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Evaluation of Testing and Implementation of Evidence-based RN Bedside Swallow Screen for Dysphagia: A Clinical Practice Change

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Evaluation of Testing and Implementation of

Evidence-based RN Bedside Swallow Screen for Dysphagia:

A Clinical Practice Change

Final Project
Presented in partial fulfillment of the requirements
Of the Doctorate of Nursing Practice Degree Program

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1. Abstract:

Stroke patients initially experience dysphagia approximately 42 - 67% of the time with noted improvement reducing dysphagia rates to approximately 43% at seven days post acute stroke (Perry & Love, 2001). However, the dysphagia experienced by these patients makes them at high risk to develop aspiration pneumonia. In addition to promoting patient safety, the benefit of reducing aspiration pneumonia includes reduction in financial burden of the national cost of morbidity, mortality, and disability in this population. With no generally recognized registered nurse (RN) administered swallow screen and with few having been rigorously tested, a bedside swallow screening protocol was developed and a quality improvement (QI) project study implemented to provide teaching of this new skill set for the RN.   Thereafter, an evaluation study was designed to assess whether the established screening protocol was a valid, reliable, cost effective, and easy method to administer an evidence-based swallow screen for dysphagia that could prevent acute stroke patients from developing aspiration pneumonia. The evaluation assessment also determined whether the RN staff developed confidence, as a result of the education methods used, that they could administer this new skill and protocol. An additional assessment was done to see if change in organizational practice throughout the hospital occurred. The evaluation indicated that change in practice occurred and adherence to evidence-based clinical practice guidelines of swallowing screen before allowing anything by mouth was the result throughout the organization. This report includes lessons learned related to the use of this screening tool, the behavioral changes as a result of learning new information among the professional nursing staff and the politics involved in forging organizational practice change.

2. Executive Summary

According to the American Heart Association (2009), overall death rates from stroke in the United States among those 20 years and older are 46.6 per 100,000 and strokes are the third leading cause of death at one death every 3-4 minutes   In addition to loss of life, estimated fiscal costs of stroke-related health care for 2009 topped $68.9 billion (American Heart Association, 2009). In order to identify and screen stroke victims accurately and to therefore expedite treatment, ten evidence-based clinical practice guideline performance measures were established by The Joint Commission (TJC) disease-specific care certification program for primary stroke centers (PSC) (2008). These clinical practice interventions were found to decrease the incidence of stroke patient mortality and disabilities of stroke (TJC, 2008). One of the ten recommended guidelines of TJC was to withhold oral intake by placing acute stroke patients on nothing by mouth (NPO) until a dysphagia screen was performed. Stroke patients initially experience dysphagia approximately 42 - 67% of the time with noted improvement, reducing rates to approximately 43% at seven days post-acute event (Perry & Love, 2001). The dysphagia experienced by these patients puts them at high risk for developing aspiration pneumonia. Moreover, there is a threefold risk of death for stroke patients with aspiration pneumonia in the first 30 days following onset of the condition (Katzan, Cebul, Husak, Dawson, & Baker, 2003). Stroke guidelines in the United States (US), Canada, Germany, United Kingdom, and Scotland include the requirement that dysphagia be assessed by a trained healthcare clinician using a validated screening tool (American Heart Association, 2009; JCAHO, 2008; Teasell, et al, 2005; Heuschmann, et al. 2006; & Scottish Intercollegiate Guidelines Network, 2004). Assessing for dysphagia in this population is essential for safety and to reduce morbidity and mortality.

Nonetheless, barriers to this clinical practice guideline exist. For instance, the screening is most often completed by a speech language pathologist (SLP); yet patients often wait for extended periods of time before the screening is done since SLPs are not always available during times when patients require assessment. Since most hospitals only employ the SLP during normal business hours, patients do not receive any medications or nutrition orally during the wait time since SLPs are not available to conduct the screening evaluation that must precede the use of stroke related treatments. Therefore, many hospitals have begun to develop and implement an RN bedside swallow screen to improve practice compliance, decrease wait time, reduce cost of care and to attempt to increase response time for stroke victims (Great Lakes Regional Stroke Network Dysphagia Quality of Care Workgroup, 2008-2009).

During the period of April-June 2010 an evaluative study was conducted to determine the outcomes of a QI study completed between September – December 2009 entitled an "Evidence-based RN Bedside Swallow Screen for Dysphagia (RNBSS)". Both of these studies were conducted at a regional acute care 315-bed hospital in the mid-west region of the United States. The initial swallow screen study was conducted for the purposes of developing an appropriate swallow screen protocol and of changing nursing practice to improve outcomes for stroke and transient ischemic attack (TIA) patients. Twenty one nurses and 52 patients on one acute (non-critical care) stroke unit were involved in the testing of the swallow screen.

The evaluative study, conducted during April –June 2010 presents the analysis of data from closed medical records from subjects included in the initial study. Following are the six objectives for this evaluative study with corresponding questions to be answered related to the goal of improved organization adherence to evidence-based guidelines for stroke patients. The first objective was to determine if the RNBSS was a valid screen to identify patients with and

without dysphagia. The question related to this goal to be answered was: Is the RNBSS for

Dysphagia a valid tool for assessing dysphagia as indicate by testing sensitivity and specificity of

the swallow screen protocol? The answer to this question ultimately determined if the screen

correctly identified patients with dysphagia and those without dysphagia.   The second objective

was to evaluate inter-rater reliability of the RNBSS. The related question was: Does the RNBSS

have strong inter-rater reliability? This question was answered by calculating Cohen's Kappa

statistic to determine if there was consistent agreement between RN screeners. The third

objective was to evaluate how effective the education methodology was in teaching the RN staff

new assessment skill. The key question here was: Did the education methods used to teach the

nurses how to perform the swallow screen (video, quiz, return demonstration) confidently

prepare the RN staff to administer the RNBSS?   This question was answered using a pre and

post training staff survey of nine questions, to include asking respondents to rate knowledge

gained, feelings of preparedness, and appropriateness of education methods used. The fourth

objective was to evaluate if the RNBSS was economically beneficial as measured by a

comparison analysis with Emergency Department Physician, SLP, or an RN to perform the

bedside swallow screen. The related question was: Does the RN bedside swallow screen

demonstrate a cost benefit to the healthcare organization?   The fifth objective of this evaluation

study was to determine what improvements needed to be made in the protocol.

Recommendations to improve the protocol resulted from the answer to the question: What

improvements should be made to the protocol? This analysis also looked at the study process to

understand the political factors which were evident during the study, such as patient and staff

satisfaction and time constraints. If unintended problems arose during the initial QI testing of the

protocol, then recommended changes would take place. The sixth and final objective was to

evaluate all of the above findings to determine if the RNBSS protocol should continue to move forward as the hospital wide standard of care. Should the protocol continue to be used? The answer to this final question determined the extent to which the protocol could be used. If the results of the analysis demonstrated that the RNBSS was both sensitive and specific in correctly identifying patient's dysphagia showed fiscal benefits, and impacted organizational change, then the protocol should continue and be implemented throughout the organization.

