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Efficacy of Post-discharge Interventions on Preventing Hospital Readmissions in Stroke Patients

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COLLEGE
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"Efficacy of Post-Discharge Interventions on Preventing Hospital Readmissions in Stroke Patients"

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The journey to find a better path for the patients and families after hospital discharge was born out of multiple episodes of hospitalizations with members of my family. The frustration that occurred when the "plan" for the medical care did not go in the expected direction or wasn't communicated in terms that were easily understood was overwhelming. This frustration steered my nursing path to the specialty of case management. I credit my mother for teaching me that the way to fix a problem, is to tackle it head-on. Thus, I embarked on a search to make the necessity of hospitalization both more patient-friendly and more patient focused.

I owe a great deal of debt to my husband for supporting me on this journey and plying me with endless cups of tea and unconditional love. To my daughter for showing me the importance of laughter and to my mother for a lifetime of support. Each of these things helped me to move along the journey, and to understand that each step along the way had both purpose and meaning. Each of these also helped me to understand that the journey goes ever on and that each of the achievements or pitfalls in life are just steps along the way.

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Abstract

More than 795,000 people in the United States have a stroke every year. Some 610,000 of them are first or new strokes, and 185,000 of these are recurrent strokes (Centers for Disease Control and Prevention, 2016). Studies show that anywhere from 17.4% to 66% of patients discharged from a healthcare facility following an acute stroke are readmitted within 30 days (Zhong et al., 2016; Lahiri et al., 2015; Strowd et al., 2015; Bjerkreim, Thomassen, Waje-Andreassen, Selvik, & Naess, 2016; Burke, Skolarus, Adelman, Reeves, & Brown, 2014; Kilkenny, Longworth, Pollack, Levi, & Cadilhac, 2013; Lichtman, Leifheit-Limson, Jones, Wang, & Goldstein, 2012; Li, Yang, & Chung, 2011). Hospital readmissions are costly both to the healthcare system and to patients. In 2016, the average hospital cost for each admission that resulted in a live patient discharge was $17,500, and that figure has been projected to increase in 2017 and 2018 (U.S. Department of Health and Human Services and the Agency for Healthcare Research and Quality, 2016, p. 16). All the conclusions in the reviewed literature recommend the use of multiple or bundled interventions versus the use of just one intervention (Poston, Dumas, & Edlund, 2014; Verhaegh et al., 2014; Wong, Chow, Chan, & Tam, 2014). The objectives of this program improvement project were, 1) to examine whether specific discharge interventions, as a group, helped reduce hospital readmissions; and 2) to develop an understanding of the effectiveness of these discharge interventions based on readmission risk stratification for stroke patients. Data was analyzed using retrospective chart analysis. This data was used to compare preintervention and postintervention readmission rates for patients discharged from the hospital after their first stroke. All three of the Fischer's Exact Tests revealed no significant differences in the relationship of the sample prior to the intervention and that of the sample after implementation (two-tailed *p* values of 0.42 for all data, 1.00 for medium risk, and 0.23 for high

risk). Postintervention analyses revealed organizational systemic barriers that might have affected the results.

***Keywords*: hospital readmission, discharge interventions, stroke**

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List of Abbreviations

CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare and Medicaid Services
DME	Durable medical equipment
DOH	Department of Health
HHC	Home healthcare
PICOT	Research question framework: (P) population; (I) intervention; (C) comparison; group; (O) outcome; (T) timeframe
PCP	Primary care provider
UNMH	University of New Mexico Hospital

Chapter 1. Introduction and Background – Stroke Patients and Hospital Readmissions

More than 795,000 people in the United States have a stroke every year. Some 610,000 of them are first or new strokes, and 185,000 of these are recurrent strokes. Nearly 130,000 of all strokes are fatal (Centers for Disease Control and Prevention, 2016). The greatest number of strokes occur in patients 65 and older which account for nearly 51% of all stroke patients. The next most common group of patients to suffer from strokes are those 45 – 64 years of age, comprising 20% of all stroke patients. The third most common group of patients includes 18-44-year-olds, comprising approximately 4% of the total number of strokes (U.S. Department of Health and Human Services and the Agency for Healthcare Research and Quality, 2016, p. 16).

Studies show that anywhere from 17.4% to 66% of patients discharged following an acute stroke are readmitted within 30 days (Zhong et al., 2016; Lahiri et al., 2015; Strowd et al., 2015; Bjerkreim, Thomassen, Waje-Andreassen, Selvik, & Naess, 2016; Burke, Skolarus, Adelman, Reeves, & Brown, 2014; Kilkenny, Longworth, Pollack, Levi, & Cadilhac, 2013; Lichtman, Leifheit-Limson, Jones, Wang, & Goldstein, 2012; Li, Yang, & Chung, 2011). This wide variation can be attributed to the multitude of interventions and study populations. It is both fiscally important, and important for good patient care for healthcare workers, to be aware of and to proactively implement measures to ensure that processes are in place to prevent readmissions for stroke patients. The most common reasons for these readmissions included infection, coronary artery disease, and recurrent stroke (Zhong et al., 2016; Lahiri et al., 2015). More than half of the unscheduled readmissions could be classified as avoidable because they include returning for procedures that could have been completed during the initial admission, inadequate discharge planning or inadequate care coordination (Nahab et al., 2012).

