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Adoption of Evidence-based Practices in Stroke Transitions of Care

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GW | Nursing

DOCTOR OF NURSING PRACTICE (DNP) PROGRAM

A DNP PROJECT

TITLE:

Adoption of Evidence-based Practices in Stroke Transitions of Care

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Abstract

Background: Stroke is a leading cause of mortality in the U.S. Individuals who suffer from stroke or transient ischemic attack are at risk for further cerebrovascular events. Prevention requires thorough diagnostic evaluation and care coordination, particularly from inpatient to outpatient settings. Transition of Care programs are effective methods for developing long-term treatment, establishing follow-up, and preventing further complications.

Aims/Objectives: The project purpose was to integrate evidence-based recommendations into a Transitions of Care program for patients with ischemic stroke or transient ischemic attack. The aims were to evaluate whether implementation of Stroke Transitions of Care improved outpatient follow-up and stroke readmission rates.

Methods: This quality improvement project occurred in a Primary Stroke center and Neurology clinic. Participants were hospitalized individuals diagnosed with ischemic stroke or transient ischemic attack, assigned to the Neurology service, and discharged home. Process improvements included the nurse practitioner meeting with patients, establishment of a designated patient contact, scheduling follow-up, and performing a post-discharge call with medication reconciliation. Process measures were tracked with run charts over twelve weeks. Pre- and post-implementation data were collected.

Results: There were n=45 patients prior to intervention and n= 24 during intervention. There was a statistically significant 34% increase in proportion of patients attending clinic after intervention (83% vs 62%, p=0.012). Readmission rates were maintained at less than 10% post-implementation.

Implications/Conclusions: Overall, the process improvement measures led to an increase in outpatient follow-up. Adopting evidence-based practices in stroke transitions of care can lead to increased patient retention in the outpatient setting, which may improve overall patient care.

Adoption of Evidence-based Practices in Stroke Transitions of Care

Introduction

Stroke is the leading cause of disability and the fifth leading cause of death in the United States (Yang et al., 2017). Individuals experiencing a stroke require hospitalization and acute treatment as well as an in-depth investigation to determine the etiology of stroke. Oftentimes, risk factors like hypertension, hyperlipidemia, diabetes, and smoking, among others, need to be addressed and managed in order to prevent recurrent events. Coordinated care is one of the most important aspects in assisting in stroke management and prevention of stroke recurrence. Transitions of Care Programs have recently been promoted to improve management of patients as they transition from acute care to community settings (The Joint Commission, 2012). Many models of Transitions of Care have been developed, including key elements like multidisciplinary participation, clinician involvement, staff training, standardized care planning, and timely follow-up after hospital discharge (The Joint Commission, 2012). Evaluation of such models, through patient surveys and monitoring of readmission rates, is critical to developing a comprehensive stroke program (The Joint Commission, 2012).

Therefore, the intention of this project was to improve an existing Stroke Transitions of Care program, through adoption of evidence-based recommendations, in order to promote improved TIA and ischemic stroke patient care and follow-up. This updated model included establishment of nurse practitioner-led transitions of care planning during patient hospitalization, face-to-face nurse practitioner interaction with patients prior to discharge, multidisciplinary planning, scheduling for discharge follow-up, post-discharge phone calls, and rapid follow-up appointments. Long-term adoption of such practices is expected to positively impact stroke patient readmission rates.

Background and Significance

Stroke affects roughly 795,000 people in the United States per year and every forty seconds someone has a stroke (Virani et al., 2020). There are two types of stroke, ischemic and hemorrhagic, but a majority of strokes are ischemic strokes, which are mostly preventable. Transient ischemic attacks (TIAs), sometimes called mini strokes, are transient episodes of stroke-like symptoms that indicate an individual is at heightened risk for stroke. Quick action must be taken after a TIA or stroke, in order to prevent stroke recurrence.

Data shows that patients who have had a stroke or TIA are at an increased risk of having a subsequent event, particularly in the early phases after the initial event. After an initial stroke, Burn et al. (1994) reported "patients were most at risk of stroke recurrence in the first 6 months, with the risk in the first year being more than twice the average annual risk of the subsequent 4 years" (p. 335). Amarenco et al. (2018) found risk for stroke was about 9.5% in five years after initial TIA or minor stroke. For patients with TIA, risk of stroke is heightened and "stroke risks after a TIA were 8.0% (95% confidence interval 2.3% to 13.7%) at seven days, 11.5% (4.8% to 18.2%) at one month, and 17.3% (9.3% to 25.3%) at three months" (Coull et al., 2004). Because of concerns related to early stroke recurrence, patients are at an increased risk of stroke readmission. Lichtman et al. (2013) found 14.4% of ischemic stroke patients were readmitted to the hospital within thirty days of discharge. Estimates of recurrent stroke and TIA risk after an initial event have shown that aggressive medical management has reduced the risk of recurrent events (Amerenco et al., 2018). This data support the importance of establishing patient follow-up after hospitalization and working to mitigate risk factors in the early phase after stroke or TIA, in order to prevent complications and further stroke events.

Stroke survivors often experience a difficult transition from the inpatient hospital and acute care setting back to the community, due to the long-term effects of stroke and the need for lifestyle changes to prevent recurrent stroke (Condon et al., 2016). In addition, much education that occurs during the inpatient setting is lost on stroke patients, because of the difficulty of processing such an unexpected, sometimes debilitating diagnosis. Furthermore, many patients require the establishment and training of long-term family caregivers, which completely alters the family dynamic and has potential implications for patient health outcomes. Care coordination after stroke hospitalization is complex and multifactorial. According to Broderick & Abir (2015), "continuity and coordination of care after hospital discharge usually involve physical therapy, occupational therapy, speech therapy, social work, management of stroke risk factors and associated medical conditions…and reintegration of patients into their social and work settings as much as possible" (p.S191).

Research supports the development and implementation of Transitions of Care Programs in order to ease the process of transition from acute stroke treatment to long-term stroke management in the community, thereby improving stroke outcomes and patient health. While there is great variability in the delivery of such programs, institutions should implement transitional care measures to prevent readmission and stroke complications (Broderick & Abir, 2015). In fact, data shows that stroke death rates have declined in recent years, due to improved care in stroke prevention and risk factor management (Yang et al., 2017). Overall, Transitions of Care programs have been shown to be successful in reducing readmission rates, proving financially beneficial to institutions that implement such programs (McClain et al., 2020). As the nationwide focus changes towards a preventative healthcare model, with focus on value-based care, Transitions of Care programs will be encouraged as standards of practice to promote

positive patient health outcomes. Such programs deliver regular interaction with stroke patients and caregivers in order to provide supportive and educational interventions to assist in care coordination, long-term stroke treatment, and prevention of recurrent stroke. Research also supports the role of nurses and advanced practice nurses in providing these services to patients, in order to assist in mitigating complications post-discharge and improving patient health outcomes (Irewall et al., 2015; Condon et al., 2016; Olaiya et al., 2016). Therefore, nurses and advanced practice nurses specializing in stroke care should be encouraged to review available research and tailor evidence-based recommendations to develop their own Transitions of Care programs. This project will encourage the role of this nurse practitioner in adopting recommended methods of transitions of care in order to benefit TIA and ischemic stroke patients as they navigate the acute care and community settings.

This project provided significant benefit to patients, as they received coordination of care to assist in transition from hospital to home. Over time, such practices may lead to improved long-term follow-up in the outpatient setting and overall decreases in hospital readmission rates for stroke patients. This project contributed to growing support of the creation and development of Stroke Transitions of Care programs in order to improve stroke follow-up and reduce readmission rates. In particular, this project supported the important role of Nurse Practitioners in stroke patient management and transitions of care for TIA/stroke patients back to the community after hospitalization. It encourages the advanced practice nurse as a key member in Stroke program development and adoption of evidence-based practices.

Needs Assessment

A SWOT Analysis (Appendix A) was conducted in order to determine benefits and challenges for this project development and assisted in organizing potential areas for

improvement in the current Stroke Transitions of Care (STOC) Program. The needs assessment of the existing Stroke Transitions of Care Program within a Primary Stroke Center and its affiliated Neurology clinic demonstrated the need for an evidence-based structure and design model, to improve care coordination and communication as well as patient follow-up, while reducing readmission rates. In particular, the program required a seamless, standardized process for communication between patients and providers, in order to improve follow-up and better engage patients in self-management and secondary stroke prevention. In addition, the hospital organization aspires to progress from a Primary Stroke Center Certification to Comprehensive Stroke Certification through the Joint Commission, which required an advanced level of care afforded to stroke patients with a consistent, effective method of care coordination. For these reasons, it was imperative to promote the translation of research and establish a strong foundation for the delivery of evidence-based care in stroke transitions through a quality improvement initiative.

The hospital's greatest strength was its vision and determination to provide quality patient care and satisfaction. This directly correlated with the goals of the Stroke Transitions of Care program and its intended improvements. Additionally, there was a good foundation for successful implementation of the project, as the stroke services provided by the Neurology team were focused on providing evidence-based care to patients. The SWOT Analysis showed that the organization overall had strong stroke expertise led by Vascular Neurologists, engaged and highly involved leadership, with a multidisciplinary interest in collaboration. Some challenges to the success of the program included the fact that Stroke Transitions of Care Program was young in its development, there was no interoperability between the hospital electronic health records and the Neurology clinic records, and lack of manpower to enact all of the goals of the program.

There were opportunities for improvement with the Transitions of Care program development, particularly as the hospital moves toward attaining Comprehensive Stroke Certification in the upcoming year.

