclusion into the current policy.

In conclusion, TCNs are empowered to improve the efficiency of transfers by standardizing the process using the EMC protocol as a time-based guide driving IHT timeliness. Achieving IHT efficiency is a complex process that impacts the TC and organization operations.

Acknowledgments

I am thankful to Dr. Erica Dean DNP, RN, my project adviser, for her encouraging words and support. Thank you, Dr. LaVonne Downey, Ph.D., for your guidance and direction as I journeyed the course. I am forever grateful. Also, I thank Dr. Lisa Potts DNP, RN for providing the resources and assistance needed to ensure the successful completion of this project. A special thanks to Sharese Terrell Willis for providing technical advice and assisting with the organization of this manuscript, and Robert Eric Heidel for statistical assistance. I am grateful to and fortunate enough to get constant encouragement and support from my family and friends who persevered the journey with me. I love You. Most of all, I thank God, my Lord, and savior for providing me with the strength to endure it all.

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Tables

Table 1 Clinical Characteristics

Variable	2017* (n = 119)	2018* (n = 126)	*p*-value
Transfer request Time of day			
AM	48 (40.3%)	58 (46.0%)	
PM	71 (59.7%)	68 (54.0%)	0.37
Level of emergency care			
Comprehensive services	78 (66.7%)	87 (69.0%)	
Level I trauma	19 (16.2%)	18 (14.3%)	
Level II trauma	20 (17.1%)	19 (15.1%)	
Level III trauma	0 (0.0%)	1 (0.8%)	0.70
Emergency medical condition			
Emergent	0 (0.0%)	25 (22.1%)	
Urgent	27 (45.8%)	70 (61.9%)	
Non-urgent	32 (54.2%)	18 (15.9%)	< 0.001**
Documentation of transfer delay			
Yes	6 (5.1%)	6 (4.8%)	
No	60 (51.3%)	89 (71.8%)	
Other	53 (43.6%)	29 (23.6%)	0.012**
Department chief notification 13 minutes or greater			
Yes	4 (7.1%)	0 (0.0%)	
No	52 (92.9%)	67 (100.0%)	0.04**

Note: * Values are frequency (percentage), ** p < 0.05, statistically significant

Table 2 Descriptive Statistics: Non-parametric group comparisons

Variable	2017*	2018*	*p*-value
Time physician called for transfer request	2.0 (4.0)	2.0 (4.0)	0.99
Physician's call back time	1.0 (1.0)	1.0 (0.0)	0.04**
Transfer acceptance time	4.0 (3.0)	3.0 (3.0)	0.04**
Time bed assigned	2.0 (5.0)	2.0 (3.0)	0.17
Time of arrival after acceptance	3.0 (0.0)	3.0 (1.0)	0.06
Time of completion to bed, ER, Cath lab &	1.0 (0.0)	1.0 (0.0)	0.51
Neuro-angio			
Date of arrival beyond EMC and requested date	1.0 (1.0)	1.0 (1.0)	0.59

Note: * Values are Median (interquartile range), ** p < 0.05, statistically significant

Table 3 Level of emergency care provided

			Comprehensive services	Level 1 trauma	Level 11 trauma	Level 111 trauma	Not applicable	Total
Year of transfer request	2017	Count	78	19	20	0	0	117
		% within Year of transfer request	66.7%	16.2%	17.1%	0.0%	0.0%	100.0%
	2018	Count	87	18	19	1	1	126
		% within Year of transfer request	69.0%	14.3%	15.1%	0.8%	0.8%	100.0%
Total		Count	165	37	39	1	1	243
		% within Year of transfer request	67.9%	15.2%	16.0%	0.4%	0.4%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.213[a]	4	.697
Likelihood Ratio	2.983	4	.561
Linear-by-Linear Association	.002	1	.967
N of Valid Cases	243		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is .48.

Non-significant (NS) difference, p = 0.70.