Findings indicated that the RNBSS for Dysphagia was valid with high sensitivity, with 94% of the RN screenings correctly identifying patients with dysphagia. Inter-rater reliability results showed strong consistent agreement between RN screeners. The training survey results found significant change in staff feeling knowledgeable to carry out the screen, feeling prepared to carry out the screening, and that the teaching methods used were appropriate. The cost benefit analysis demonstrated a cost savings for the hospital for the RN staff to provide the dysphagia screening over the SLP or physician group. Furthermore, the RN staff providing the screening resulted in the benefit of improved patient satisfaction, as the patients received expedited recommended guideline care. RN staff was given an additional responsibility; however, the analysis strongly suggested that the RNBSS Protocol continue with full implementation. In conclusion, it was found that the QI study had an impact on organizational change with adherence to this recommended guideline, keeping stroke and TIA patients NPO until swallow dysphagia screening**.** January through June of 2010 GWTG results showed this hospital outperformed the all hospitals average with the highest in June at 97% of stroke patients receiving dysphagia screening prior to any food, fluids, or medication by mouth. The hospital recently received Silver recognition from The American Heart Association achieved by

following stroke treatment guidelines 85% of the time for at least 12 months. Further future

recommendations are provided in the conclusion section of this report.

3. Introduction

3.1 Purpose

This evaluative study involved a secondary data analysis of the closed records of a QI

study conducted during the period September – December 2009 entitled an "Evidence-based RN

Bedside Swallow Screen for Dysphagia"(RNBSS). The quality improvement pilot study was

conducted at a regional hospital in the Midwest. The QI study involved the education of

registered nurses (RN) to complete a dysphagia swallow screen protocol. This would have the

benefit of educating more staff who would be able to perform this procedure on Stroke and TIA

patients admitted to the hospital. Speech Language Pathologists (SLP) who generally performed

the screening were not always available for the procedure that should be done immediately upon

diagnosis to prevent aspiration pneumonia in stroke patients. The swallow screen protocol

designed for the QI study was implemented to change nursing practice to improve outcomes for

stroke and transient ischemic attack (TIA) patients. The RNBSS protocol was developed and

based on recommendations from The Joint Commission (2008) and following a literature review

of best practices methodology (Perry, 2001; Hinckey, et al. 2005; Lees, Sharpe, & Edwards,

2006; Courtney & Flier, 2009; Martino, et al., 2009).   Consultation was sought from the work of

the Great Lakes Region Stroke Network (2009), and the University of Illinois Speech Language

Department (2009) during protocol development.

3.2 Goal

The aim of an evaluation study is to examine whether or not a project attains its goal and

meets objectives, has an impact with benefits, and to determine feasibility of continuing the

project for which it was designed (Rossi, Lipsey, & Freeman, 2004; Bamberger, Rugh & Mabry, 2006; Veney & Kaluzny, 2004). There were six goals for this evaluative study. The first goal was to determine if the RNBSS was a valid screen to identify patients with and without dysphagia. The second goal was to evaluate if the RNBSS had strong inter-rater reliability. The third goal was to evaluate how effective the training methodology was in training the RN staff this new assessment skill. The fourth goal was to evaluate if the RNBSS was cost effective and beneficial through comparison analysis with Emergency Department Physician, SLP, or an RN to conducted screenings. The fifth goal of this evaluation study was to assess the successes and areas that needed improvement in the protocol. The conclusions from this assessment would serve as the basis for recommendations to improve the protocol. This sixth and final goal was to evaluate all of the above findings to determine if the RNBSS protocol should continue moving forward as the hospital wide standard of care to screen stroke and TIA patients for dysphagia. The above objectives related to the ultimate to improve organizational adherence to evidence-based guidelines for stroke patient quality of care.

3.3 Significance

Without a common swallow screen, and if nurses are to participate in testing patients for dysphasia, then hospitals need to establish a body of work that aims to develop and test an evidence-based, valid, reliable, RN-administered bedside swallow screen for dysphagia that can be promptly completed for acute stroke and TIA victims. Use of a swallow screen has been found to improve health care, lower costs of health care, and reduce morbidity and mortality rates among patients experiencing a stroke or TIA (American Heart Association, 2009; Caprio, Holloway, & McCann, 2007; Luengo-Fernandez, Gray, & Rothwell, 2009). If effective, organizational change in practice is likely to occur and if acute stroke patients are to receive

appropriate continued care, systematic use of a swallow screen could lead to increased speed of

accurate dysphagia diagnosis. After positive diagnosis using a swallow screen, the patient could

safely receive medications and nutrition by mouth. In contrast, patients who failed the swallow

screen are at risk for aspiration and would remain on a nothing by mouth (NPO) protocol

keeping them safe from aspiration pneumonia until the full evaluation is conducted by the SLP.

According to The Joint Commission (2008), the work of the Great Lakes Region Stroke Network

(2009), and the literature review (Perry, 2001; Hinckey, et al. 2005; Lees, Sharpe, & Edwards,

2006; Courtney & Flier, 2009; Martino, et al., 2009), a standardized valid swallow screen

protocol that can be administered by registered nurses does not exist at this time and many

hospitals are developing such a screen without providing evidence of the efficacy of such a

screen. It is essential for safe care and the improvement of nursing practice that once a swallow

screen protocol to be administered by nurses is developed it needs to be evaluated for efficacy.

As of January 2010 The Joint Commission dropped this requirement for hospital primary stoke

designation until further evidence was available to support a standardized swallow screen. They

continued to request hospitals to perform the swallow screen and show data supporting these

efforts, however, until such time an agreed upon screen emerges it is not a data requirement for

designation.

   While this swallow screen protocol was being developed, a process for evaluating the

development, implementation and outcome of the swallow screen protocol on patient care was to

be completed to determine the impact of the proposed protocol on patient outcomes, on changes

to nursing practice, and the impact on the organization change to guideline care as a whole.

4. Background-Initial QI study conducted September – December 2009.

4.1 Problem Description

4.1.1 Problem definition.

According to the American Heart Association (2009), overall death rates from stroke in the United States among those 20 years and older are 46.6 per 100,000 and strokes are the third leading cause of death at one death every 3-4 minutes   In addition to loss of life, estimated fiscal costs of stroke-related health care for 2009 topped $68.9 billion (American Heart Association, 2009). As a result, ten evidence-based clinical practice guideline performance measures were established by The Joint Commission (TJC) disease-specific care certification program for primary stroke centers (2008). These clinical practice interventions have been found to impact stroke patient mortality and decrease disabilities of stroke. These standards of care were compiled from recommendations of the Disease Specific Care Stroke Advisory Panel, American Stroke Association, Center for Disease Control Division of Heart Disease and Stroke Prevention, and the Paul Coverdell National Acute Stroke Registry (The Joint Commission, 2008). These clinical practice guideline standards of care for primary stroke center designation (PSC) are listed in appendix A, (p.69).