Moreover, the development of such a service provided continuity of care and improved access to Neurology services for patients. External factors to support the development of the service included Medicare reimbursement services and the desire for healthcare models to shift towards value-based services. Some threats to the program included competition in the surrounding area, as well as difficulties in maintaining a system of communication with patients after hospital discharge. In addition, about 20% of the stroke population at the hospital was managed separately by Kaiser Permanente and its affiliated Neurologists. The Transitions of Care process for that portion of the stroke population was managed separately, which affects overall hospital and patient quality metrics. The challenges and threats to success of the program were addressed and interventions in these areas (improved interdisciplinary communication, multidisciplinary rounding, scheduling of follow-up visits) provided solutions to improve current workflow and processes, as well as patient outcomes. In summary, the Stroke Transitions of Care Program required evidence-based protocol and recommendations to improve stroke prevention metrics and elevate the delivery of care provided to such patients, while focusing on improved communication and technology implementation.

Problem Statement

Stroke patients experience a difficult transition from the hospital to the outpatient setting, as they process their new diagnosis, residual neurological deficits, and long-term lifestyle changes for future stroke prevention. Oftentimes, they require close outpatient monitoring and evaluation, with input from a variety of specialists. In addition, patients suffering from TIA are

at increased risk of having an ischemic stroke and require continued testing and rapid lifestyle changes to improve their overall health. Care coordination is imperative to successful TIA and stroke management and prevention, through the development of an educational, collaborative, and supportive system, ensuring adherence to medical management and routine follow-up. Stable processes for continuity of care in the hospital and the critical post-discharge period were lacking in the initial Stroke Transitions of Care program. Improving the Transitions of Care program was expected to decrease gaps in patient care, improve post-discharge patient and healthcare provider communication, and promote optimal patient follow-up. This project implemented changes to expand the Stroke Transitions of Care program using evidence-based interventions to improve post-discharge follow-up and reduce overall readmission rates.

Aims and Objectives

The aim of this doctoral quality improvement project was to improve follow-up in the Stroke Transitions of Care program. This project included all admitted hospital patients diagnosed with ischemic stroke or TIA patients in an evidence-based Transitions of Care program. This was a pilot project and projected goals were for 100% compliance, with successful implementation considered at 80% or above.

Project Aims and Analysis Plans

1. The primary endpoint of the project was to optimize the proportion of patients with ischemic stroke or TIA who came to the Stroke Transitions of Care Neurology Clinic within two weeks of hospital discharge to home.

2. The second endpoint of the project was for all cause readmission rates for stroke patients to remain less than 10%.

In order to achieve these goals, the Stroke Transitions of Care program was revised to include evidence-based recommendations for process improvement. The goal was for all (100%) TIA and ischemic stroke patients, meeting inclusion criteria for this project, to:

1. Be seen by the nurse practitioner prior to discharge

2. Have a patient contact designated in Electronic Health Record (EHR)

3. Have a follow-up appointment scheduled prior to discharge

4. Have a successful post discharge phone call within 2 business days

5. Have a medication reconciliation at post-discharge phone call

6. Be reminded of their follow-up appointment scheduled within 1-2 weeks of discharge.

The objectives of this project timeline were:

1. Identify a process model for Transitions of Care services and create a DNP protocol by May 2020

2. Receive Approval by DNP Proposal Professor and Advisors by Summer 2020

3. Receive IRB Exemption by Fall 2020

4. Meet with Stakeholders to Discuss Stroke Transitions of Care Implementation during Summer/Fall 2020

5. Educate Organization Staff regarding Transitions of Care during Summer/Fall 2020

6. Implement the process model for Transitions of Care by October 2020

7. Establish a Half-Way Point Check-in with Stakeholders

8. Evaluate Process and Project Outcomes related to the Stroke Transitions of Care model by January 2021

9. Explore the success of the Transitions of Care program and Document Project Evaluation

7. Disseminate Project Results by May 2021

Review of Literature

Transitions of Care services for stroke are complex and vary in structure, depending upon organizational and patient population needs. The reviewed literature included studies with different applications of Transitions of Care and post-discharge care coordination models, to improve stroke secondary prevention metrics and outcomes (Appendix B). The focus of the majority of studies was nurse-led or advanced practice nurse implementation of such services. Most of the studies were randomized controlled trials and demonstrated a high level of evidence, with transparency about limitations of their findings.

While many of the studies were single center studies, their design and methodology were consistent with high levels of evidence. Almost all of the studies identified an intervention group versus a control group, with a standard level of hospital care and discharge. The studies were comprehensive in including ischemic stroke participants of many ethnic and racial backgrounds, and only Feldman et al. (2019) limited inclusion criteria to black and Hispanic individuals. Most of the studies focused on stroke patients who were discharged home from hospital. Transition of Care interventions varied across studies, including structures with home visits, clinic visits, telephone calls, education, and health coaching programs, among others.

Outcome measurements were widespread, assessing secondary stroke prevention metrics and long-term patient outcomes. Many studies reported significant findings. Allen et al. (2009) found that advanced practice in-home assessments for Transitions of Care with development of individualized care plans, led to a significant increase in stroke knowledge and lifestyle

modifications. Results from Wong et al. (2015) showed that a nurse-led intervention for Transitions of Care led to significant effects on quality of life, patient satisfaction, functional outcomes, depressive symptoms, and reduction of the use of emergency room visits. Several studies found that Transitions of Care interventions resulted in clinically beneficial results in blood pressure reduction, but no statistically significant effects (Feldman et al, 2019; Cheng et al., 2018). Cheng et al. (2018) did find significant changes in LDL cholesterol reduction from a chronic care-based model of Transitions of Care. Irewall et al. (2015) noted significant beneficial effects in both blood pressure reduction and LDL levels for the intervention group. These outcomes were initially explored as outcome measures for this project, but would likely not generate any significant results within the time frame of the project. They proved valuable in this literature review as important future metrics and outcomes of long-term project implementation.

Hospital quality metrics were also important outcomes for determining success of Transitions of Care interventions, as several studies assessed readmission rates and hospital utilization. Condon et al. (2016) found a 48% decrease in 30-day readmissions as a result of Transitions of Care services. Poston, Dumas, & Edlund (2014) found 30-day readmission rates decreased from 9.39% to 3.24% after implementation of a transitional care model. McClain and Chance (2019) found significantly higher rates of 30-day readmissions in patients who did not receive Transitions of Care services (13.4% vs 1.5%, respectively; $p = .003$). Therefore, such services improved patient health outcomes, through the prevention of hospital readmission rates.

Stroke care recommendations, as a whole, have shifted focus towards Transitions of Care services. Adeoye et al. (2019) recommended the development of coordinated, discharge and transition of care services for stroke patients, in order to improve education, support, and long-

term management of stroke patients. The reviewed literature suggested nurse-led interventions in Transitions of Care have the potential to manage stroke risk factors (through blood pressure and cholesterol reduction, improved stroke knowledge) and improved outcomes (improve quality of life, decrease depression rates, prevent hospital readmissions and stroke recurrence). Much of the data supported use of a standardized approach and template for Stroke Transitions of Care.

Rochester-Eyeguokan et al. (2016) developed recommendations for best practices of Transitions of Care services, including pre-discharge planning, establishing timely follow-up prior to hospital discharge, planned interventions and education, and promotion of patient self-management. In addition, important care coordination measures were supported, including multidisciplinary team discharge planning, assessment of caregiver status and established contact information, as well as medication reconciliation at all transfers of care (Rochester-Eyeguokan et al., 2016). Mountain et al. (2020) developed evidence-based guidelines to support transitions for stroke patients. These recommendations included collaborative goal setting between healthcare providers, patients, and caregivers, ongoing stroke education and skills training, discharge planning, assessment of patient and caregiver capabilities in providing care, timely transfer of information between settings, support from healthcare professionals within the stroke team and routine evaluation of patients' rehabilitation needs (Mountain et al., 2020, p. 8). Overall, these findings and recommendations supported the development of a structured and standardized Transitions of Care service with processes to improve secondary stroke prevention and outcome measures.

EBP Translation Model

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) Model was utilized to assist in implementation of this project. This model utilized three main concepts, inquiry,

practice, and learning, which were all interrelated (Dang & Dearholt, 2018). Inquiry referred to the practice of asking questions and learning more information about existing issues or concerns (Dang & Dearholt, 2018). Dang & Dearholt (2018) defined practice as "the translation of what nurses know into what they do" (p.37). This can be based off of the standards of practice that nurses uphold, as determined by professional associations (Dang & Dearholt, 2018). Learning was the process of constantly obtaining new information about one's surroundings and their role in influencing those surroundings (Dang & Dearholt, 2018). Learning is affected by personal experiences (Dang & Dearholt, 2018).

The practice steps of this model included recruiting an interprofessional team, defining a problem, developing a question, establishing stakeholders, determining responsibility for the project, scheduled team meetings (Dang & Dearholt, 2018). The steps of the JHNEBP Model regarding evidence included gathering evidence, reviewing the evidence, and then grading the evidence to determine its strength for recommended changes (Dang & Dearholt, 2018). The translation stage of this model incorporated creating an action plan, securing resources and support, implementation of the plan, evaluation, and dissemination of findings (Dang & Dearholt, 2018). This model served as a basis for the overall timeline objectives for the project completion.

Methodology

Design

This quality improvement project used rapid cycle tests of change to implement best practice recommendations in a Stroke Transitions of Care (STOC) program, in order to improve patient transitions back to the community and outpatient follow-up. The project timeline was established via a Gantt Chart (Appendix C).

The project implemented PDCA cycles, incorporating the four steps of plan, do, check, act, repeated in a cyclic fashion for continuous improvement (ASQ Quality Press, 2020). Each cycle was helpful as a project planning and evaluation tool (ASQ Quality Press, 2020). The steps were simple, and this model was already widely used within the hospital organization for quality improvement projects.