The University of New Mexico Hospital in Albuquerque, N.M. (UNMH) sees 450 to 560 stroke patients a year, and that population has a readmission rate of 6% to 9% (Forner, 2018). The overall readmission rate at UNMH in 2017 was 10.7% (Vizient, 2018). The physical and emotional insult of a condition requiring hospital readmission adds to the morbidity already suffered by the patient, especially if more than one readmission occurs for a patient.

Hospital readmissions are costly to both the healthcare system and to the patients themselves. In 2016, the national average hospital cost for each admission that resulted in a live patient discharge was $17,500, and that figure has been projected to increase in 2017 and 2018 (U.S. Department of Health and Human Services and the Agency for Healthcare Research and Quality, 2016, p. 16). The cost to hospitals can be higher if a more significant percentage of readmissions occurs secondary to monetary penalties from the Centers for Medicare and Medicaid Services. These penalties, administered according to the Hospital Readmissions Program, part of the Affordable Care Act, became effective in October 2012. The penalty for excessive readmission rates for CMS reportable conditions is 3% of all reimbursed Medicare funds (Medicare.gov, 2016). The readmission program was designed to incentivize hospitals to provide the best possible care during the first encounter with a patient and to penalize ineffective or incomplete care (Centers for Medicare and Medicaid Services [CMS], 2017, p. 81).

The CMS Hospital Readmission Program evaluates several reportable conditions, comprised of acute myocardial infarction, heart failure, pneumonia, chronic obstructive pulmonary disease, elective total hip arthroplasty, total knee arthroplasty, and coronary artery bypass graft (Centers for Medicare and Medicaid Services, 2017). The diagnosis of stroke has been listed as a possible addition but has not been included as one of the diagnoses subject to potential payment reductions for excess readmissions. However, stroke data is subject to public

reporting of excess readmission rates posted on the Medicare.gov Hospital Compare website (CMS, 2017, p. 81). Knowledge of this public reporting is essential both for consumers and for healthcare facilities. Consumers can find and examine outcome data to help them choose a facility for care, and these reports are the basis for hospital reimbursement.

Facilities use many interventions to help reduce hospital readmissions. All of the conclusions in the reviewed literature recommend the use of multiple or bundled interventions versus the use of just one intervention (Poston, Dumas, & Edlund, 2014; Verhaegh et al., 2014; Wong, Chow, Chan, & Tam, 2014). Little research is available, however, about the effectiveness of bundled transitional care interventions specifically for stroke patients, nor which set of interventions provides the best results for the prevention of readmissions.

Problem Statement

The series of stroke readmissions led to the question: For stroke patients, 18 or older, having been discharged home from an acute care academic medical center with a new cardiovascular accident (CVA) episode or stroke, will implementation of the stratified discharge intervention protocol based upon readmission risk assessment scores versus standardized discharge interventions decrease the hospital readmission rates within 30 days of the initial discharge?

Objectives and Aims

The objectives of this program improvement intervention project were:

- To examine whether specific discharge interventions, bundled or as a group, helped reduce hospital readmissions.
- To develop an understanding of the effectiveness of stratified discharge interventions based on readmission risk assessments for stroke patients.

Chapter 2. Review of Literature

"Stroke," "hospital," "intervention," and "readmission comprised the search parameters for a literature search. The literature search was done in CINAHL, PubMed, WorldCat.org, Wiley Online Library, ScienceDirect, BioMed Central, Taylor and Francis Journals, AccessMedicine, Annual Reviews, Cambridge Companions Online, Oxford Journals, AccessPharmacy through the University of New Mexico library database. The final literature included only peer-reviewed articles written or translated into English within the previous 10 years. The 280 articles were then further screened for specific discussion related to stroke patients or an intervention that affected hospital readmission of a patient suffering a stroke.

Strokes and Hospital Readmissions

The impact of a stroke on patient suffering can be detrimental. Stroke is the fifth leading cause of death in the United States and kills more than 130,000 people every year (Centers for Disease Control and Prevention, 2016). The number of people who have a stroke every year is increasing (Felgin et al., 2014). Stroke survivors face a high risk of mortality and are challenged to initiate lifestyle changes based on new physical and mental detriments. A recurrence of a stroke is also a risk. The multitude of potential problems and late sequelae profoundly impact a person's previous lifestyle and norms. Each stroke impacts a patient's physical, emotional, and financial well-being, along with that of their family, the healthcare system, and society in general (Felgin et al., 2014; Zhong et al., 2016; Lahiri et al., 2015; Strowd et al., 2015).

Hospital readmission for complications from the initial stroke or subsequent strokes expands this impact. The higher financial costs associated with these types of readmissions have prompted researchers to study reasons for the readmissions and specific interventions to reduce their number. The range of readmission rates for stroke patients in the literature spans from

17.4% to 66%. This range is extensive and demonstrates a gap in the knowledge (Zhong et al., 2016; Lahiri et al., 2015; Strowd et al., 2015). Finding the correct intervention or set of interventions to help address this gap and to prevent hospital readmission is of utmost importance.