The dysphagia experienced by these patients puts them at high risk for developing aspiration pneumonia. Moreover, it has been reported that there is a threefold risk of death for stroke patients with aspiration pneumonia in the first 30 days following onset of the condition (Katzan, Cebul, Husak, Dawson, & Baker, 2003). Stroke guidelines in the United States (US), Canada, Germany, United Kingdom, and Scotland include the requirement that dysphagia be assessed by a trained healthcare clinician using a validated screening tool (Summers, Leonard, Wentworth, Saver, Simpson, & Spilker, 2009; The Joint Commission, 2008; Teasell, et al, 2005;

Heuschmann, et al. 2006, & Scottish Intercollegiate Guidelines Network, 2004). Clearly,

assessing for dysphagia, either through an evaluation or a screening, in this population is

essential to reduce morbidity and mortality. Traditionally, the gag reflex was a common method

to test for swallow function. However, the researchers found patients with dysphagia to have

normal gag reflex. Therefore, the gag reflex was found not to be a strong indicator of dysphagia

(Marik & Kaplan, 2003). Clinical evaluation for dysphagia is a systematic, detailed method to

determine swallowing ability. If severe dysphagia is present, an invasive instrumental video

fluoroscopic (VF) examination is conducted.

There are three models currently used in the United States to conduct swallowing

evaluation or screening to detect dysphagia in stroke and TIA patients. First, swallow

evaluations are performed by a master's degree prepared speech language pathologist (SLP) who

is educationally prepared in speech, language, and swallowing disorders. Second, screenings can

be performed by emergency or hospitalist physicians who have received formal training (Turner-

Lawrence, Peebles, Price, & Asimos, 2009). Third and most recently, SLPs have taught RN staff

to perform a swallow screen since they are continuously available to provide care and monitor

illness progression. Then, when indicated, RNs can refer patients who fail the screen to SLPs for

a full evaluation. Many hospitals have turned to training emergency room or hospitalist

physicians and/or RN staff to conduct the swallow screening (Swigert, Steele, Riquelme, 2007).

Goldsmith and colleagues (2005) and Turner and colleagues (2009) emphasized the importance

of training for successful implementation of a bedside swallow screen. There is variability in all

of the screening tools used by these three professional performing screenings.

4.1.2 Target population.

The initial QI study occurred at a regional acute care 315-bed hospital in the mid-west region of the United States The population served by this regional hospital includes 11 critical access hospitals, six Community Hospitals, spanning a geographic distance of N-S 200 miles, W-E 120 miles, with transport times of 12-44 minutes by air and 27-144 minutes by ground. Hospital stroke statistics for 2009 were 74% ischemic and 26% hemorrhagic with National rates of 85% and 15% respectively. The number of stroke patients treated with the diagnosis of ischemic and hemorrhagic for 2009 was 709 patients.

According to the Center for Disease Control (2009), nationwide, approximately 795,000 people sustain a stroke each year, 610,000 new and approximately 185,000 recurrent. In this state, stroke death rates were 102 per 100,000 while County stroke death rates were slightly higher at 105 per 100,000 rates for 2000-2006 hospitalizations. Stroke hospitalization rates for this community were 15 per 1,000, age-adjusted, tracking just above the national average of 17.2 per 1,000 for Medicare beneficiaries ages 65 and older during 1995–2002 (CDC, 2009).

The future holds a strong likelihood of an epidemic of stroke in developing countries as the populations begin to age and experience the high risk factors for stroke: smoking, high cholesterol, hypertension, and diabetes (Paul, Srikanth, & Thrift, 2007). Specifically then, the population of stroke patients in the United States will continue to rise as the baby-boomers age. Providing evidence-based care to decrease the disability and mortality to this population is essential to reduce the financial and social impact of this devastating neurological attack. As a means to reduce this increasing healthcare financial burden and suffering, the RNBSS protocol was developed and tested to keep acute stroke patients safe from aspiration.

4**.1.3 Clinical environment.**

The clinical environment was a regional, acute care, 315 bed hospital in the mid-west region of the United States that was seeking Joint Commission Disease Specific Primary Stroke Center Designation. The inpatient stroke unit was a 20 bed acute care unit, non-critical care, comprised of 23 RN staff members. This nursing unit was designated as the primary stroke unit one year prior to the swallow screen study. The unit also cared for a cardiovascular surgical patient population. The unit was served by one full time SLP who worked Monday through Saturday, 8am to 4:30 pm, with on-call coverage for Sunday.

4.1.4 Location of problem population.

The problem population is defined as stroke/TIA patients who may experience dysphagia. Dysphagia has the potential to exist in all of these patients during the acute phase of stroke victims. Stroke patients initially experience dysphagia approximately 42 - 67% of the time, with noted improvement reducing rates to approximately 43% at seven days post-acute event (Perry & Love, 2001). The dysphagia experienced by acute stoke and TIA patients makes them at high risk to develop aspiration pneumonia. The patients in this study were comprised of those in the hospital service area of 11 Critical Access Hospitals and six Community Hospitals. This county has a slightly higher prevalent of stroke at 2.8% with national average of 2.6%.

4.2 Literature

4.2.1 Review of evidence.

Dysphagia screenings have been tested; however, the literature review indicated there was limited evidence and a lot of variability in screen methodology (Perry & Love 2001; Hinchey, et al. 2005; Lees, Sharpe, & Edward 2006; Westergren, 2006; Courtney & Flier 2009;

Martino, et. al., 2009).   Some hospital studies validated their own screening methods, which

include water swallowing against an instrumented videofluorscopic examination (VF) or a SLP

clinical evaluation tool such as the Mann Assessment of Swallowing Ability (MASA) (DiPippo,

Holas, & Reding, 1992; Massey & Jedlicka, 2002; Mann, 2002; Nishiwaki, et al., 2005; Suiter &

Leader, 2008; Turner-Lawrence, et al. 2009). Goldsmith and colleagues (2005) and Turner and

colleagues (2009) emphasized the importance of staff education for successful implementation of

a bedside swallow screen.