In order to effectively evaluate this project, a logic model was created and utilized (Figure 1). This model was developed based on recommendations from the Centers for Disease Control Division for Heart Disease and Stroke Prevention (n.d.) and was designed to assist in ensuring appropriate implementation of project design. The logic model delineated specifics of interventions, with planned involvement of stakeholders and attention to outcomes with regard to time (CDC Division for Heart Disease and Stroke Prevention, n.d.).

Data were collected from electronic records of participants in the Stroke Transitions of Care program. This program included individuals who were assigned to the Neurology service, with anticipated discharge home, after a hospitalization for transient ischemic attack or acute ischemic stroke, at a community Primary Stroke Center.

Figure 1

Logic Model

LOGIC MODEL

ESTABLISH PROBLEM STATEMENT: EXPLORE CURRENT STROKE TRANSITIONS OF CARE PROCESSES AND OUTCOMES

PROGRAM GOAL: IMPROVE STROKE TRANSITIONS OF CARE TO PROMOTE OUTPATIENT FOLLOW-UP

RATIONALE: RECOMMENDATIONS SUPPORT IMPROVED CARE COORDINATION METHODS WITHIN THE HOSPITAL

PROCESS

Inputs
Stroke Program Stakeholders
DNP Advisors
Stroke Discharge Template
Stroke Phone Call Template

Activities
Meet with Stakeholders
Collect Baseline Data
Develop Stroke Discharge Templates
Develop Stroke Transitions of Care Discharge Report/List
Educate Staff
Engage In Multidisciplinary Rounding
Develop a Designated Contact
Perform Discharge Phone Calls
Evaluate Outcomes

Outputs
Transitions of Care Improved Model Processes
Documented Patient Education
Improved Staff Education
Documented Discharge Planning
Documented Follow-up

OUTCOMES

Short-term
Established Standardized Approach to Stroke Transitions of Care
Obtain Baseline Understanding of Current Process Measures
Increase Nurse Practitioner Engagement in Inpatient Care Coordination

Intermediate
Timely Post-Discharge Phone Calls
Timely Post-Discharge Follow-up

Long-term
Improved STOC Model within the Hospital
Improved Long-term Patient Follow-up
Reduced Stroke Readmission Rates
Improved Secondary Stroke Prevention Metrics

ASSUMPTIONS/CONTEXTUAL FACTORS

Stroke Transitions of Care interventions will be standardized and readily adopted by all involved.
Patients will be agreeable to participate in Stroke Transitions of Care.
The STOC Program will not be impacted by other competing Transitions of Care services.

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Inclusion/Exclusion Criteria

Inclusion criteria for the Stroke Transitions of Care program were adults above the age of 18, who had a diagnosis of ischemic stroke or transient ischemic attack, at the participating hospital and who were discharged home. Patients with hemorrhagic stroke were excluded from this project. Patients requiring acute rehabilitation facilities, skilled nursing facilities, or long-term rehabilitation facilities were excluded from the follow-up appointment at two weeks for this project. The patients were encouraged to follow-up to Neurology Clinic at a later date. The included individuals were required to be in good enough health to participate in STOC. The COVID-19 pandemic was taken into consideration with respect to patient health in follow-up. Individuals engaged in Palliative Care or Hospice services were excluded. Individuals who did not have access to STOC services, with outside insurance, or who lived outside of an appropriate area for transportation to clinic, were also excluded from follow-up. In addition, patients were able to with follow-up with their private Neurologist or primary care physician for these services, if they preferred. Lastly, Kaiser patients, managed separately under Kaiser Neurology, were excluded from this project.

Recruitment Strategy

All patients diagnosed with transient ischemic attack or ischemic stroke, and fulfilling inclusion criteria, were included in the Stroke Transitions of Care program and received evidence-based STOC services. Patients were excluded from immediate post-discharge follow-up, based upon determination of discharge location other than home. Data were collected from the electronic health record from the hospital setting and from clinic.

Risks/Harms

There were no perceived risks or harms to participants of the Stroke Transitions of Care program. A review of the proposed project was performed by DNP Advisors and internal research review boards in the George Washington School of Nursing, as well as the hospital location, prior to implementation.

Ethical Considerations

Project approval was required from the DNP project advisors and team prior to project initiation. This was a quality improvement project and was exempted from IRB review, based on a review by the George Washington School of Nursing research review (Appendix D). The project site Clinical Research Coordinator also reviewed the project and provided written approval for the project (Appendix E).

Setting

The project occurred in a 394-bed, not-for-profit hospital, designated as a Primary Stroke Center. In addition, follow-up visits occurred in the Neurology Clinic located within the main hospital building. The project occurred over a three- month timespan, during the Fall 2020 semester of the academic school year.

Process Improvement Implementation

This was a quality improvement project to improve the existing Stroke Transitions of Care program. In the improved Stroke Transitions of Care process model (Figure 2), patients were identified based on TIA or ischemic stroke diagnosis, and coordination of care began in the inpatient setting. The nurse practitioner met with all TIA or ischemic stroke patients to educate them on the Transitions of Care process and follow-up. Multidisciplinary team rounding and

discussion was employed on the stroke unit, with participation of the Neurology service, in order to assist in patient care coordination. A designated patient point of contact, family member, or caregiver, was included in the electronic medical record to improve communication for follow-up planning.

Discharge planning was reviewed in multidisciplinary discussions and the nurse practitioner met with patients prior to discharge to schedule a follow-up appointment within 1-2 weeks and notify them of the post-discharge phone call. Appointment information was documented in the discharge instructions. Discharge phone calls were made and documented within 2 days of discharge. The post discharge phone call reviewed medication adherence, prescriptions, signs and symptoms of stroke, patient discharge instructions, and reminded patients of their scheduled appointment. Patients presented to in-person clinic or via telehealth for their follow-up appointment at 1-2 weeks post discharge and further discussed long-term stroke prevention lifestyle changes. Patients were provided the option to follow-up with their established private physicians, and patients who were not eligible for Neurology follow-up clinic were recommended to follow-up with their primary care physicians.

Figure 2

STOC Model Flowchart

Stroke Transitions of Care (STOC) Process Model
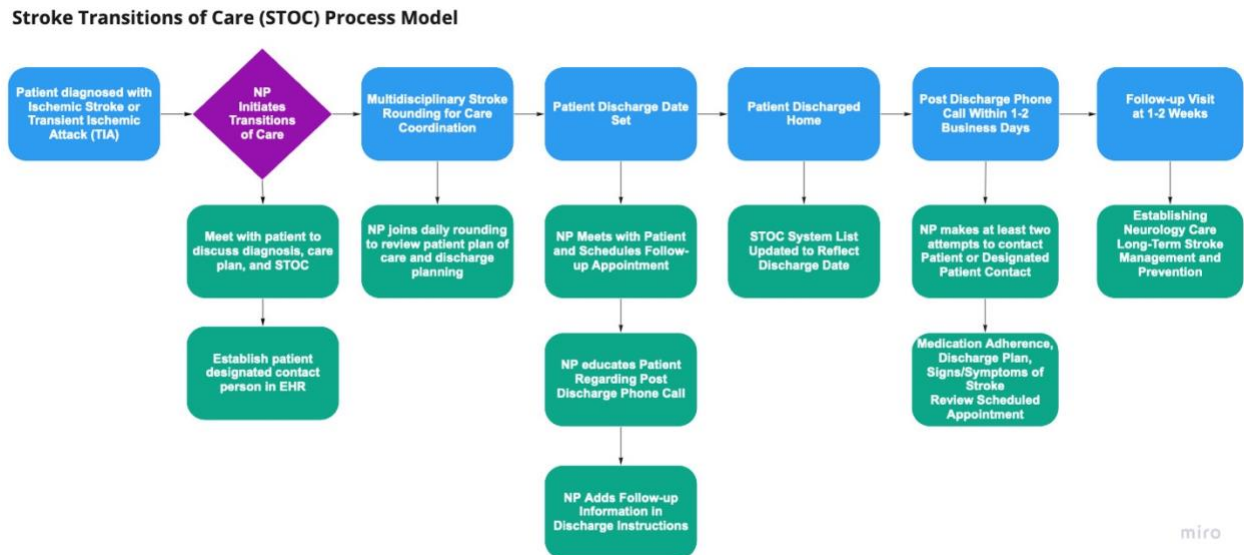
Outcomes

Outcomes for this project were focused on process implementation measures and were collected using electronic health data and documentation. The process measures (Table 2) included implementation of evidence-based recommendations from successful Transitions of Care programs. Creating a rigid and structured approach to Stroke Transitions of Care, with specific templates for discharge instructions, follow-up phone calls, and follow-up appointment scheduling, established a reliable and effective process to ensure improved patient follow-up and understanding of discharge instructions. Facilitation of patient care in the inpatient and outpatient settings promoted continuity of care for patients and improved stroke management adherence. In addition, outcomes like readmission rate were valuable to begin to evaluate for long-term outcomes, in order to better appreciate the lasting effects of such program development and utilization.

Project Timeline

The project was conducted over the course of a three-month time period, in order to allow for adequate time for post discharge follow-up. The implementation phase of the project began in late October 2020 and was completed in late January 2021. There was a project preparation phase of three months prior to implementation. Project preparation included meeting with stakeholders and finalizing stages of planning, allowing time for project approval by review board entities, and creating the templates for discharge phone calls and discharge instructions. This allowed time to prepare the appropriate resources for the project and the education of staff members regarding STOC changes.

