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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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 DRIP 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 (OVA) 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 dales_

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

SignaturA

3/5/7/7 Date

Appendix E: Human Research Review Committee approval

IIEALTI f SCIENCES CENTER

Hainan Research ***REVIEW CDPERlifER***
Manion Research Protections Office

May 9, 2017

Therese Hidalgo
thhidalsoqOalud.urumedu

Dear Therese Hidalgo:

On 5'912017, the 1411.R.0 reviewed the following submissicm:

Type of Review-. Initial Study
Title ofStud).: Stratified Discharge Interventions Based on Risk for Stroke Patients and Their Effect Upon Hospital Readmissions
investigator. Therese Hidalga
Study ID- 17-175
Submission ED 17-175
IND, IDE, or HDE: None

Submission Summary: Initial Study

Documents Approved: • HRP-582 - VICKERY - Version 3 Exempt Category 4 protocaLpdf Review

Category: EXENOTION: Categories (4). Data, documents, or specimens.

Determinations•Vaivers: Documentation of Consent not required_
HIPAA Authorization Addendum Not Applicable.

Submission Approval Date: 5/912017
Approval End Date: **Neale**
Effective Date: 51912017

The 11.R.RC approved the study from 519.[1]2011 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 I-IRRC appeared your modificatians 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 docimients. If changes are being considered and there are questions about whether I-LRRC review is needed, please submit a study modification to the H.R.RC fora determination. A change in the research may· disqualify this research from the current review category. **You** can create a modification by clicking Create Modification f CR within the study.

In conducting this study, you are required to follow the Investigator Manua] dated April I, 2015 (HR_P-163), which ran he found by navigating to the 122 Library.

Sincerely,

C7e,1/4,fre-7,404A,

Thomas F. Byrd, MD
'MAC Chair