Table 4 Reason for transfer request

			Our Patient	Pt. requires higher level of care	Service not available	Specialist not available	Hospital is in network	Patient/Family Request	Prisoner	Inpatient Admission	OR to ICU	Total
Year of transfer request	2017	Count	26	50	11	13	4	3	5	3	4	119
		% within Year of transfer request	21.8%	42.0%	9.2%	10.9%	3.4%	2.5%	4.2%	2.5%	3.4%	100.0%
	2018	Count	28	48	26	17	2	1	3	1	0	126
		% within Year of transfer request	22.2%	38.1%	20.6%	13.5%	1.6%	0.8%	2.4%	0.8%	0.0%	100.0%
Total		Count	54	98	37	30	6	4	8	4	4	245
		% within Year of transfer request	22.0%	40.0%	15.1%	12.2%	2.4%	1.6%	3.3%	1.6%	1.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13.707[a]	8	.090
Likelihood Ratio	15.533	8	.050
Linear-by-Linear Association	3.030	1	.082
N of Valid Cases	245		

a. 10 cells (55.6%) have expected count less than 5. The minimum expected count is 1.94.

NS, p = 0.09.

Table 5 Emergency Medical Condition

			Emergency Medical Condition			
			Emergent, arrive within 90 minutes of transfer request	Urgent, arrive within 24 hours of transfer request	Non-Urgent, arrive within 36 hours of transfer request	Total
Year of transfer request	2017	Count	0	27	32	59
		% within Year of transfer request	0.0%	45.8%	54.2%	100.0%
	2018	Count	25	70	18	113
		% within Year of transfer request	22.1%	61.9%	15.9%	100.0%
Total		Count	25	97	50	172
		% within Year of transfer request	14.5%	56.4%	29.1%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	34.421[a]	2	.000
Likelihood Ratio	41.128	2	.000

Linear-by-Linear Association	33.919	1	.000
N of Valid Cases	172		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.58.

Significant difference, p < 0.001.

Table 6 Documentation of transfer delay

			Yes	No	Unit Capacity	Patient Unstable	Amb. Diversion	No Bed	Total
Year of transfer request	2017	Count	6	60	2	1	0	48	117
		% within Year of transfer request	5.1%	51.3%	1.7%	0.9%	0.0%	41.0%	100.0%
	2018	Count	6	89	0	0	1	28	124
		% within Year of transfer request	4.8%	71.8%	0.0%	0.0%	0.8%	22.6%	100.0%
Total		Count	12	149	2	1	1	76	241
		% within Year of transfer request	5.0%	61.8%	0.8%	0.4%	0.4%	31.5%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14.717[a]	5	.012
Likelihood Ratio	16.348	5	.006
Linear-by-Linear Association	9.293	1	.002
N of Valid Cases	241		

a. 6 cells (50.0%) have expected count less than 5. The minimum expected count is .49.

There was a significant difference, p = 0.012.

Appendix A

Resurrection University
Department of Nursing

September 20, 2018

Re: Letter of Support

Dear DNP Committee,

It is my honor to give my support to the quality improvement project, INTERHOSPITAL TRANSFER TIMELINESS – IMPLEMENTING A STANDARDIZED TRANSFER PROCESS. In my role as an Associate Chief Nursing Officer of the organization in which this project will be carried out, I will support Renee and her implementation team's efforts by providing resources and assistance to assure that she successfully completes this valuable project. I believe that this project will have a positive impact on our quality outcomes and the safety of our patients at the University of Illinois Hospital & Health Sciences System. I also believe that this project will provide others with a greater awareness of how technology, process, structure, and evidence-based practice can help to drive our clinical operations and outcomes.
Regards,

Lisa Potts

Associate Chief Nursing Officer

University of Illinois Hospital & Health Sciences System

312-996-0333
lpotts2@uic.edu

Appendix B

DATA COLLECTION SHEET

Year	Date Time	Facility	Transfer Reason	Physician Notification Time	Physician Response Time	Doc. of Delays)	Chief Notified	Time of Acceptance	EMC	Time Bed Assigned