The specifics of the projected timeline and course of this project implementation were delineated in the Gantt Chart (Appendix C). There were three stages of this project: project initiation, project maintenance, and project performance and evaluation. Project initiation provided time for the roll-out of the new STOC initiatives, accounting for potential delays or complications in initiation. The project maintenance stage included the continuation of STOC updates, meeting with stakeholders at the halfway point to assess successes and barriers to implementation, and data collection of outcomes. Data collection was an ongoing process throughout the duration of the project. This stage also involved meeting with stakeholders in order to assess stakeholder and staff responses to the changes. The final stage, project performance and evaluation, outlined the last opportunities for data collection, as well as the time period of analysis of the data in preparation for final dissemination.

Resources/Budget/Costs

No additional costs were needed in order to perform this project.

Evaluation Plan

A logic model (Figure 1) was appropriate for this project, in order to categorize planning for short term versus long term goals, categorize activities and projected outputs, and address existing assumptions that may impact overall project implementation. Final project results were disseminated as a comprehensive Doctoral Project and an abstract and poster were prepared for nursing conference submissions.

Analysis

Data Collection

Data collection occurred through abstraction from two separate electronic health records, EPIC for inpatient data, and Allscripts for clinic follow-up data. There was no interoperability between these systems, so separate data abstractions were required. Data were first collected from EPIC, gathering demographic information for patients, diagnosis, as well as readmission rates. Data were gathered from Allscripts, the clinic system, to determine timing of follow-up appointment date and success of patient follow-up.

Demographic data were collected, including patient age, gender, race/ethnicity. Diagnosis at discharge (ischemic stroke or TIA) was collected, as well. Baseline data were collected regarding current process measures, including clinic follow-up rates at 1-2 weeks post discharge. Readmission rates were collected, and were identified as a hospital stay of over 24 hours within 30 days post-discharge. After process model changes, outcomes were assessed including successful documentation of designated patient contact for STOC, NP meeting with patient prior to discharge, appointment made prior to discharge, successful post discharge phone calls, and clinic follow-up rates between 1-2 weeks post discharge.

Data Analysis

Each of the process measures were tracked with the use of Excel spreadsheets and analyzed via run charts, in order to determine successful implementation of the project measures. All cause readmission rates were to be assessed for the course of 6 months, to review pre-implementation readmission rates (for three months) and post-implementation rates (for three months). Data regarding pre-implementation follow-up rates was collected prior to initiation of this project. Pre-implementation data, over the course of the three months prior to project implementation, was collected for the comparison of the pre-implementation and post-implementation groups.

Alignment of Aims and Outcomes

Each of the project objectives were designed as translation of evidence-based recommendations from existing literature. These recommendations were supported to improve care transitions and to optimize outpatient follow-up, thereby reducing complications, like readmissions, for TIA and stroke patients. Therefore, the outcomes being measured were expected to contribute to the overall aims of the study, including improved patient follow-up and maintenance of low readmission rates. Overall, a significant change in readmission rates was not expected during the course of the project, but will continue to be analyzed as a long-term outcome. Data regarding pre-implementation follow-up rates were collected prior to initiation of the project in order to gain a sense of the pre-implementation follow-up rates, as well as pre-implementation readmission rates.

Software Analysis

A password secured Excel spreadsheet was created to collect and trend data for the project objectives. Data collection occurred through review of the electronic health records and

electronic record system reports for Stroke and TIA patients. Additional data, including

readmission rates, were generated by the project site location, for quality review purposes. Excel

was utilized to create analytic data and frequency charts related to demographic information for

patients. Run charts were also created in Excel, in order to identify trends of successful process

measures over time, and to determine pre-and post-implementation changes.

Data Entry

Data analyses were reviewed by both the DNP Project Advisors for completion. In

addition, data were reviewed by this data entrant in order to assess accuracy. Some patients were

initially included in data collection, but excluded from the follow-up to the Stroke Transitions of

Care program for a variety of reasons. The data baseline demographics were added for the

purposes of assisting in determining some of the barriers to patient follow-up in Neurology

clinic.

Objectives/Aims and Analysis

Specific analysis measures for the aims and objectives of this project were described in

the Data Collection/Evaluation and Analysis Methods (Table 1). Collected data were defined

and coded in the Data Dictionary (Table 2). For each of the project objectives, percentages of

patients who received each objective was calculated. In addition, run charts were created to

determine process trends over time. For the main study outcome, pre-implementation rate of

follow-up was compared to post-implementation follow-up. Readmission rates were collected

for the determination of long-term trends.

Participant Demographics

Demographic information for project participants was organized into Table 3. A total of

thirty-two participants were initially selected for the Stroke Transitions of Care program. Of

these individuals, eight participants were voluntarily excluded from the program follow-up appointment, after it was determined that they had outside or no insurance coverage (62.5%), or an existing outpatient Neurologist for follow-up (37.5%). Nineteen of the thirty-two participants (59%) were diagnosed with transient ischemic attack, while thirteen (41%) were diagnosed with ischemic stroke. Thirteen patients were female (41%) and nineteen were male (59%). The average age of participants was 68 years old and average length of hospital stay was 2.75 days.

Results

A total of 32 participants were selected for the TIA/Stroke Transitions of Care program, but 8 participants were excluded from Neurology follow-up, based on exclusion criteria (outside or no insurance coverage and a having an existing outpatient Neurologist). Therefore, a total of 24 participants were fully included in the TIA/Stroke Transitions of Care program for intended outpatient follow-up. With regard to process measures, there was success in the incorporation of evidence-based measures to improve the overall Stroke Transitions of Care program.

Run charts were created for the purposes of following trends of successful project implementation over time. Although run charts were helpful in data analysis, the charts were limited in evaluation of the success of process implementation, as there was a limited amount of data on a weekly basis. All 32 patients were included in the objectives of meeting with the NP prior to discharge and establishment of a designated point of contact in the electronic health record. During the course of the project, all but one patient (97%) met with the Nurse Practitioner prior to discharge. All patients (100%) had a designated point of contact, whether themselves or an appointed caregiver/family member, in the electronic health record. At this point, follow-up determinations were made for patients and eight patients (25%) were excluded from the remainder of the Stroke Transitions of Care program. For the remaining objectives (3-6

above), only the twenty-four patients who met all inclusion criteria were analyzed. Twenty-two

participants (92%) were scheduled for outpatient follow-up prior to hospital discharge. All

patients (100%) received post-discharge phone calls after discharge, but 87.5% (twenty-one out

of twenty-four) of patients were successfully reached for follow-up within two days of discharge.

All of the patients (100%) who were successfully reached for follow-up had medication

reconciliation completed. In addition, all patients (100%) who were successfully reached for

post-discharge phone call were reminded of their appointment date and time. Patients who were

not reached via post-discharge phone call were all notified of their appointment date and time via

voicemail messages.

Of the twenty-four patients included for the Stroke Transitions of Care program, a total of

twenty patients (83%) came for their two-week follow-up appointment. One patient cancelled

due to falling sick with COVID-19. One patient cancelled due to transportation problems. One

patient declined to provide a reason for their cancellation and one patient declined to schedule

follow-up. In the setting of the ongoing COVID-19 pandemic, patients were offered either

telehealth or in-person follow-up appointments. Eleven patients (55%) attended telehealth visits

and nine (45%) attended in-person visits. All of the patients who cancelled their appointments

were scheduled for in-person visits.

Data were analyzed for the twelve weeks prior to project implementation and a total of

forty-five patients were included in the Stroke Transitions of Care program at that time. Overall,

attendance to follow-up was compared and found to be 62% (28/45) pre-implementation versus

83% (20/22) post-implementation with p=0.012.

At the conclusion of the project, the secondary outcome regarding stroke readmission

data were aggregate data for this Neurology service and the Neurology service for Kaiser

patients. Kaiser Neurology manages a large percentage of its own stroke patients within the hospital and has its own follow-up process. The data were not separated in readmission rates and all stroke patients were included; therefore, changes or trends in stroke readmission rates may not be noticeable and, because of such confounding variables, it would be difficult to correlate any changes in readmission rate to the changes made to this Stroke Transitions of Care Clinic. Therefore, the readmission results were not reflective of the patient population identified in this project, stroke patients discharged home under this Neurology service. This information was collected and added as a chart and graph for continued evaluation and trending over time (Table 6). In the future, readmission data may be better reviewed if isolated from the Kaiser Neurology data, and over a longer course of time, in order to determine any effects of the Stroke Transitions of Care program. Readmissions data were not available for the month of January at the time of data collection and project analysis.

There were some additional limitations for this project. For example, population sizes of the pre- and post- implementation groups were different. The pre-implementation group was more than double the size of the post-implementation group. In addition, the project inclusion and exclusion criteria were not addressed in patients prior to project implementation. For example, patients who may have had incompatible insurance coverage were included in data collection for anticipated follow-up. This may have led to decreased follow-up rates in the pre-implementation phase. Lastly, the COVID-19 pandemic worsened within the region and hospital during the project timespan, which may have negatively affected admissions for TIA and stroke patients.