Organizations struggle to implement evidence-based practice guideline changes.   In 2003

it was reported that all hospital patients received recommended care only 54.9% of the time, and

there is tremendous variability in practice (McGlynn et al. (2003). The American Heart

Association has made great strides in translating research into practice "to build healthier lives,

free of cardiovascular diseases and stroke" (Jones, et al. 2008, p.687). Their work includes the

development of evidence-based guidelines and advocating implementation through the quality

improvement tool for performance measurement called *Get with the Guidelines*. Ongoing efforts

by hospitals continue to focus on improving adherence to these evidence-based guidelines

(Jones, et al. 2008). To that end, evaluation of program success must include data of adherence to

the swallow screening protocols with concluding recommendations for improvements to achieve

organizational adoption of changes in practice.

FRAMEWORK FOR THE INITIAL QUALITY IMPROVEMENT STUDY

As a result of the literature review, discussion ensued with the Great Lakes Regional

Stroke Network (GLRSN), starting October 2008, to form a dysphagia quality workgroup. The

goal of this quality performance improvement group was to evaluate the swallow screen

practices across the Great Lakes to meet the required Joint Commission guideline. The Centers

for Disease Control and Prevention (CDC) initially funded the GLRSN program in 2004-2010.

They had 500 professional members and over 4,000 healthcare providers had participated in

quality of stroke care events to improve the care of stroke patients and their families in the Great

Lakes region.   The quality workgroup involving over 30 hospitals first met in November 2008

and continued to review progress with dysphagia screening protocol outcomes until CDC

funding ceased for this network on June 30, 2010. The workgroup compared screening protocols

used by hospital across the Great Lakes Region and consulted the experts in the speech language

pathologist field. The screening tool items were compared for common assessment and failure

criteria. Lastly, the University of Illinois Speech Language Department was consulted to

determine the use of water or food in the screen. Results of the consultation included the

importance of including a water swallow test in the evidence-based screen, in part because it is

standard practice for SLP evaluation (Mann, 2002). Furthermore, water is one of the safest

fluids in the event the patient experiences aspiration into the lungs. (Schleder, Stott, & Lloyd,

2002).

The purpose of the screening protocol developed for this study project was to determine

if the patient could manage water. Because if they could not, it would be important to place

them on NPO and recommend a videofluorscopic swallow examination to more clearly

determine the severity of dysphagia and appropriate route for feeding and medications. The staff

education plan was developed and included various teaching methods to educate the registered

nurse staff on the protocol to conduct the swallow screen. All materials were developed by the

Principal Investigator (PI) of the QI study with input from the SLP. The education was

mandatory for all RN staff. The teaching incorporated a PowerPoint lecture, video of live

demonstration of the protocol and examples of failure criteria. Concluding the video, return

demonstration among the RN staff was observed by the SLP. A mandatory quiz was taken by

the end of the month in which the protocol training occurred. A nine question survey was

conducted both pre and post training to determine knowledge gained, feelings of preparedness,

appropriateness of teaching methods, and confidence in implementing the guideline protocol,

among other questions (Appendix C,p.73) . A procedure, policy and corresponding competency

was written for newly hired RN staff and for ongoing annual competency.

In summary the initial QI study included the following processes: (a) to create an

evidence-based RNBSS protocol (Appendix B, p.70); (b) to develop an education video,

including return demonstration & quiz ; (c) to survey staff to measure pre- and post-training and

patients on the process of implementing the RNBSS protocol (Appendix C, p.73).

The evaluation study was developed to test the swallow screen for validity, inter-rater

reliability, patient, staff, and evaluate organizational change during the study period. The

evaluation results are the focus for the remainder of the paper.

4.2.2 Data supporting the existence of the problem.

The hospital-specific quality data, for the year prior to the study, on primary stroke center

(PSC) requirements revealed the need to improve patient care in the area of performing a

swallow screen prior to keeping the patient NPO (Table 1). These results showed that the usual

standards of care to assess swallowing were not working, jeopardizing Joint Commission

Primary Stroke Center designation for this hospital. Table 1 denotes the variability described.

The red bars denote all hospitals in the Get With The Guideline program of the Joint

Commission for requirement number 7, patients undergo dysphagia screening prior to given

anything by mouth, database for the noted month. The blue bars are the Study hospital specific

stroke/TIA patients who were screened, these data revealed great variability in dysphagia

screening of stroke and TIA patient. The first few months of the following year, 2009 data,

continued to show low adherence to this guideline, demonstrating a need to begin a focused

change in practice. The first attempt to improve upon this guideline in 2008 was to have the SLP

train the emergency room and hospitalist physicians to conduct the swallow screen. These

physician groups recommended that nursing staff be trained, as they are under time constraints

for patient admission throughput in the emergency department. Hence, the SLP and hospital

stroke core team moved forward to implement this new process of having nursing staff conduct

swallow screening at the bedside once the patient had been admitted. The search for an

evidence-based, valid, reliable RN swallow screen began. When the evidence was found to be

varied, the development of the screen protocol began with a subsequent education plan and IRB

submission to test the screen and survey the staff pre- and post-training. Development of this

RNBSS for Dysphagia protocol was an action taken to improve upon adherence to clinical

practice guidelines for the stroke program.
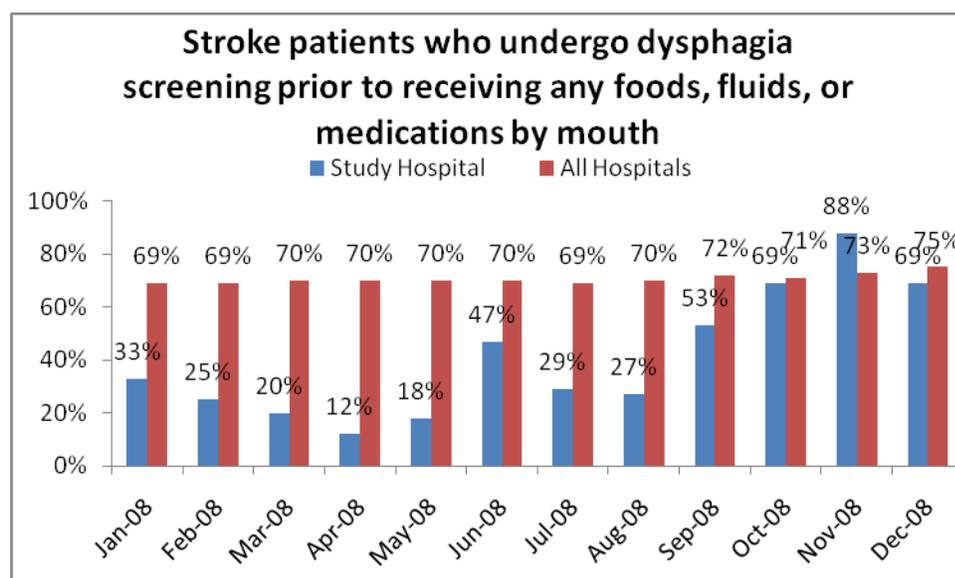
Table I: Numbers of stroke patients who have dysphagia screening at the study hospital Compared to all

hospitals in the Get with the Guideline Data Base

4.3 Stake Holders

4.3.1 Descriptions.

Multiple stakeholders were involved in the outcomes of adherence to the new protocol. If

the evaluation indicates a valid and reliable protocol, then the stroke patient populations, as the

primary recipients of the screening, may ultimately have a reduced risk of complications from

dysphagia like developing aspiration pneumonia. Prior to implementing the new protocol the

stroke/TIA population was kept NPO and was not receiving their medications or nutrition until a

full speech pathology evaluation was performed, which could take up to 18 hours wait if

admitted on a weekend in the evening. Implementing the required Joint Commission (2008)

NPO clinical practice guidelines had created patient and staff dissatisfaction with speech therapy.