Several studies have examined specific interventions and their relationship to readmissions for stroke patients. Torp et al. (2006) evaluated the influence of the interdisciplinary stroke team on hospital length of stay, readmission rate, and patient satisfaction. The researchers' results revealed no significant difference in readmission rates. Similarly, Claesson, Gosman-Hedstrom, Fagerberg, and Blomstrand (2003) evaluated the type of inpatient care unit and how it related to the readmission rate. This study also revealed no significant difference in readmission rates. Another study, by Anderson, Eriksen, Brown, Schulz-Larsen and Forchhammer (2002), evaluated home follow-up services for stroke survivors and compared aftercare with home visits by a physician, physiotherapist instruction in the patient's home, and standard aftercare. Again, the study revealed no statistically significant differences in outcome between the different groups. Unfortunately, no studies have shown a statistically significant difference between the preintervention readmission and postintervention readmission data for stroke patients.

Multiple and Bundled Interventions

When addressing decreased readmission rates, the reviewed literature points toward using bundled or multiple interventions versus just one intervention (Poston, Dumas, & Edlund, 2014; Verhaegh et al., 2014; Wong, Chow, Chan, & Tam, 2014). There is, however, no agreement between studies as to which combination of interventions works best to prevent or reduce readmissions. The literature supports the use of different sets of interventions to address specific

complications of diseases, such as heart failure and chronic obstructive pulmonary disease, but again, there is no consensus about which set is best or which set is universal to all diseases.

Kripalani, Theobald, Anctil, and Vasilevskis (2014) expressly stated that single-component interventions are not likely to reduce readmissions and the use of risk stratification methods is paramount when looking at multiple interventions. The researchers suggest using a tool similar to that used in Project BOOST, Better Outcomes for Older Adults Through Safe Transitions, or some other vetted framework that assigns risk stratification to interventions. The researchers examined discharge processes across multiple diagnoses and suggested using interventions designed for comprehensive discharge planning, care transition interventions, and multilevel assessments that include patient education, discharge planning, postdischarge telephone calls, and discharge coaches. Their conclusions stated that multiple interventions, even though they required more resources, are superior when addressing patient discharge needs. They could not, however, determine which grouping of interventions would work best.

Saleh, Freire, Morris-Dickenson, and Shannon (2012) examined the combined intervention of a patient-centered health record, a structured discharge checklist, patient self-activation sessions, confirmation of follow-up appointments, and coordination of information flow. Their study presented a cost-benefit analysis by using these interventions. It also revealed that their control participants were more likely to be readmitted than the intervention participants. They suggested examining the costs and benefits of increasing the amount and intensity of care interventions as compared to the cost and detriments of patient readmission. Similarly, Shu et al. (2011) examined the use of a disease-specific care plan, telephone monitoring, counseling, and referral to a clinic about the effect of unplanned readmissions within 30 days after discharge. The researchers reported that using multiple postdischarge interventions

lowered the readmission rates for the population they examined. Each of these sets of interventions, as a group, was shown to be successful on readmission rates. The authors suggested the use of each set of interventions as appropriate for use on multiple diagnoses in future research.

LACE Index, Telephonic follow-up and PCP follow-up

The LACE Index is a generalized predictive model that has been adopted and modified by many facilities and organizations and was developed to help quantify the risk of unplanned readmissions after discharge from a hospital. The index is a tool that helps examine the effects of the hospital length of stay, acuity of the admission diagnoses, patient comorbidities, and the number of visits to the emergency room before the current admission in relation to the risk of hospital readmission (Canadian Medical Association Journal, 2010). The index was found to have several limitations and was therefore modified. The Modified LACE Index has been shown to be a valid predictive tool for readmission risk ($p < 001$) (El Morr, Gingburg, Nam, & Woollard, 2017), but like other interventions, cannot alone reduce readmission rates (El Morr, Ginsburg, Nam, & Hansen, 2016).

Another successful individual intervention includes telephone follow-ups, as discussed in a systematic review by Verhaegh et al. (2014). They concluded that intensive interventions such as focused telephone follow-ups reduced 30-day readmission rates and that these interventions were most effective with people older than 60 (Verhaegh et al., 2014). A quality improvement project carried out by Poston, Dumas, and Edlund (2014) showed that using nurse navigators to make follow-up primary care provider (PCP) appointments and transmitting discharge summaries to the PCPs decreased readmission rates when comparing preintervention and postintervention data. Both teams of researchers emphasized the need for the implementation of

several interventions in their discussion as they believed that no individual intervention was useful in and of itself.

Chapter 3. Theoretical Model and Methodology

The midrange theories of Goal Attainment and the Social Support Theory by Imogene King were the basis for the theoretical model used for this project. These theories include many definitions of social support. The definitions use either positive interactions or effective interventions provided to a patient in need of that support within some form of social system (Hupcey, 1998, p. 1232). King defined social systems as "groups of individuals joined together in a network or system of social relationships to achieve common goals" (King, 1971, p. 22). The nurse-client dyad is one type of social or interpersonal relationship. The function of this relationship is to impart appropriate knowledge and assistance to help the patient achieve the best level of health possible by utilizing the concepts of interaction, perception, communication, and development (King, 1981, p. 144). Within this theory, nurses assist the individual with health teaching and guidance to be able to put together the sociocultural factors, the psychologic factors, and the physiologic factors of the situation to attain the goal of the best possible health (King, 1971, p. 96).