Table 1

Data Collection/Evaluation and Analysis Methods

Aims/Evaluation Questions	Measures	Measure Type	Data Source	Recruitment Method/ Population	Timing/Frequency	Calculation/ Statistics	Goal/ Benchmark
Patients meet with NP prior to discharge home from hospital. *Did patient meet with NP prior to hospital discharge?*	Percentage of Patients seen by NP prior to discharge	Process	EHR chart review	All ischemic stroke/TIA patients assigned to Neurology service and discharged home during the reporting period	Daily for 3 months post-implementation	Percentage/ Proportion; Run Chart	100%
Patients have designated contact listed in EHR. *Did patient have a designated contact listed in EHR?*	Percentage of Patients with a listed contact designated in EHR	Process	EHR chart review	All ischemic stroke/TIA patients assigned to Neurology service and discharged home during the reporting period	Daily for 3 months post-implementation	Percentage/ Proportion; Run Chart	100%
Patient scheduled for follow-up prior to discharge. *Did patient have a scheduled follow-up appointment prior to discharge home?*	Percentage of follow-up appointments made prior to discharge	Process	EHR chart review	All ischemic stroke/TIA patients assigned to Neurology service and discharged home during the reporting period	Daily for 3 months post-implementation	Percentage/ Proportion; Run Chart	100%

Post-discharge phone call made to patient within two business days of discharge. *Did patient have a successful post-discharge phone call within two days of discharge?*	Percentage of successful phone calls within 48 business hours of discharge	Process	EHR chart review	All ischemic stroke/TIA patients assigned to Neurology service and discharged home during the reporting period	Daily for 3 months post-implementation	Percentage/ Proportion; Run Chart	100%
Post-discharge medication reconciliation completed during post-discharge phone call. *Was medication reconciliation completed during the post-discharge phone call?*	Percentage of patients with medication reconciliation at post-discharge call	Process	EHR chart review	All ischemic stroke/TIA patients assigned to Neurology service and discharged home during the reporting period	Daily for 3 months post-implementation	Percentage/ Proportion; Run Chart	100%
Patient received appointment reminder at post-discharge phone call. *Was patient provided a reminder of follow-up appointment during post-discharge phone call?*	Percentage of Patients with Appointment Reminder	Process	EHR chart review	All ischemic stroke/TIA patients assigned to Neurology service and discharged home during the reporting period	Daily for 3 months post-implementation	Percentage/ Proportion; Run Chart	100%

Patient successfully attended follow-up appointment. *Did patient attend follow-up appointment within two weeks of discharge home?*	Percentage of Follow-up Appointment Attendance	Outcome	EHR chart review	All ischemic stroke/TIA patients assigned to Neurology service and discharged home during the reporting period	Daily for 3 months post-implementation; Assessed for 3 months prior to implementation and 3 months post-implementation	Percentage/ Proportion; Run Chart; Independent t-test	100%
All cause readmission rates for stroke patients were less than 10%. Were stroke readmission rates maintained at less than 10%?	All cause readmission rate for stroke patients	Outcome	EHR chart review	All ischemic stroke/TIA patients assigned to Neurology service and discharged home during the reporting period	Monthly rates for 3 months pre-/ and 3 months post-implementation	Percentage/ Proportion	<10%

Table 2

Data Dictionary: Adoption of Evidence-Based Practices in Stroke Transitions of Care

| Data element	Data Label	Data Type	Definition/Purpose	Data Values & Coding
Patient Identifier	patID	Alpha-numeric	Unique identifier	Alpha-numeric
Age	age	Numeric, Continuous	Age in years	Actual Numeric Value
Gender	gender	Categorical	Self-identified gender from EHR	1, Male; 2, Female; 3, Other
Race	race	Categorical	Self-identified race from EHR	1, White; 2, Hispanic or Latino; 3, Black or African American; 4, Native American or American Indian; 5, Asian/Pacific Islander; 6, Other; 7, Unknown; 8, Not Hispanic, Latino, or Spanish in Origin; 9, Decline to Answer
Admit Date	adDate	Numeric, Continuous	Admit date from EHR	Date (00/00/0000) 10/20/2020 to 01/20/2021
Discharge Date	disDate	Numeric, Continuous	Discharge date from EHR	Date (00/00/0000) 10/26/2020 to 01/20/2021
Diagnosis Code	diag	Categorical	Diagnosis as written in EHR	1, Ischemic Stroke; 2, Transient

				Ischemic Attack/TIA
Meet with NP	meetNP	Categorical	Did patient meet with NP prior to discharge?	1, Yes; 0, No
Patient Contact	patCon	Categorical	Did patient have designated contacts listed in chart?	1, Yes; 0, No
Appointment Scheduled	apptSched	Categorical	Follow-up Appointment Scheduled Prior to Discharge?	1, Yes; 0, No
Post-discharge phone call in 2 days	phoneCall	Categorical	Did patient have post-discharge phone call within 2 business days of discharge?	1, Yes; 0, No
Medication Reconciliation	medRec	Categorical	Did patient have medication reconciliation completed at post-discharge phone call?	1, Yes; 0, No
Appointment Reminder	apptRem	Categorical	Did patient have appointment reminder during post-discharge phone call?	1, Yes; 0, No
Appointment Follow-up Attendance	follAtten	Categorical	Did patient attend two-week follow-up?	1, Yes; 0, No
Percentage Successful Attendance to follow-up	successAtten	Numeric	Percentage of patients who successfully attended follow-up throughout project	Actual Numeric Value from 0-100%
Readmission rate	readmission	Numeric	Rate of All-cause readmission for stroke patients	Actual Numeric Value from 0-100%
Length of Stay	LengthOfStay	Numeric	Length of Stay from Admit Date to Discharge Date	Actual Numeric Value in Days
Appointment Type	apptType	Categorical	Type of Appointment	1, In-person; 2, Telehealth

Table 3

Participant Demographics

Variable	Frequency (N)	Percentage
Participants	N=32, Excluded from follow-up= 8	25% excluded from follow-up visit
Diagnosis		
Ischemic Stroke	13	41%
Transient Ischemic Attack	19	59%
Gender		
Female	13	41%
Male	19	59%
Other	0	
Race		
White	19	59%
Hispanic or Latino	2	6%
Black or African American	6	19%
Native American or American Indian	0	0
Asian/Pacific Islander	0	0
Other	1	3%
Unknown		
Not Hispanic, Latino, or Spanish in Origin		
Decline to Answer		
Age	Range: 30-99 Average: 68	
Length of Stay	Range: 1-11 days Average: 2.75 days	

Run Charts

Objective 1: Percentage of Patients who Met with NP Prior to Discharge
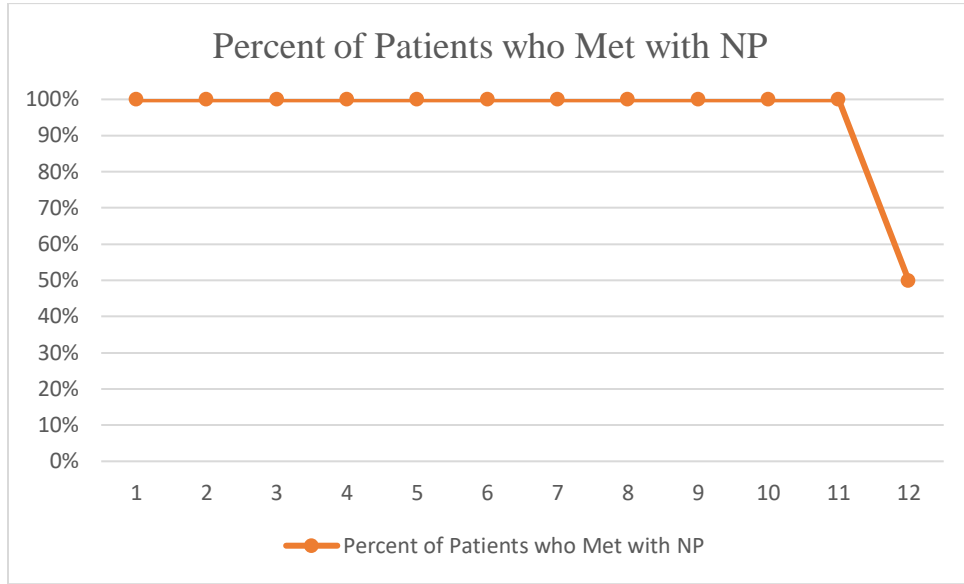
Objective 2: Percentage of Patients with Designated Point of Contact in EHR
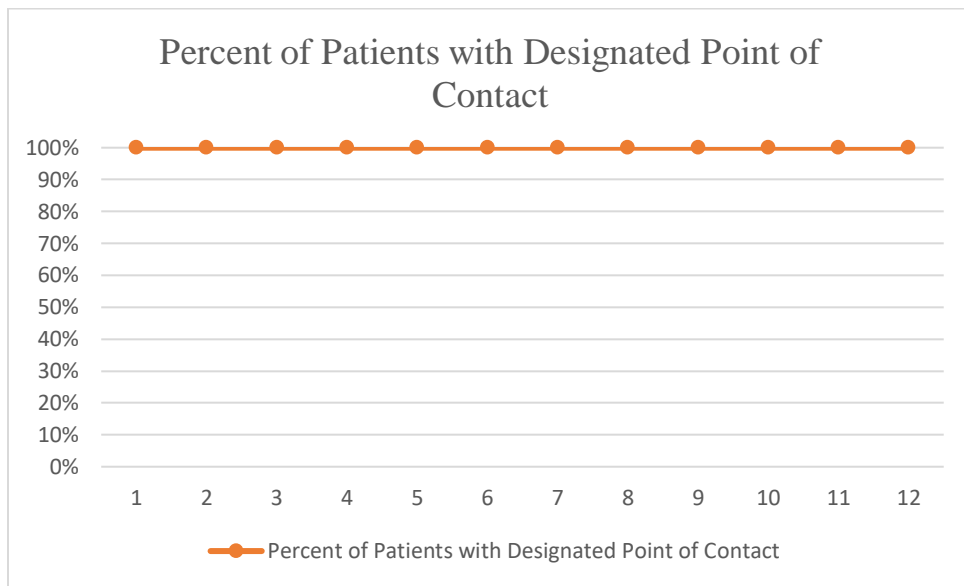
Objective 3: Percentage of Patients with Follow-up Scheduled Prior to Discharge
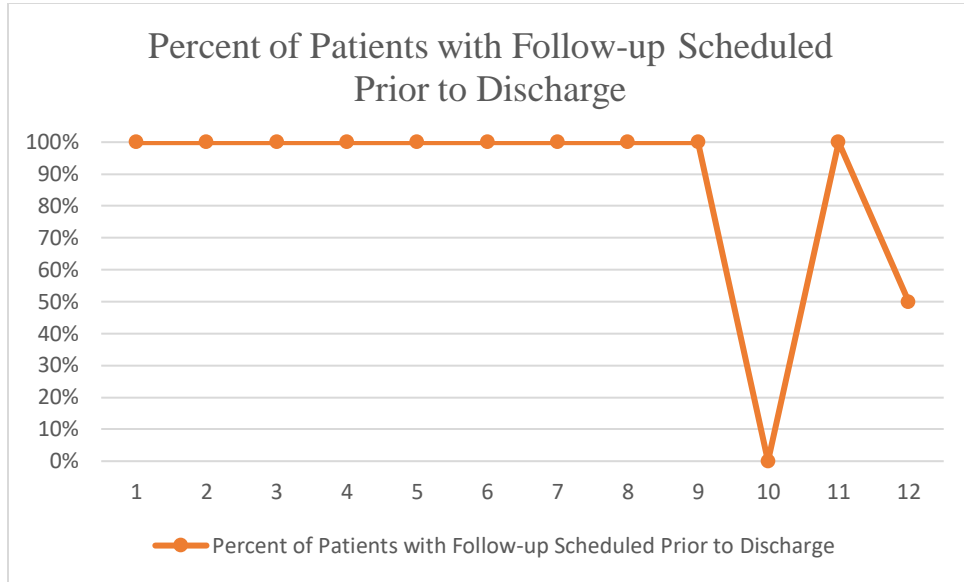
Objective 4: Percentage of Patients with Successful Post-discharge Phone Call
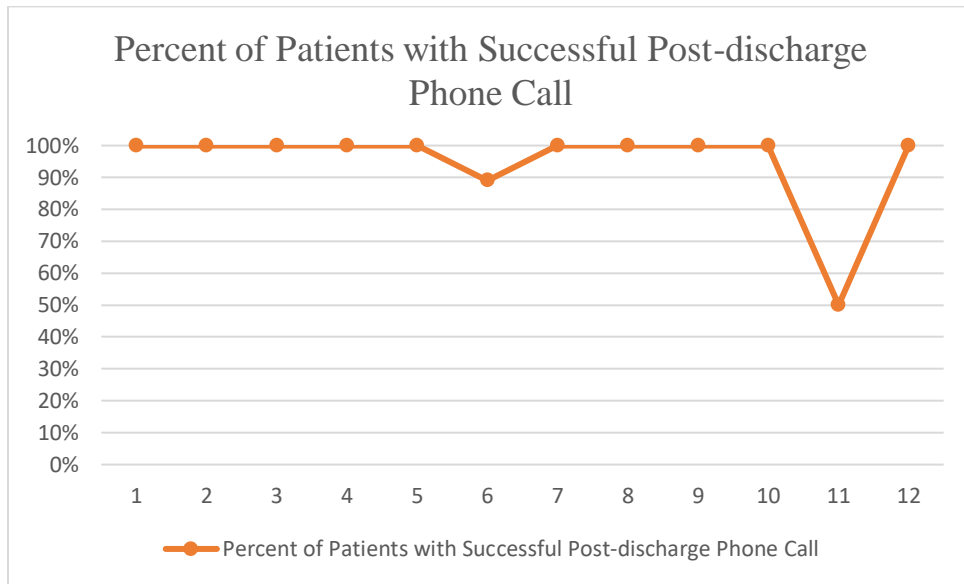
Objective 5: Percentage of Patients with Medication Reconciliation During Call