Speech language pathologists embraced this potential practice change, to have the bedside RN

perform a screening which would decrease patient wait times. Stroke unit registered nurses were

required to learn a new skill and participate in the testing of the screen for validity and reliability

while also increasing nurse responsibilities and accountability. As such the new screening

protocol meant additional responsibility for them. Physicians who admitted the stroke patients

had to use an electronic stroke order set which included the required clinical practice guideline

"NPO until dysphagia screen completed." This required physicians to change the route of

medications. Lastly, stakeholders for this change in practice were the hospital and payer sources.

Estimated fiscal costs of stroke related health care for 2009 were $68.9 billion (American Heart

Association, 2009). In one year the cost of treating aspiration pneumonia in a hospital ranged

from $8,949-$23,961 (Caprio, Holloway, & McCann, 2007). The cost savings for keeping

stroke/TIA patients safe from aspiration pneumonia impacts the hospital from a financial

perspective. The payer sources may experience a reduction in costs. Overall, the financial

impact of reducing aspiration pneumonia may reduce the national cost of morbidity and

disability burden in this population with a positive evaluation and implementation of this new

swallow screen protocol.

4.3.2 Information needs of each group.

When conducting an evaluation study, it is imperative to understand the political

implications for each stakeholder while considering their information needs. Methods used to

report to stakeholders how the evaluation is conducted and the results reported have implications

for successful change (Rossi, Lipsey, & Freeman, 2004; Bamberger, Rugh & Mabry, 2006;

Veney & Kaluzny, 1998). The evaluator must provide information to the stakeholders in a

meaningful and useful manner from the initiation of the study to the concluding

recommendations for patient improvement as a result of the swallow screen protocol.

Patient information needs were important as patients did not understand why they could

not drink, eat, or receive their medications until a swallow screen could be conducted to

determine if they were experiencing dysphagia. Patient and family education was essential to

prevent patient oral intake and in order to reduce overall dissatisfaction with wait time involved

with a swallow screen. Explanation of tests using clear communication positively impacts

patient satisfaction and safety (Press, 2006; Studer, 2003). Physician information needs included

knowledge of the importance of using the stroke order sets that included NPO until swallow

screen. They needed an understanding of the dysphagia and aspiration risk during the acute

phase of stroke as some would not place the NPO order for their patients. Consequently,

information exchange was vital for them to understand the purpose, processes, results, and

conclusions of the evaluative study. With this knowledge they could assist in patient education

and provide evidence-based care by keeping the patient NPO to avoid patient harm and aspiration pneumonia.

Nurses needed to know if the stroke order set including the guideline to keep the patient NPO had been used. Additionally, the stroke unit nurses where the swallow screen was tested for reliability and validity needed time to learn the swallow screen protocol. This included steps to learn how to conduct a swallow screen, which was a new skill for all the nurses.

4.4 Creative Approach to Resolving the Problem

4.4.1 Description.

The evaluation study included statistical analysis of the patient results on the RN administered swallow screen to test for sensitivity. This was conducted by comparing the RN results to the Mann Assessment of Swallowing Ability (MASA) dysphagia results administered by the SLP. Results from implementation of the swallow screen by two registered nurses were analyzed. The RN #1 patient results were compared to RN #2 findings, statistically calculating inter-rater reliability of the screening protocol. The pre- and post-RN education survey was conducted to evaluate the teaching methods (lecture video, quiz, return demonstration) in order to confidently prepare the RN staff to administer the RNBSS protocol.

4.4.2 Development process.

The swallow screen design was based on the literature review (Perry & Love, 2001; Hinchey, et al., 2005; Lees, Sharpe, & Edward, 2006; Courtney & Flier, 2009; Martino, et. al., 2009, DiPippo, Holas, & Reding, 1992; Suiter & Leader, 2008; Massey & Jedlicka, 2002) as well as GLRSN (2008-2009) quality task force dysphagia screen analysis, and expert opinion consultation with University of Illinois Speech and Language Department. The screen included appropriate assessment items and definitive failure criteria within a registered nurse's scope of

practice.   Then, the next step was to test validity of the swallow screen by performing validity

testing for sensitivity, specificity, positive predictive value, and negative predictive value using a

comparison to the MASA evaluation results. MASA is a standardized dysphagia severity rating

scale used by Speech Language Pathologists with high validity and reliability (Mann, 2002).

Development of the evaluation for inter-rater reliability required consultation from Dr. Rayens,

University of Kentucky biostatistics College of Nursing faculty, and Dr. Bronson-Lowe, Study

Hospital infectious disease statistician, to determine the appropriate statistic to be used. Cohen

Kappa was determined to be the appropriate statistic to measure consistency among two RN

raters performing the screening on the same patient.

In order to evaluate the implementation process, a staff satisfaction survey (Appendix C

p. 73) was developed to evaluate staff pre- and post-education. Such staff evaluations assist in

determining if there was adequate staff support and appropriate education methodologies used to

carry out the new practice protocol (Cullen, 2009).

The evidence-based nursing standard of care for stroke/TIA patients was developed in

collaboration with the study hospital "Standards of Nursing Stroke Care Committee". This

committee was comprised of the director of nursing, manager of the stroke unit, along with

managers from all units who also care for stroke patients, the stroke coordinator, the hospital

accreditation manager, and the SLP. This group wrote standards of nursing stroke care based on

TJC and American Stroke Association guidelines for the inpatient units at the study hospital.

The swallow screen procedure was written by members to include all steps of the screening and

ultimately a formal competency for new stroke unit staff to be used for annual staff testing.

These documents were reviewed for acceptance by the Stroke Core Team, comprised of

physicians, nursing, and SLP, and then posted on the stroke unit webpage with the video for

implementation and training of new nurses orienting to this unit. The physician electronic stroke

order sets were changed to reflect this new swallow screen protocol to include a diet order if the

patient passed the screen. Results from the staff satisfaction survey will be incorporated into the

training methods if this new skill is taught to other appropriate units.