The nurse must be goal directed to be able to help the individual regain or maintain health as well as adapt to chronic illness or disability. King believed that the purpose of any research was to determine the effects of this mutual goal setting and implementation upon both the attainment of the goal and the attainment of health and understanding. King also urged theory development and adaptation to provide structure for a systematic organization to new models and to develop new knowledge for nursing (Frey, Sieloff, & Norris, 2002, p. 108). King's Social Support Theory and Theory of Goal Attainment have been used multiple times since she published her conceptual framework in 1971. Central to all uses of her theory include goal

attainment, communication, and interactions at different levels of social interaction (Khowaja, 2006, p. 45).

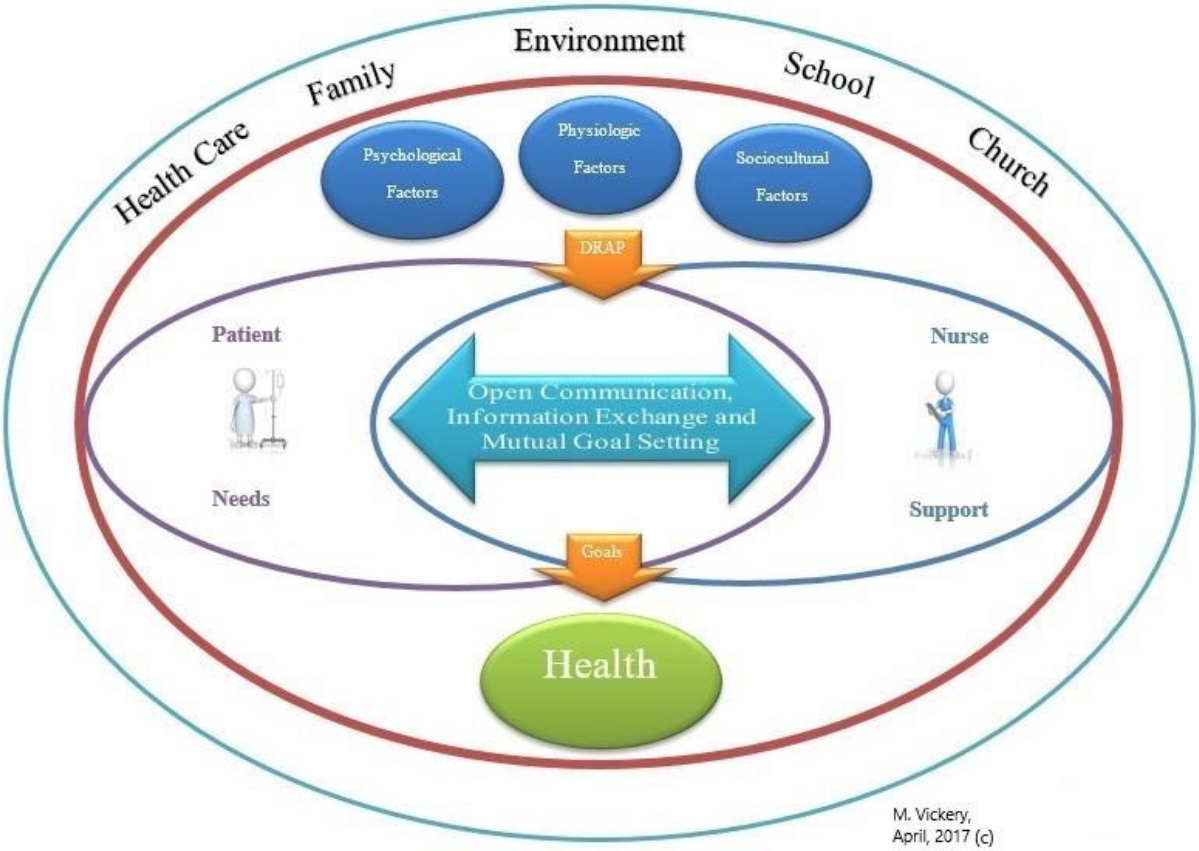

Figure 1 Theoretical Model of Nursing Case Management - Designed by M. Vickery, 4/24/2017, based upon King's theories of Goal Attainment and Support Theory

This project utilized the basic principles of both the Social Support Theory and Theory of Goal Attainment. The nurse collects patient-specific data with the premise that one needs have mutual goal setting and understanding, to do this, the nurse must understand the patient's history and current needs. The nurse must also understand his or her own beliefs, and be able to separate these from the needs of the patient. The nurse examines the patient's social influences such as family, school, church, healthcare and the environment in which the patient exists. The nurse

also assesses specific interpersonal influences including psychological, physiologic and sociocultural factors. The nurse processes this information with the use of the Discharge Risk Assessment Plan. Once processed, the nurse uses this assessment through open communication and information exchange with the patient to create goals agreeable to the patient. The purpose of these goals is to help move the patient from the current setting or situation to one that is the most appropriate for the attainment of a state of health. Once this initial assessment and goal setting session has been completed, the nurse continues, through multiple cycles of assessment and goal setting with the patient to make sure that each goal is either met or changed according to the patient's needs. See Figure 1, Theoretical Model.