Percent of Patients with Medication
Reconciliation During Call
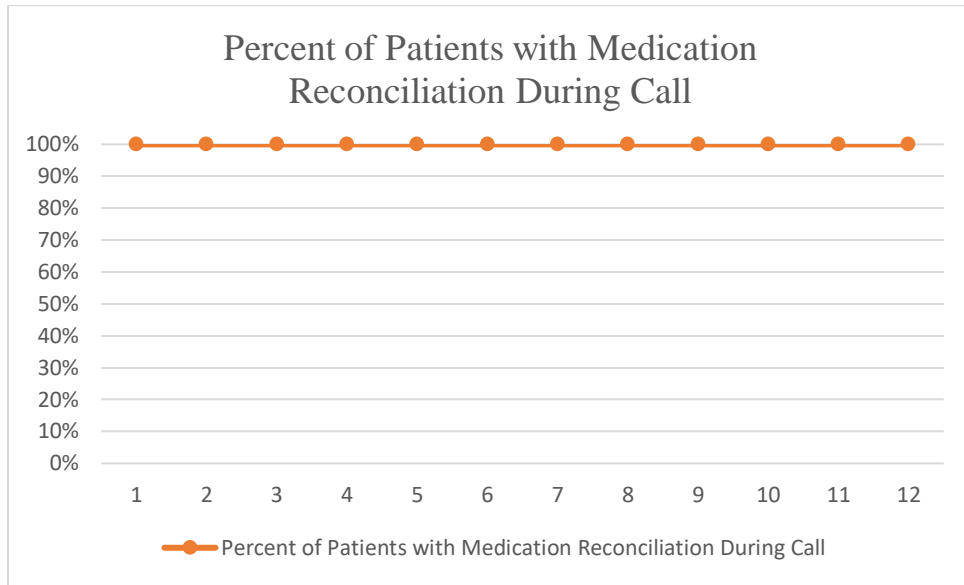
Objective 6: Percentage of Patients with Reminded of Appointment During Call

Percent of Patients Reminded of Appointment
During Call
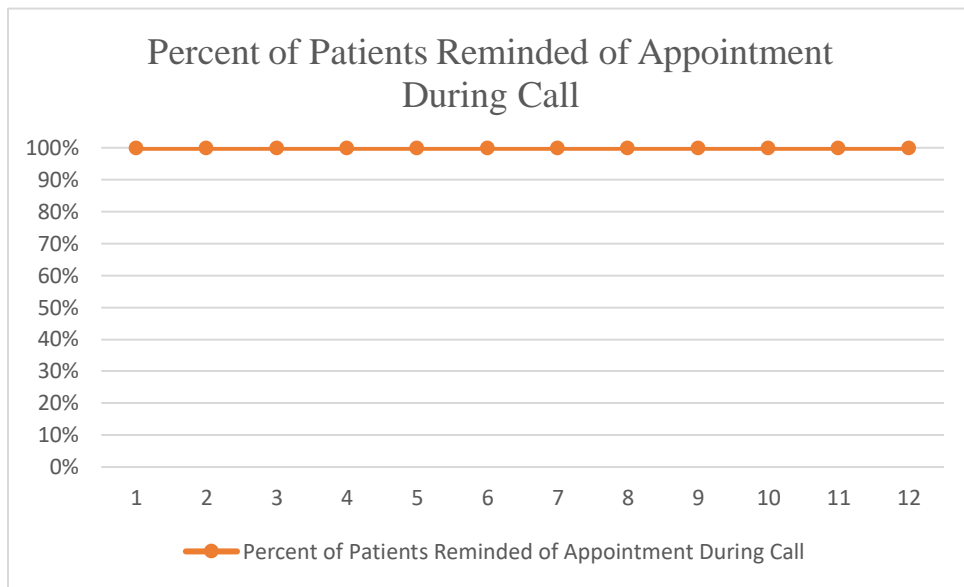
Table 4

Follow-up Attendance Pre- and Post-Implementation

	Participants who Attended Follow-up	Total Participants	Percentage
Pre-implementation	28	45	62%
Post-implementation	20	24	83%

Follow-up Attendance Pre- and Post-Implementation Graph
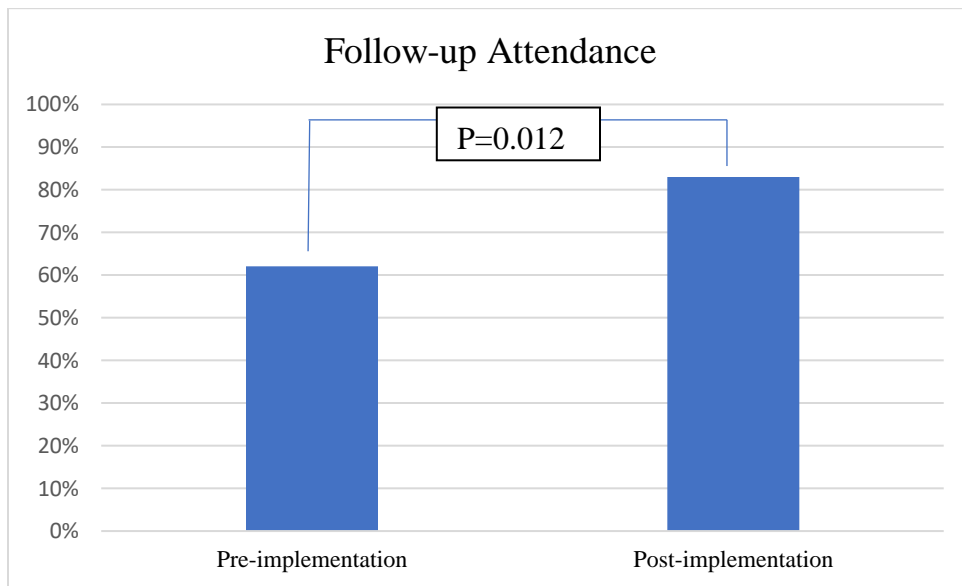
Table 5

Follow-up Attendance Pre- and Post-Implementation with T test

Week	Pre-Implementation	Post-Implementation
1	50%	100%
2	57%	100%
3	100%	100%
4	75%	100%
5	60%	100%
6	50%	100%
7	100%	100%
8	25%	40%
9	50%	100%
10	67%	100%
11	50%	100%
12	100%	50%