Appendix C

DATA COLLECTION SHEET

Time of Arrival	Time Bed Assignment Completed	Arrival Date	ID

Appendix D

RESURRECTION UNIVERSITY
NURSING & HEALTH SCIENCES

Resurrection University
Institutional Review Board

November 20, 2018

Renee Maeweather-Reed, MSN
Dr. Erica Dean
Dr. Lisa Potts

Dear Investigators:

Please be advised that on November 20, 2018, your request and application of the study listed below was approved:

PROJECT NUMBER: RU 201808.12
PROJECT TITLE: Interhospital Transfer Timeliness
PRINCIPAL INVESTIGATOR(S): Renee Maeweather-Reed, MSN
ADDITIONAL INVESTIGATOR(S): Dr. Erica Dean, Dr. Lisa Potts

This approval is for one year from the date of approval and will require continuation on an annual basis if needed. ***Note: any changes to the protocol must be submitted for approval.***

An annual review and status report is due prior to November 20, 2019. Changes to the protocol must be submitted to the IRB immediately, before data collection can continue. If the study will continue past the year approved, the IRB Committee must be notified three weeks before the expiration of approval, November 20, 2019. Closure of the study is to be reported upon completion of the project. The appropriate forms can be found on the University web site.

Sincerely,

Laurie Zack, Ed.S., MSN, FNP, LPC, CNE
Chair
Resurrection University Institutional Review Board

cc: Therese Scanlan, President of Resurrection University
IRB file

Resurrection University
1431 N. Claremont Ave. • Chicago, IL 60622 • 773.252.6464

Appendix E

Notice of Determination of Human Subject Research

December 21, 2018

20181555-119595-1

Renee Maeweather-Reed
Nursing

RE: **Protocol # 2018-1555**
Interhospital Transfer Timeliness

Sponsor(s): None

Dear Renee Maeweather-Reed:

The UIC Office for the Protection of Research Subjects received your "Determination of Whether an Activity Represents Human Subjects Research" application, and has determined that this activity **DOES NOT meet the definition of human subject research** as defined by 45 CFR 46.102(f).

Specifically, this is a Resurrection University DNP student Quality Improvement project. The purpose of the QI project is to evaluate compliance of transfer center nurses employing the emergency medical condition as a standardized method used to improve interhospital transfer (IHT) timeliness. Implementation of the project will identify gaps in performance and areas needing improvement. There is no intent to produce or contribute to generalizable knowledge.

You may conduct your activity without further submission to the UIC IRB.

If this activity is used in conjunction with any other research involving human subjects or if it is modified in any way, it must be re-reviewed by UIC OPRS staff.

Concepts/Definitions

Interhospital Transfer: The movement of a patient outside a primary care hospital to a facility with the capabilities and resources needed for definitive care (Emergency Nurses Association, 2015).

Emergency Medical Treatment and Active Labor Act (EMTALA): A federal law that requires a hospital to transfer a patient to a facility where the services are available or when the benefits of transfer outweigh the risks to the patient (Gupta & Mueller, 2015).

Emergency Medical Condition (EMC): A condition manifesting itself by acute and severe symptoms of enough severity that the absence of immediate medical attention could result in placing a patient's health in serious jeopardy, severe impairment to bodily functions, or acute dysfunction of any bodily organ or part (42 U.S.C.1396)

Emergency Medical Condition Protocol/Status:

- Auto-Accept- Patients who are automatically accepted by the transfer nurse for transfer due to the severity of symptoms requiring immediate transfer as determined by the accepting physician.
- Emergent- Patients clinical condition requires transfer and admission within 90 minutes or less from the initial transfer request as determined by the accepting attending.
- Urgent- Patient's clinical condition requires transfer and admission within 24 hours or less from the initial request as determined by the accepting attending.
- Non-urgent- Patient's clinical condition requires transfer and admission within 36 hours or less from the initial request as determined by the accepting attending.