Project Goal and Study Design

Historically, the discharge interventions at the University of New Mexico Hospital, an acute academic care medical center in central New Mexico, have had a vast amount of variability dependent upon time, location and postdischarge setting. This program improvement intervention project addressed the application of a set of specific discharge interventions with stroke patients based upon a readmission risk assessment score. Each of the individual nonbundled interventions had been shown to have a positive effect on hospital readmission but had not been studied as a group of interventions for stroke patients. Approaches to this problem included the comparison of data for discharges and readmissions of stroke patients prior to the implementation of a stratified discharge intervention protocol versus the data collected after the implementation of this specific intervention. This review was carried out using retrospective chart reviews on patients with diagnoses related to stroke or stroke symptoms upon admission. Readmission risk was categorized as low-risk, medium-risk, or high-risk for readmission. This project specifically examined medium-risk and high-risk patients. The results were compared as

a whole and then as separated sets secondary to different levels of interventions based upon a readmission risk score. The study used specific data, including stroke diagnoses, either ischemic or hemorrhagic; age; gender; ethnicity, comorbidities, Discharge Risk Assessment Plan scores and results; hospital length of stay, and diagnoses. This data was used to determine if there was a difference in readmission rates between the preintervention and postintervention samples. The timeframes for data collection were matched to try to correct for any seasonal effects on the readmission rates.

Setting and Resources

The setting for this program improvement was at UNMH. The patient information for this project came from the hospital database and included assistance from information technology services to provide medical records for patients with stroke diagnoses on admission and discharge information as appropriate (See Appendix C: ICD – 10 codes for inclusion in patient data searches.) Both sets of data were retrospective patient chart reviews that compared discharged stroke patients at the same time within two years. The timeframes for data collection were matched to try to correct for any seasonal effects on the readmission rates.

Study Population

The study population was selected from inpatient files and included all patients with ICD - 10 categorized diagnoses related to stroke (See Appendix C: ICD – 10 codes for inclusion in patient data searches) age 18 and older who were admitted to UNMH between May 2016 and November 2016 and between May 2017 and November 2017. Further screening was done to exclude any patient who did not present with symptoms of an initial stroke or did not have a medium-readmission risk or high-readmission risk during the initial stroke encounter. Further

exclusions were done for any patient not discharged to home. The strict detail was maintained to ensure inclusion of all qualifying patients.

The final data sets included 82 patients in the preintervention group and 89 patients in the postintervention group. The preintervention group was comprised of 40 female patients and 42 male patients; the postintervention group was comprised of 47 female patients and 43 male patients. The age range for the preintervention group was 18 to 89 and had a median age of 64. The postintervention group had an age range of 19 to 99 and a median age of 63. The preintervention group was 77% White or Anglo, 7% American Indian or Alaskan Native, 1% Asian and 1% Black or African American. Within the preintervention group, 3% declined to answer this question, and that information was not available from 11% of that group. The postintervention group was comprised of 78% White or Anglo, 8% American Indian or Alaskan Native, 3% Asian, and 1% Black or African American. The postintervention group included 4% who declined to answer this question; with 6% of the participants, that information was not available. The preintervention group included 29 patients who described themselves as Hispanic or Latino while 53 described themselves as Not Hispanic or Latino. The postintervention group had 35 patients who described themselves as Hispanic or Latino, 46 as Not Hispanic, or Latino, and seven patients for whom this description was not included in the data.

Sources of Data

The UNMH database provided the study data. After obtaining written approval for access to patient records for this project, the hospital database was searched to find admitting or discharge diagnosis of stroke. The patient identities were blinded to the researcher by the information technology data analyst. The collected data contained stroke diagnoses, either ischemic or hemorrhagic; age; gender; ethnicity; comorbidities; Discharge Risk Assessment Plan

scores and results; hospital length of stay; diagnoses; and dates of hospital admissions within the six months prior to the qualifying admission. The patient data was separated by the assigned risk score as defined by the discharge risk assessment plan, into either medium-risk or high-risk standards for readmission.

Data Analysis

Data was collected using retrospective data analysis. This data was used to compare preintervention and postintervention readmission rates for patients discharged from the hospital after their first stroke. The data were analyzed using a two-by-two Fischer's Exact Test to determine if there were any statistically significant differences between the data sets. A Fisher's test was used secondarily to the small number of items in each data set. The analyses examined the data for all qualifying patients and then separately for the medium-risk patients and the high-risk patients. All three of the Fischer's Exact Tests revealed no significant differences in the relationship of the sample prior to the intervention and that of the sample after implementation (two-tailed *p* values of 0.42 for all data, 1.00 for medium risk, and 0.23 for high risk). See Tables 1, 2 and 3.

	Number of patients	Number of readmissions	Total
Preintervention data	82	5	87
Postintervention data	89	10	99
Total	171	15	186

Table 1 Fisher's Exact Test – All data; two-tailed* p-*value of 0.42

	Number of patients	Number of readmissions	Total
Preintervention data	48	4	52
Postintervention data	51	4	55
Total	99	8	107

Table 2 Fisher's Exact Test – Medium Readmission Risk; two-tailed* p*-value of 1.00

	Number of patients	Number of readmissions	Total
Preintervention data	34	1	35
Postintervention data	38	6	44
Total	72	7	79

Table 3 Fisher's Exact Test – High Readmission Risk; two-tailed* p*-value of 0.23

Quality

Patient information not related to the study was not available to the research team. The patient information used in this study remained on an encrypted password-protected computer in a locked office. The members of the research team were limited to the capstone chair, capstone committee member, and the student, with consultation by a faculty statistician.