4.5 Evaluation Project Objectives

There were six project objectives for this evaluative study. The first objective was to

determine if the RNBSS was a valid screen to identify patients with and without dysphagia. The

second objective was to evaluate if the RNBSS had strong inter-rater reliability. The third

objective was to evaluate how effective the training methodology was in training the RN staff

this new assessment skill. The fourth objective was to evaluate the cost benefits of the RNBSS

through comparison analysis with Emergency Department Physician, RN, and SLP conducting

the screening. The fifth objective of this evaluation study was to assess the successes and areas

that needed to be improved in the protocol. The discussion concludes with recommendations to

improve the protocol. This sixth and final objective was to evaluate all of the above findings to

determine if the RNBSS protocol should continue to move forward as the hospital wide standard

of care to screen stroke patients for dysphagia. Overall, this study project aimed to change

organizational practice throughout the hospital using the evaluation data to positively impact

organizational adherence to evidence-based Joint Commission Clinical Practice Guidelines to

achieve primary stroke center designation.

4.6 Activities and Components

Based on the data from the closed records of the QI study completed between September –

December 2009 entitled "Evidence-based RN Bedside Swallow Screen for Dysphagia,"

conducted at the study hospital, the following activities were included in this evaluation study.

The first activity was statistical data analysis to validate the Evidence-based RNBSS and Protocol to determine sensitivity, specificity, and predictability. The swallow screen was correlated with the SLP-validated Mann Assessment of Swallowing Ability (MASA) which was conducted after each RN screen during the study period. The RNBSS results of each individual patient screen were entered into SPSS statistical program to calculate sensitivity, specificity, positive predictive value, and negative predictive value.

The second activity was statistical data analysis of inter-rater reliability between two registered nurses using the swallow screen conducted on each patient during the study project period. RN #1 and #2 patient results, on the same patient, were entered using Cohen's Kappa crosstab analysis to determine consistency among RN raters. Did both nurses conduct the screen similarly on the same patients?

The third statistical analysis used was to determine pre- and post-education significance of the RN staff survey on nine items (Appendix C.p.73). The survey and locked box for the surveys were placed outside the training room and in the staff lounge. Two weeks post-education, the same survey was placed in the staff lounge with a locked box for survey submissions. Upon completion, the completed surveys were collected by the principal investigator and kept in a locked file cabinet. The data from each question was entered into a statistical program to determine significance of the pre and post-education on knowledge gained, feelings of preparedness, appropriateness of teaching methods, and confidence in implementing the guideline protocol, among other questions (Appendix C, p.73) The final activity was to evaluate the organizational change which occurred during implementation of this acute stroke clinical practice guideline

4.7 Description of Setting and Planned Time Line for the Project

4.7.1 Rational for choice of setting.

The setting for the evaluation study project was the same setting used for the QI study.

4.8 Resources Required to Implement the Project

The investigator analyzed the individual de-identified patient records and nurse surveys

of the patient nurse records from the initial QI study. The data were entered into SPSS statistical

program to run sensitivity, specificity, and Cohen's Kappa for inter-rater reliability. Analysis of

the pre and post training staff survey, patient satisfaction questions included during the screening

and organizational change were all conducted by the PI. Resources required to implement this

analysis of the initial project was the PI's time. No other resources were utilized for this

evaluation study.

4.9 Expected Measurable Outcomes

It was expected that the results of this evaluation study would produce a valid and reliable

RNBSS. This may add to the evidence in the literature of tested RN bedside screens for

dysphagia. If effective, acute stroke patients would receive appropriate prompt continued care

according to the swallow screen results, and wait times for a speech pathology consult could be

reduced, therefore, providing the patient with nutrition and medications by mouth if safe.

The third expected outcome was to have staff satisfied post education with their ability to

perform a new skill, the RNBSS protocol. The measures for this were statistical data analyses of

each survey question for significance pre and post education. The fourth outcome was to

determine if the RNBSS was a cost beneficial method to screen stroke patients. The final

measurable outcome was to analyze the above results and determine if the RNBSS should

continue as a new hospital wide protocol for all acute stroke patients to receive this valid,

reliable RNBSS prior to being given anything by mouth.

4.10 Constraints

4.10.1 Anticipated.

The initial QI study was conducted via IRB hospital approval only. It was anticipated

time would be needed for the hospital and the University of Kentucky office of research integrity

to work out the details related to the evaluation study, since data from the hospital would be used

to implement the evaluation study.

4.10.2 Actual.

Actual constraints of the evaluation study using the secondary data analysis of the closed

records of the QI study project completed between September – December 2009 entitled an

"Evidence-based RN bedside swallow screen for dysphagia" was time constraint. The hospital

staff, physicians, RN, and SLP, wanted the results to be analyzed quickly. They wanted the RN

staff to independently conduct the screening to improve patient and staff dissatisfaction by

decreasing wait times for patients in order to begin medications and increase nutrition quicker.

The constraint surrounding this request to expedite the study results was the time required to

obtain hospital IRB and University of Kentucky IRB approval before secondary data analysis

could be implemented. An additional constraint was obtaining the post education surveys from

the RN staff. Three attempts were made to obtain the post education surveys over four weeks.

4.10.3 Resolution of Constraints.

The time constraint to analyze the data quickly was not easily resolved. Several

discussions occurred between the principal investigator, University of Kentucky(UK) IRB office,

and college of nursing committee project chair to gain the understanding that the hospital IRB

did not need to be the overarching IRB for this evaluation study. A final discussion with the

human subjects protection director at the hospital and executive director of the research office

occurred resulting in the letter of support from the hospital indicating that UK would be the

primary IRB for this evaluation study. Several attempted were made to obtain the post training

surveys from the staff. Signs were posted to remind staff that the locked box and surveys were

available in the staff lounge.

5. Evaluation of Study Questions

5.1 Questions Addressed by the Study

Through this study, several key questions are explored. The first question addressed by

the evaluation study was: Is the RNBSS for Dysphagia a valid tool for assessing dysphagia by

testing for sensitivity and specificity of the swallow screen protocol? The answer to this

question ultimately determined if the screen correctly identified patients with dysphagia and

those without dysphagia.   The second question addressed was: Does the RNBSS for Dysphagia

have strong inter-rater reliability? This was done by calculating Cohen's Kappa statistic to

determine if there was consistent agreement between RN screeners. The third question for

evaluation was: Did the training methods used to teach the nurses how to perform the swallow

screen (video, quiz, return demonstration) confidently prepare the RN staff to administer the

RNBSS protocol?   This was done through a pre and post training staff survey of nine questions,

among them, asking respondents to rate knowledge gained, feelings of preparedness, and

appropriateness of teaching methods used. The fourth question was: Does the RNBSS

demonstrate a cost benefit to the healthcare organization? A cost benefit analysis was conducted

comparing the costs in using an Emergency Room physician, a speech pathologist or an RN to

perform the bedside swallow screen. The fifth question for this evaluation study was: What

improvements should be made to the protocol? This part of the analysis included an evaluation

of the study process to understand the political factors which become evident during such a

study, such as patient, staff satisfaction, and time constraints. If unintended problems arose

during the initial testing of the protocol, then recommended changes would take place. The sixth

and final study question addressed was: Should the protocol continue to be used? Included in

this evaluation was analyzing all of the above findings to determine if the RNBSS protocol

should continue and move forward as the hospital wide standard of care to screen stroke patients

for dysphagia. This involved a fiscal impact evaluation using a cost benefit analysis of RN vs.