$p=0.012035711$

Table 6

Readmission Rates

	Total Cases	Readmissions	Observed Rate
Pre-Implementation			
JUL 2020	20	1	5.00%
AUG 2020	24	2	8.33%
SEP 2020	30	3	10.00%
Post-Implementation			
OCT 2020	33	3	9.09%
NOV 2020	27	2	7.41%
DEC 2020	21	1	4.76%

30-Day Readmission Rates Graph

30-day Readmission Rates

Pre-Implementation   Post-Implementation

Month	Readmission Rate
JUL 2020	~5.00%
AUG 2020	~8.30%
SEP 2020	~10.00%
OCT 2020	~9.10%
NOV 2020	~7.40%
DEC 2020	~4.80%

(Chart y-axis: 0.00%, 2.00%, 4.00%, 6.00%, 8.00%, 10.00%, 12.00%)
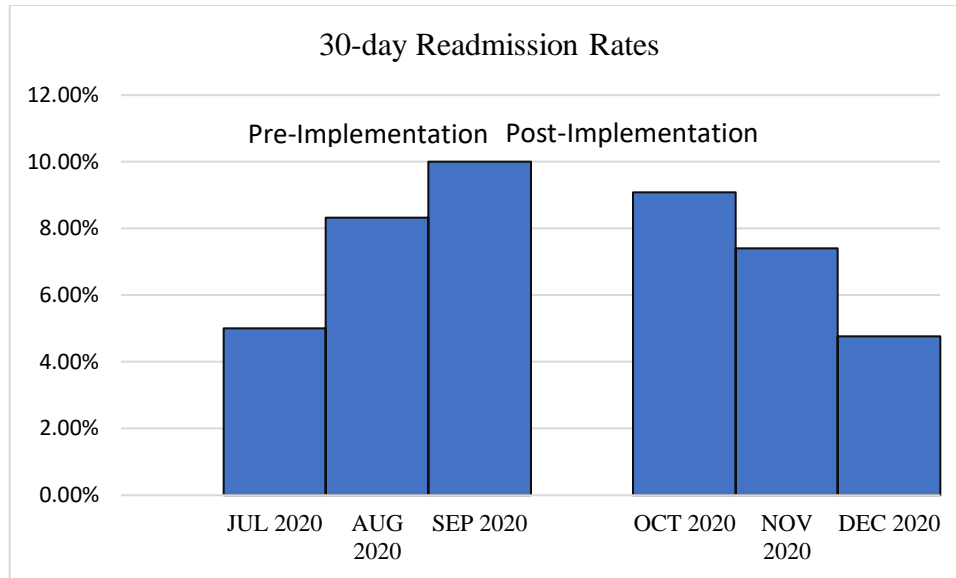
Discussion

Overall, the process measures that were adopted from evidence-based recommendations were successful in streamlining and improving the Stroke Transitions of Care program. Continued evaluation via run charts will further establish successful process implementation as the Stroke Transitions of Care program expands and develops over time. The project outcomes resulted in a significant increase in patient follow-up to Neurology clinic in the outpatient setting. Readmission rates remained less than 10% during the course of project implementation and did not rise after project initiation. Readmission rates should be evaluated in the long-term setting in order to identify any ongoing effects of the Stroke Transitions of Care program on stroke patient readmissions and complications. This project engaged a multidisciplinary, structured approach to Transitions of Care for stroke patients and will be a permanent aspect of the stroke program at this Primary Stroke Center. Replications of this project and similar projects regarding Stroke Transitions of Care will contribute to the growing data supporting such programs in benefiting patient outcomes.

Implications for Practice

The findings of this project indicate that the adopted evidence-based recommendations do support improved practices in Stroke Transitions of Care. As the healthcare market in the United States evolves towards a focus of quality-driven care, effective transitions in healthcare settings will gain traction. The Stroke Transitions of Care program will remain a permanent practice at the project site location and this project will serve as an example for other future projects at similar institutions.

Implications for Healthcare Policy

Structured, evidence-based Transitions of Care programs have been shown to benefit patient health and outcomes, reducing readmission rates and complications after stroke. This project, and future projects or studies will encourage widespread emphasis of the benefits of such programs. This data should engage policymakers to further promote the development of policy recommendations and incentives for institutions that develop and implement Transitions of Care models. Such policies will further strengthen the quality focused approach of modern medicine and healthcare.

Implications for Executive Leadership

This project involved a multidisciplinary approach, with a nurse practitioner led Stroke Transitions of Care program. The results of this project, with the successful development and implementation of process measures to improve the Stroke Transitions of Care program will be disseminated to the project location and leadership members, as part of the initiatives to expand the comprehensive stroke services offered within the hospital. This will assist with leadership engagement and resource allocation to provide continued support for the stroke program as it progresses towards Comprehensive Stroke certification.

Implications for Quality/Safety

The process measures adopted into the Stroke Transitions of Care program ensured consistent patient and healthcare provider communication, effective care coordination throughout patient hospitalization, and improved follow-up in the outpatient setting. The impacts of this program on patient stroke treatment and risk factor management can be studied in further projects. Future long-term studies related to patient health outcomes, including long-term evaluation of readmission rates or other stroke complications, will demonstrate the value of such programs in providing quality patient care.

Plans for Sustainability and Future Scholarship

The results of this project will be disseminated throughout the practice organization, in order to promote Stroke Transitions of Care implementation and sustainability in the long-term. Run charts will remain effective measures for continued program evaluation and will allow for analysis of any barriers to program maintenance. In the future, the Stroke Transitions of Care services will be broadened to a larger population, including patients discharged to other locations. This will allow for an expansion of stroke services and benefits to care coordination for a greater population of stroke patients.

Conclusion

This doctoral quality improvement project resulted in the successful adoption of evidence-based process measures to improve the Stroke Transitions of Care program. In addition, these measures led to a statistically significant improvement in outpatient Neurology follow-up within two weeks of hospital discharge, when compared to the pre-intervention group. Improved patient follow-up could translate to improved stroke management and prevention of further cerebrovascular events in the long-term. Readmission rates were less than 10% for stroke

patients for the duration of the project and will continue to be analyzed as the program continues, in order to evaluate for long-term trends. The successful results of the project will lead to further expansion of the Stroke Transitions of Care program and the possible inclusion of a larger patient population. Continued evaluation of the Stroke Transitions of Care program will demonstrate further long-term benefits to patient health outcomes. Dissemination of the project results will encourage the development of Stroke Transitions of Care programs in other settings.

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Appendices

Appendix A: SWOT Analysis

	Helpful To achieving the objective	Harmful To achieving the objective
Internal Origin {Attributes of the organization}	**Strengths** • Existing Vascular Neurology-Led Stroke Program • Culture of Providing Quality Care and Patient Satisfaction • Leadership Support and Communication • Strong Stroke Expertise • Multidisciplinary Staff Engagement	**Weaknesses** • Lack of Evidence-Based Processes in Stroke Transitions of Care • Lack of Focus on Post-Acute Care Setting • Young/New Stroke Program • Lack of Electronic Health Record System Interoperability • Lack of Manpower
External Origin {Attributes of the organization}	**Opportunities** • Goal of Comprehensive Stroke Certification-Improve Reputation • Shift in Focus towards Long-term Stroke Recovery • Continuity of Patient Care • Improved Access to Care • Standardization of Transitions of Care Processes • Medicare Transitions of Care Goals	**Threats** • Competition By Other Organizations and Primary Care Groups • Systems and Technology Complications • Difficult Post-Discharge Communication • Lack of Patient Follow-up at 1-2 weeks post discharge

Appendix B: Evidence Table

PICOT Question: In adult stroke patients, what nurse-led interventions from Transitions of

Care programs improve stroke prevention and management outcomes in the immediate post

hospitalization period?

Article #	Author & Date	Evidence Type	Sample, Sample Size- Intervention (I) and Control (C), Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	*Evidence Level & Quality
1	Adeoye et al. (2019)	Policy Statement	Participant were experts in stroke care recognized by the American Stroke Association	- Establish support systems for improved follow-up with neurology services - Standardized care - Routine communication in pre- and post-discharge settings - Reinforce secondary prevention and lifestyle changes	This policy was established to improve stroke patient outcomes	None identified.	A- High Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size- Intervention (I) and Control (C), Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	*Evidence Level & Quality
2	Allen et al. (2009)	Randomized controlled trial	Sample: 380 Sample size: 190 (I) 190 (C) Setting: 963-bed hospital in Akron, Ohio	- Intervention included multidisciplinary approach with therapy, education, medication reconciliation, social support services, and assessment for poststroke complications - Resulted in significant effects on stroke knowledge and lifestyle modifications but overall no significant superiority from the control (standard care group) at 6 months.	• Neuromotor function • Institution Time and Death, • Quality of life, • management of risk • Stroke knowledge and lifestyle	Single, center setting Baseline patient characteristics were not far from the goal outcomes in the intervention group (blood pressure, cholesterol, depression, falls, neuromotor deficits).	Level 1- High Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size-Intervention (I) and Control (C), Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	*Evidence Level & Quality
3	Cheng et al. (2018)	Randomized controlled trial	Sample:404 Sample size: 204 (I) 200 (C) Setting: 4 county hospitals in Los Angeles, CA	- Intervention included medication adjustment, promotion of lifestyle changes and adherence to stroke prevention -Findings were not significant for blood pressure, antithrombotic medication use, smoking cessation, and physical activity -Significant findings of LDL<100md/dL in the intervention arm	Systolic blood pressure at 3, 8, and 12 months; LDL reduction, antithrombotic medication use, smoking cessation, and physical activity	Possible contamination from lack of site randomization Lack of participation of subjects in all aspects of intervention	Level 1-High Quality
4	Condon et al. (2016)	Prospective pre- and post-modification quality improvement study	Sample:510 Sample size: 167 in Phase 1 group and 343 in Phase 2 group Setting: Wake Forest Baptist Medical Center (WFBMC)	-Intervention included Transitional care model services (TSC) with a post-discharge call and visit with a structured visit template - TSC was associated with 48% reduction in 30-day readmission. There was no impact on 90-day readmissions.	Follow-up call completed, TSC visit, days from discharge to TSC, days from discharge to readmission, 30-day readmission, 90-day readmission	Single center setting Not randomized controlled trial Patient population limited- Those discharged home only	Level V-Good quality