Ethics and Human Subjects Protection

All conceivable safeguards were implemented based upon considerations and ethical principles discussed on the Department of Health and Human Services, National Institutes of Health Clinical Center's Patient Recruitment website.

Social and clinical value.

The information from this research question is important enough to be able to contribute to the scientific understanding of the hospital discharge process. The benefit of this information outweighs any potential risk.

Scientific validity.

The research methods in this process-improvement project were valid and feasible. The project was designed with a clear objective and used acceptable methods and practices.

Fair subject selection.

The study included every qualifying patient. No purposeful exclusions were made.

Favorable risk-benefit ratio.

Everything was done to minimize the risks and inconvenience to research subjects, including blinding the researcher to subject identity.

Independent review.

The study was reviewed and approved by the Human Research Review Committee at the Human Research Protection Office at the University of New Mexico Health Sciences Center. See Appendix F Human Research Review Committee approval.

Informed consent.

The data was blinded and collected after the completion of the patient encounter. Therefore, no consents were completed.

Respect for potential and enrolled subjects.

Data was collected after the completion of the patient encounter. All information was protected for confidentiality on an encrypted password-protected computer kept in a locked office.

Timeline

The timeframe for the data for this project was from May 2016 through November 2016 and from May 2017 through November 2017. The data was collected after the completion of the encounters. No information was collected or analyzed before the IRB approval. The exact timeframe for this project was from May 9, 2017, to March 4, 2018.

Budget

No money was spent to carry out this project because it used a retrospective chart review performed by the student researcher.

Strengths and Limitations of the Study

Limitations include:

- The project was done at a single-site academic medical center, thus limiting the generalizability of the results.
- Limited data set and timeframe of observation.
- Inconsistent use of risk assessment tool.

Strengths include:

- The clinician documentation was robust and was paired with the exact reason for the Discharge Risk Assessment Plan score and clinical reasoning for that score.
- Because the data was collected retrospective to the patient encounter, data analysts had checked and corrected, if necessary, any admitting and discharge

diagnoses based upon the clinical documentation of the medical providers and staff, thus ensuring a more accurate diagnoses list for comparison.

- Training had occurred with competency testing prior to the implementation of the protocol.

Chapter 4. Discussion

The purpose of this quality improvement project was to find a better process for discharging patients from a healthcare facility to help reduce readmission rates. The goal was to show that a specific group of discharge interventions decreased readmissions, enhanced discharge planning, and helped improve patient care. The literature was reviewed to help determine which interventions were best for this process. But the lack of statistically significant results in the literature presented a challenge with the implementation of this quality improvement project. The results of this project, like the previous projects, showed a lack of statistical significance. This lack prompted a review of the specific processes used in discharge planning and postacute care. Instead of discovering that the specific interventions reduced readmission rates, the quality improvement project found specific systemic problems within the assumptions of the availability for postacute clinic access and standardization of the content and intent of follow-up phone calls. While inpatient, the patients received care according to a standardized care plan. However, once a home discharge was appropriate, the standardization changed.

Discussions with the case management team regarding the use of the Discharge Risk Assessment Plan revealed that not all case managers used the form equally. Some used it as they were instructed to do, while others used more subjective judgement in both the completion of the form and the interpretation of the importance of certain fields within the form. Some of the team members gave equal weight to the choice of “other” when valued with the specific choices in the form. This inconsistent use of the form might have skewed the data collection or altered the risk assessment results. During an education project to help standardize the use of the form, the care

management peer review team discovered a duplication in the interpretation of two of the fields within the form. This duplication might also have altered the risk assessment results.

One assumption of this project was the ability for patients to be seen by their primary care provider within the prescribed length of time. This project highlighted the reality that individual clinic processes vary severely across the UNMH system and that clinic access outside of the UNMH system has even further variances. While it is the goal to see patients in an appropriate time window, the ability for the clinic to schedule the patient to be seen within that window was much less consistent. The access and availability of the clinics were discovered to be very limited.

Another systemic deficit that this project found was a lack of consistency with the timing and intent of telephone follow-up calls. The Care Management Department allocated two FTEs to have callback nurses in 2017. The implementation and training of these two nurses coincided with a decrease in emergency room visits. However, the content of the calls that these two nurses use was not consistent with that of other call back nurses throughout the entire hospital system. This project found areas where there was inconsistency in the intent and content of the follow-up calls.

Future research needs

Future research is needed to determine if this intervention would have significant results if systemic issues were not present prior to the project. The combination of interventions should also be augmented to include comprehensive stroke specific teaching at the bedside and complete medication reconciliation prior to the discharge of the patient from the hospital. Future research should also examine the home ZIP codes of the subjects to determine if rural geography affects readmission.