SLP vs. Emergency Department Physician cost of performing the swallow screen. The answer to

this final question determined the extent to which the protocol could be used. If the analysis

found the RNBSS to be sensitive and specific in determining dysphagia, have strong inter-rater

reliability, fiscal benefits, and positively impact organizational change so that stroke patients will

receive a swallow screen prior to receiving anything by mouth then the protocol should continue

and be implemented throughout the organization.

5.2 Questions That Could Not be Addressed (Limitations & Delimitations)

Can the RNBSS for Dysphagia be used in other populations? The GLRSN quality group

found that some hospitals in the network used their swallow screens for patients in the critical

care units, who, post extubation, had difficulty with vocalization and swallowing. Due to study

sample sizes of 52 acute stroke patients on a non-critical care stroke unit in one hospital,

generalizability of the results are limited. Further studies need to be conducted to strengthen the

tool's evidence of validity and reliability in a variety of other settings and populations.

6. Evaluation of Procedures

6.1 Study Design

This study involves a descriptive evaluation of a previously designed QI study. Quantitative data measures are used and reported for each of the six study questions. An evaluative framework was not used.

Validity testing consisted of the RNBSS for Dysphagia (behavioral assessment items followed with water swallow test) and the Mann (2002) Assessment of Swallowing Ability (MASA). The MASA was used as the gold standard assessment of a swallowing test to compare with the swallow screen. Sensitivity is the ability of an instrument to sense the attribute being measured. This test property answers the question: Did the RNBSS correctly identify patients with dysphagia? The statistical test, specificity, was calculated to determine the probability that the instrument can differentiate when there is absence of a condition. This test property answers the question: Did the RNBSS correctly identify patients without dysphagia? Positive predictive value statistically measures the probability that a patient does have a condition if they have a positive test finding. This test property answers the question: Does the patient have dysphagia when they test positive for dysphagia? Negative predictive value measures the probability that a patient will not have a condition given a negative finding (Spitalnic, S. 2004). This test property answers the question: Does the patient not have dysphagia when they pass the dysphagia screen, a negative test? These tests were performed by entering the RN #1 scores with the SLP evaluation scores into SPSS where a cross-tabulation is calculated with RN#2 scores on each test patient .

Inter-rater reliability between RN staff conducting the bedside swallow screen was included in the study design. Acute stroke and TIA patients received the RNBSS by two nurses

independently. They did not share the patient results prior to data analysis. Agreement

percentage between screeners was calculated by using Cohen's Kappa statistic. This measure is

used to test how well the measurement tool is consistently carried out (SPSS, 2010).

RN staff satisfaction with the educational teaching methods and knowledge was included

in the study design of the screening protocol. A pretest and posttest Likert scale (1-4) survey was

administered to measure confidence in understanding steps to administer the screen,

implementation of the RNBSS, and satisfaction with the screening protocol for the acute stroke

patients (Appendix C, p.73). The survey also offered an open comments section in order to illicit

suggestions for improving the survey. A chi-square test compared the pre- and post-education

survey results and determined differences between groups (Nolan & Mock, 2000). In this study,

differences before and after education on the RNBSS protocol were calculated to determine if

there were positive improved scores.

Fiscal impact was calculated by conducting a cost benefit analysis comparing the cost of

RN, SLP, and emergency department physicians. In additions several aspects of the benefits of

RN staff conducting the swallow highlighting the fact that they are available 24 hours a day.

Patient satisfaction with the swallow screen protocol was sought as a means to better the

patient experience. Patient perceived satisfaction with the protocol and comments for

improvements in the process were calculated using a Likert Scale of 1-5, 1 poor – 5 being

excellent. The questions to the able patients were: 1. How would you rate the RN swallow

screen experience? 2. Do you have any suggestions to improve the swallow screen experience?

Results were tallied for each rating and comments displayed in a chart for analysis to make

improvements for the patient experience. The ultimate outcome of the study design was to

monitor organizational change by assessing the monthly quality data that all acute stroke and

TIA patients were receiving a swallow screening before given anything by mouth.

6.2 Sample

6.2.1 Selection procedure.

Secondary data analysis was conducted, April-June 2010, on the closed records of the

population of adult patients admitted over 18 years of age in the stroke (non-critical care) unit

with acute stroke and TIA. Records from 52 patients comprised the population who received the

RNBSS conducted by two nurses and followed by the MASA swallow assessment during the QI

study period, September – December 2009.

6.2.2 Representatives of the sample.

The sample size of 52 adult patients was a convenience sample of patients who received

the swallow screen to be evaluated. The patient beds in the hospital number 315. The numbers

of patients admitted per year with stroke or TIA numbers 709. The 52 patients were seven

percent of all patients admitted to the hospital with these diagnoses. Because the evaluation was

completed in one acute care hospital setting, the sample is not representative of the population

with diagnoses of stroke and TIA

6.2.3 Use of comparison groups (if possible).

There was no comparison group for the evaluation of the swallow screen protocol. The only

comparison that can be made is pre- and post-screening protocol implementation is adherence to

the NPO until Swallow Screen for Dysphagia clinical practice guideline. This data is reported

monthly through American Heart Association GWTG database. Previous adherence rates prior

to this study for this practice guideline were below 20%. Adherence to the clinical practice

guideline after implementation of the swallow screen protocol was 97% for June of 2010, the

highest percentage of compliance thus far.

6.3 Data Collection

6.3.1 Methods.

6.3.1.1 Procedures & processes.

Acute stroke and TIA patients received the swallow screening by two nurses independently.

Following the screening, the Speech Language Pathologist performed the MASA evaluation, and

compared scores. These scores were de-identified by patient #1-52. The procedure to analyze

the closed records for validity testing consisted of collecting the RN #1 and RN #2 swallow

screen results and the corresponding Mann Assessment of Swallowing Ability (MASA) forms.

The procedure to analyze the patient records for inter-rater reliability between RN staff involved

collating all the patient screen sheets to prepare for statistical data entry of both RNs' results.