Article #	Author & Date	Evidence Type	Sample, Sample Size- Intervention (I) and Control (C), Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	*Evidence Level & Quality
5	Feldman et al. (2019)	Randomized controlled trial	Sample:495 Sample size: 165 (C) 165 (I with NP) 165 (I with Health Coach) Setting: urban home health organization in the US	- Interventions included an NP-led transition of care service and a health coach program - SBP declined 9-10mmHg from baseline to 12 months across all groups; the greatest decrease occurred between baseline and 3 months. - There was no significant advantage of intervention compared to usual home care.	Systolic blood pressure from baseline to 3 and 12 months	Single center Imperfect Standardization of intervention Home care environment created bias Population-Limited to US Black and Hispanic individuals	Level I- Good quality
6	Gesell et al. (2019)	Randomized controlled trial	Sample: 2751 Sample size: 41 hospitals 20 hospitals (I) -656 patients; 21 hospitals (C) Setting: North Carolina Hospitals	- Intervention included implementation of COMPASS model - A majority of patient received two-day calls and scheduled visits. Most clinic visits occurred within two weeks. - Physical function was improved for patients who attended follow-up visits.	Two-day calls, Scheduled follow-up visits, eCare plan provided at visits, Physical function	Small sample sizes from locations Differences in implementation of COMPASS model	Level 1- Good quality

Article #	Author & Date	Evidence Type	Sample, Sample Size-Intervention (I) and Control (C), Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	*Evidence Level & Quality
7	Irewall et al. (2015)	Randomized controlled trial	Sample:537 Sample size: 241 (I) 243 (C) Setting: Östersund Hospital, Sweden	- Intervention included nurse-led telephone follow-up - Significant effects-At 12 months, mean systolic blood pressure, diastolic blood pressure, and LDL were lower in the intervention group. A larger proportion of the intervention group reached the treatment goal for systolic blood pressure.	Blood pressure and LDL levels at 1 month and 12 months post-discharge	Single center study Setting may have created bias	Level I-High quality
8	McClain et al. (2019)	Retrospective descriptive chart review	Sample:403; Sample size: 68 (I) 335 (C) Setting: Primary Stroke Center in Northeast Ohio	- Intervention included patients attending NP led transition clinic versus no clinic. - The 30-day readmission rate was significantly higher in nonclinic patients than in clinic patients. The 90-day readmission proportion was higher in nonclinic patients.	30-day readmissions and 90-day readmissions	Single center study Retrospective design Small sample size	Level III-Good quality

Article #	Author & Date	Evidence Type	Sample, Sample Size-Intervention (I) and Control (C), Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	*Evidence Level & Quality
9	Mountain et al. (2020)	Evidence-Based Guidelines	Transitions and Community Participation following Stroke Best Practice Writing Group, the Canadian Stroke Best Practices and Quality Advisory Committee	Recommendations for interprofessional care planning, ongoing stroke education, discharge coordination, timely communication at transitions and scheduled follow-up	Screening patients, health outcome measures, teach back education methods	Authors funded by Heart and Stroke Foundation, Canada; may not be fully applicable to American Healthcare System	Level A- High Quality
10	Olaiya et al. (2016)	Prospective sub-study a randomized controlled trial	Sample: 142 Sample size: 78 (I) 64 (C) Setting: 4 hospitals in Melbourne, Australia	- Intervention included an individualized management program with nurse-led education. - There was no significant difference between intervention groups in knowledge of medications.	Knowledge of secondary prevention medications at 12 months	Delay between intervention and outcome measurement Lack of baseline information on medication knowledge	Level I- High Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size- Intervention (I) and Control (C), Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	*Evidence Level & Quality
11	Poston et al. (2014)	Quality Improvement Project	Sample: Ischemic stroke patients discharged home within one year Setting: 700-bed hospital in Southeastern US	- Intervention included nurse navigators who assisted in discharge process and planning follow-up. - Thirty-day readmission rates decreased from 9.39% to 3.24% when comparing pre- with post-intervention data.	30-day readmissions, Hospital utilization	Possible effects of feasibility phase on intervention outcomes	Level V- Good quality
12	Rochester-Eyeguokan et al. (2016)	Scoping Review	1362 articles identified in database search; 348 articles were discussed, including188 original research articles were chosen with 46 reviews	- Makes recommendations for ideal transitions of care practice policies, including care coordination, timely follow-up, planned interventions, education and promotion of self-management.	Compared outcomes and processes of Transitions of Care models	Some studies had lack of description of their methods	A- High Quality

Article #	Author & Date	Evidence Type	Sample, Sample Size- Intervention (I) and Control (C), Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	*Evidence Level & Quality
13	Wong et al. (2015)	Randomized controlled trial	Sample: 108; Sample size: 54 (I) 54 (C) Setting: hospital in Hong Kong	-Intervention included a nurse-led transition of care clinic. - The transition of care program had positive effects on quality of life, patient satisfaction, functional outcomes, depressive symptoms, and reducing use of emergency room visits.	Quality of life, Patient satisfaction, Modified Barthel Index- functional performance, depression score, use of emergency services	Single center study Small sample size	Level I- Good Quality

*Evidence Appraisal Tool: Dang & Dearholt (2018)

Appendix C: Gantt Chart

Stroke Transitions of Care

Sabena Passarello, MSN, FNP-BC GANTT CHART

George Washington University School of Nursing

NUMBER	TASK TITLE	START DATE	DUE DATE	DURATION	PCT OF TASK COMPLETE
1	**Project Initiation**				
	Staff Education of Transitions of Care	8/31/20	9/7/20	7	0%
	Roll-out of NP Participation in Multidisciplinary Rounding	8/31/20			0%
	NP Documentation of Patient Contact	10/26/20			0%
	NP Meeting with Patient prior to Discharge and Scheduling Follow-up, Adding Discharge Instructions	10/26/20			0%
	Post-Discharge Phone Calls	10/26/20			0%
	Initial Follow-Up Appointments	10/28/20			0%
3	**Project Maintenance/Data Collection**				
	Halfway Point Check-In with Stakeholders	11/30/20	12/14/20	14	0%
	Review of Current Data Assessment	11/30/20	12/14/20	14	0%
	Assess Current Findings/Barriers	11/30/20	12/14/20	14	0%
	Continuation of Follow-up Appointments				0%
4	**Project Performance / Evaluation**				
	Statistical Analysis	2/1/21	2/15/21	14	0%
	Project Evaluation	2/1/21	3/1/21	28	0%
	Dissemination of Results	4/26/21			0%

Appendix D: IRB Exemption

SON Research Sep 22, 2020, 8:18 PM

Dear Sabena and Drs. Knestrick and Kesten,

Regarding the determination request for the proposal entitled, "Adoption of Evidence-based Practices in Stroke Transitions of Care" a decision has been made that your project does not meet the definition of research. That is, a systematic investigation intended to contribute to generalizable knowledge.

This determination is being made after review of the project documents. The project nature as quality improvement intends to inform internal practice. The project does not aim to inform new theories or external standards of practice. Therefore, further review by the GW Nursing Office of Research or the GW Institutional Review Board is not required (per GW IRB Policy HRP-010, Human Research Protection Program).

Should your project change in any way that it would meet the definition of research, please contact the GW Nursing Office of Research at sonresearch@gwu.edu so we may assist you in proceeding. As a reminder, you are to conduct all projects in an ethical manner regardless of review requirements.

Please do not hesitate to contact me with any questions or concerns regarding this determination.

Kind regards,

Angela M. McNelis, PhD, RN, FAAN, ANEF, CNE
Professor and Associate Dean for Scholarship, Innovation, and Clinical Science
Governor-At-Large, National League for Nursing
George Washington University School of Nursing
1919 Pennsylvania Ave, NW Suite 500
Washington, D.C. 20006Office: 202-994-2066
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Appendix E: Project Site Approval

Sabena Passarello, RN, MSN, FNP-BC.

███████████████

Re: Adoption of Evidence-based Practices in Stroke Transitions of Care
Dear Dr. Lafi:

This is to inform you that the Clinical Research Committee at Virginia Hospital Center approved "**Adoption of Evidence-based Practices in Stroke Transitions of Care"** on October 15, 2020.

This project does not require IRB review as it meets the following Quality Improvement criteria:

- it performed to implement existing knowledge to improve care

- patients are not randomized into different intervention groups

- researchers do have commitment to improvement of the local care situation

- there will be no delayed feedback from monitoring to implement changes in data interpretation

- it is not funded by an outside organization

As this project is considered quality improvement, exemption from IRB review under CRF 46.101(b)(4) from 45 CRF Part 46 requirements was not considered.

De-identified information is not considered PHI and such is not governed by the Privacy Rule. No authorization or waiver is necessary for its use or disclosure.

████████████████ approval is contingent upon following:

(1) ████████████████ Clinical Research Committee be informed of any modification in the project plan or design;

 (2) The Clinical Research Committee be notified when data collection at this facility is completed.

If there is additional assistance that I may provide, I may be contacted at ███████████████).

Sincerely,

Sharon Goldberg, CCRC
Coordinator, Clinical Research Committee