Conclusion

More than 795,000 people in the United States have a stroke every year. Some 610,000 of them are first or new strokes, and 185,000 of these are recurrent strokes. Nearly 130,000 of all strokes are fatal (Centers for Disease Control and Prevention, 2016). The number of strokes has an immense impact on the patients suffering from strokes and on the healthcare system as a whole. Studies show a wide range of readmission data for patients discharged following an acute stroke. It is both important and essential for excellent patient care to be aware of and proactively implement measures to ensure that processes are in place to reduce the need for readmissions for those patients. This study did not find a combination of specific discharge interventions that affected hospital readmission rates. It did, however, illuminate multiple issues within the system that might have affected the results. Further research and process improvement efforts are needed in this area.

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Appendix A: Discharge Risk Assessment Plan (DRAP) High-risk Indicators; (Modified LACE)

Reason for admission	□ Major trauma □ Frequent falls □ Cognitive impairment □ Other:	Disabilities	□ Two or more chronic conditions □ Needs assistance with activities of daily living □ Possible durable medical equipment need □ Other:
Readmission	□ Within thirty days of the previous admission □ Three or more emergency department visits within 90 days	Living situation	□ Lives alone and/or is homeless □ Might be unable to return to previous living arrangement
Funding	□ Self-pay □ Inadequate funding	Psychosocial barriers adult	□ Substance abuse □ Behavioral problems □ Lack of decision maker □ Lack of advanced directives □ Other:
Age	□ Younger than 16 with no legal guardian □ Older than 75	Family/ caregivers pediatric	□ Substance abuse □ Criminal history □ History of abuse or neglect □ Psychiatric disorder, Might be undiagnosed and/or untreated □ Other:
Criteria	□ Length of stay > three days anticipated □ Inpatient admission □ Three or more emergency department visits within previous six months	CVA Automatic moderate readmission risk	□ New onset of CVA symptoms within 30 days

Risk for Readmission

□ Low	□ Moderate	□ High

Adapted by M. Vickery from Discharge Risk Assessment Plan designed by S. Oliver

Appendix B: Stratified Predischarge and Postdischarge Interventions to Help Prevent Hospital Readmissions; Stratified Levels Based upon Discharge Risk Assessment

Readmission Risk Level				
Interventions		**Low**	**Medium**	**High**
	Provider follow-up	Confirms primary care provider (PCP) Assignment • If no PCP, refer patient to PCP referral line.	Confirms primary care provider (PCP) assignment • If no PCP, refer patient to PCP referral line. PCP team appointment scheduled before discharge to occur within seven days of discharge [1] • If no PCP team appointment available, get specialty appointment if appropriate	Confirms primary care provider (PCP) assignment • If no PCP, refer patient to PCP referral line. PCP team appointment scheduled before discharge to occur within three to seven days of discharge or first available [1] • If no PCP team appointment available, get specialty appointment if appropriate
	Medication reconciliation	Done before hospital discharge	Done before hospital discharge	Done before hospital discharge and again by Home care
	Discharge follow-up (Phone calls) Verify address, phone number and emergency contact before hospital D/C	Follow-up phone call for home healthcare (HHC) and any durable medical equipment (DME) within 24 hours of hospital discharge *or* as needed (PRN) if no services set up	Follow-up phone call for HHC and any DME within 24 hours of hospital discharge *or* within 72 hours of hospital discharge if no services set up	Follow-up phone call for HHC and any DME within 24 hours of hospital discharge *and* Friday after D/C
	Case management referrals, follow-up and discharge summaries	UNMH outpatient case managers (CM) check discharge list. UNMH outpatient case manager's check medical record for progress notes PRN. Discharge summary faxed to PCP if non-UNMH provider.	Inpatient CM forwards most recent inpatient CM note(s) to UNMH outpatient CM. Consider HHC referral if skilled nursing or rehab need. Consider referral to other agencies such as TBI resources or Meals on Wheels. Discharge summary faxed to PCP if non-UNMH provider.	Inpatient CM gives live handoff to UNMH outpatient CM. HHC referral should be done for home safety evaluation & medication reconciliation. Referral(s) to other agencies such as TBI resources or Meals on Wheels should be done. Discharge summary faxed to PCP if non-UNMH Provider.

[1]PCP appointment timing is ideal time frame because exact timeframe depends upon appointment availability

Adapted by M. Vickery from Discharge Interventions designed by C. Frantz

Appendix C: ICD – 10 codes for inclusion in patient data searches

G46.3* – Brain stem stroke syndrome

G46.4* – Cerebellar stroke syndrome

I60* – Nontraumatic subarachnoid hemorrhage

I61* – Nontraumatic intracerebral hemorrhage, multiple localized

- I61.0* – Nontraumatic intracerebral hemorrhage in hemisphere, subcortical
- I61.1* – Nontraumatic intracerebral hemorrhage in hemisphere, cortical
- I61.2* – Nontraumatic intracerebral hemorrhage in hemisphere, unspecified
- I61.3* – Nontraumatic intracerebral hemorrhage in brain stem
- I61.4* – Nontraumatic intracerebral hemorrhage in cerebellum
- I61.5* – Nontraumatic intracerebral hemorrhage, intraventricular
- I61.6* – Nontraumatic intracerebral hemorrhage, multiple localized
- I61.8* – Other nontraumatic intracerebral hemorrhage
- I61.9* – Nontraumatic intracerebral hemorrhage, unspecified

I62* – Other and unspecified nontraumatic intracranial hemorrhage

I63* – Cerebral infarction

- I63.0* – Cerebral infarction due to thrombosis of unspecified precerebral artery
- I63.1* – Cerebral infarction due to embolism of precerebral arteries
- I63.2* – Cerebral infarction due to unspecified occlusion or stenosis of unspecified precerebral arteries
- I63.3* – Cerebral infarction due to thrombosis of unspecified cerebral artery
- I63.4* – Cerebral infarction due to embolism of unspecified cerebral artery
- I63.5* – Cereb infrc due to unsp occls or stenos of unsp cereb artery
- I63.6* – Cerebral infarction due to cerebral venous thrombosis, nonpyogenic
- I63.8* – Other cerebral infarction
- I63.9* – Cerebral infarction, unspecified

I69* - Sequelae of cerebrovascular disease

- I69.0* – Sequelae of nontraumatic subarachnoid hemorrhage
- I69.1* – Sequelae of nontraumatic intracerebral hemorrhage
- I69.2* – Sequelae of other nontraumatic intracranial hemorrhage
- I69.3* – Sequelae of cerebral infarction
- I60.8* – Sequelae of other cerebrovascular diseases
- I69.9* – Sequelae of unspecified cerebrovascular diseases

R29.7 National Institutes of Health Stroke Scale (NIHSS) score

- R29.700-R29.709 – R2970 NIHSS score 0-9
- R29.710-R29.719 – R2970 NIHSS score 10-19
- R29.720-R29.729 – R2970 NIHSS score 20-29
- R29.730-R29.739 – R2970 NIHSS score 30-39
- R29.740-R29.742 – R2970 NIHSS score 40-42

* – All subsets for these areas as well

Appendix D: Permission to access data

Monica Vickery DNP Capstone Project Proposal

What

The purpose of this project is to look at the effectiveness of a specific set of discharge interventions that are based upon the Discharge Risk Assessment Plan (modified LACE tool). Data will be examined regarding discharge and readmission of stroke patients prior to the implementation of a stratified discharge intervention protocol versus those patients discharged after the implementation of this specific intervention.

For stroke patients, eighteen years of age or older, having been discharged home from an acute care academic medical center with a new cardiovascular accident (CVA) episode or stroke, will implementation of the stratified discharge intervention protocol based upon readmission risk assessment scores versus standardized discharge interventions decrease the hospital readmission rates within thirty days of the initial discharge?

Where

University of New Mexico Hospital, all units

Who

Stroke patients admitted to University of New Mexico Hospital from April 2016 to August 2016 and from April 2017 to August 2017. Dates may change based upon the IRB approval dates.

Patient information protection

Patient information will be protected based upon both IRB and UNMH protocols and will not leave the University of New Mexico hospital premises. I will be the only person on the team accessing patient information, and will be requesting this information to be blinded if possible.

Specific information to be viewed and collected will include:

- Stroke diagnoses information including symptoms upon admission
- Demographic information including patient age, gender, ethnicity, and comorbidities
- Frequency of hospital admissions within the past six months and length of stay for each of those admissions
- Patient home ZIP Code to be able to determine generalized location of residence of either from within the Albuquerque metro area or not

Permission

I find this project acceptable and give permission for Monica Vickery to carry out this project at the University of New Mexico Hospital if guidelines, protocols and official policies are maintained.

Sheena M Ferguson — Printed Name

Sheena M Ferguson / Crystal Frantz — Signature

3/15/17 — Date

Appendix E: Human Research Review Committee approval

UNM HEALTH SCIENCES CENTER

Human Research Review Committee
Human Research Protections Office

May 9, 2017

Therese Hidalgo
thhidalgo@salud.unm.edu

Dear Therese Hidalgo:

On 5/9/2017, the HRRC reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Stratified Discharge Interventions Based on Risk for Stroke Patients and Their Effect Upon Hospital Readmissions
Investigator:	Therese Hidalgo
Study ID:	17-175
Submission ID:	17-175
IND, IDE, or HDE:	None
Submission Summary:	Initial Study
Documents Approved:	• HRP-582 - VICKERY - Version 3 Exempt Category 4 protocol.pdf
Review Category:	EXEMPTION: Categories (4) Data, documents, or specimens.
Determinations/Waivers:	Documentation of Consent not required. HIPAA Authorization Addendum Not Applicable.
Submission Approval Date:	5/9/2017
Approval End Date:	None
Effective Date:	**5/9/2017**

The HRRC approved the study from 5/9/2017 to inclusive. If modifications were required to secure approval, the effective date will be later than the approval date. The "Effective Date" 5/9/2017 is the date the HRRC approved your modifications and, in all cases, represents the date study activities may begin.

Because it has been granted exemption, this research is not subject to continuing review.

This determination applies only to the activities described in this submission and does not apply should you make any changes to these documents. If changes are being considered and there are questions about whether HRRC review is needed, please submit a study modification to the HRRC for a determination. A change in the research may disqualify this research from the current review category. You can create a modification by clicking Create Modification / CR within the study.

In conducting this study, you are required to follow the Investigator Manual dated April 1, 2015 (HRP-103), which can be found by navigating to the IRB Library.

Sincerely,

Thomas F. Byrd, MD
HRRC Chair