RN staff satisfaction with educational methods and confidence in understanding the

screening protocol procedures involved placing the pretest and posttest education training

surveys in the nurse staff lounge. A locked box was provided with a collection of the surveys by

the PI. These surveys were kept in a locked file cabinet in the PI's office, to be held for up to

one year. The pre-education survey was conducted August-September 2009, just prior to the

teaching sessions which occurred in September 2009. The post education staff survey was

collected September-October, 2009. The staff was given four weeks to return the post education

survey. Twenty-one of 23 nurses completed the pre-training survey and 20 of 23 completed the

post education survey. The surveys were independent of one another with no paired testing.

6.3.1.2 Data analysis and collection methods planned.

The swallow screen results were collected and analyzed for correlation with the MASA results to demonstrate sensitivity, specificity, and predictability of the screen to detect dysphagia in this stroke population study group. This included entering the RN#1, RN#2, and the SLP MASA pass/fail results for cross tabulation. Data were entered into SPSS statistical program to analyze inter-rater reliability by applying Cohen's Kappa to the outcomes of the recorded swallow screen records between nurse 1 and nurse 2 of each patient.

RN staff satisfaction with education teaching methods (lecture, video, quiz, return demonstration) and knowledge was included in the study design of the screening protocol. A pretest and posttest Likert scale (1-4) survey was administered to measure a pre and post education staff survey of nine questions, among them, asking respondents to rate knowledge gained, feelings of preparedness, and appropriateness of teaching methods used to implement the protocol for the acute stroke patients (Appendix C, p.73). The survey also offered an open comments section in order to illicit suggestions for improving the educational methods. A chi-square test compared the pre- and post-education survey results and determined differences between groups (Nolan & Mock, 2000). In this study, differences before and after education on the RNBSS protocol were calculated to determine if there were positive trends between the pre and post-education scores**.** The fourth goal was to evaluate the RNBSS cost benefit through comparison analysis with Emergency Department Physician, RN, and SLP conducting the screening. The data collected for this analysis was average pay rates for each compared discipline: emergency room physician, a speech pathologist or an RN to perform the bedside swallow screen. The fifth goal of this evaluation study was to assess the successes and areas to improve the protocol concluding with recommendations to improve the protocol. This piece of

the analysis looked at the study process to understand the political factors which become evident during such a study, such as patient and staff satisfaction and time constraints. If unintended problems arose during the initial testing of the protocol, then recommended changes would take place. The sixth and final goal was to evaluate all of the above findings to determine if the RNBSS protocol should continue and move forward as the hospital wide standard of care to screen stroke and TIA patients for dysphagia. The answer to this final question determined the extent to which the protocol could be used. If the analysis found the RNBSS sensitive and specific in determining dysphagia, have strong inter-rater reliability, fiscally beneficial, and impacting organizational change so that stroke patients will receive a swallow screen prior to receiving anything by mouth then the protocol should continue and be implemented throughout the organization.

6.3.1.3 Use of consultants.

Consultants included Mary Kay Rayens, PhD, University of Kentucky, College of Nursing Associate Professor, Biostatistics course faculty and the study hospital Infection Control Department statistician Daniel Bronson- Lowe, PhD. The consultation consisted of feedback on appropriate statistics to be used for testing the reliability and validity of the swallow screen, patient, and staff satisfaction survey results. Consultation was ongoing during the evaluation study period of April-June 2010.

6.3.2 Instruments.

6.3.2.1 Validity.

This evaluation study included testing for validity. The goal was to verify that the RN swallow screen measures dysphagia. In order to validate the swallow screen, the Mann Assessment of Swallowing Ability (MASA) was used for correlation analysis. The pass/fail

results from RN#1 and RN#2 were analyzed against the SLP MASA pass/fail scores to calculate

sensitivity, specificity, positive predictive and negative predictive values. Sensitivity of the

RNBSS was calculated to be 94%, specificity 77%, positive predictive value 67%, and negative

predictive value 96%. Overall, the RNBSS is strong in detecting dysphagia, and moderate in

differentiating when dysphagia is not present. Therefore, the patients who fail the RNBSS are

referred on to the SLP who conducts a full swallow evaluation to differentiate the severity of

dysphagia.

6.3.2.2 Reliability.

Inter-rater reliability of the swallow screen was established by comparing the patient

pass/fail screen results using Cohen's Kappa, to determine agreement between nurses performing

the swallow screen. Kappa values from 0.40 to 0.59 are considered moderate, 0.60 to 0.79

substantial, and 0.80 outstanding (SPSS, 2010). The Cohen's Kappa for the RNBSS calculation

result was .92, considered outstanding for inter-rater reliability.

7. Summary

7.1 Action Plan

Date	Actions
January- March 2010	IRB forms were completed for University of Kentucky approval while collaborating with study Hospital IRB for understanding on which organization had overarching IRB responsibility for this evaluation study.

April 2010	Analysis of swallow screen and staff survey results pre and post education were conducted
	1.A.Validated the swallow screen, Entered screen results into statistical program ran data for sensitivity, specificity, and predictability through correlation with the SLP validated Mann Assessment of Swallowing Ability (MASA) conducted after each RN screen during the study period.
	2. Entered recorded swallow screen records between nurse 1 and nurse 2 of each patient into statistical program ran Cohen's Kappa cross tabulation for inter-rater reliability.
	3. Entered each question on the swallow screen training survey pre- and post-training into a statistical program and ran a cross tabulation – Fisher's exact test was used to determine significance and trends in training methods used in carrying out the swallow screen protocol.
May-June 2010	Results of the study were written up in a technical paper on analysis and evaluation of testing of the swallow screen. The evaluation included recommendations as a result of the six goals and objectives of the study.

7.2 Goal

It was expected that the results of this study would determine the validity and reliability of the previously developed RNBSS for dysphagia. It was expected that the study would show nurse confidence in using the RNBSS and that the outcomes of the analysis would provide an evidence-based recommendation to make an organization wide practice change using the RNBSS for all stroke and TIA patients.

8. Findings

8.1 Results of Analysis by Study Question Including Outcomes

Following are the analyses of the findings by study question. The first study question, did the analysis results find the RNBSS to be a valid test to detect dysphagia (table 2 and 3)? Study question two, did the analysis find the RNBSS have strong inter-rater reliability (table 4)? Study question three, did the results of the analysis show that the education methods used prepare the nurses to confidently administer the RNBSS protocol? The results are presented by analysis of each of the nine question on the pre and post education nurse surveys (table 5-15).

Study question 1: Is the RNBSS a valid test to assess for dysphagia? Overall, 54% of the patients passed the RNBSS and had no dysphagia, while 46% failed the RNBSS and experienced signs of dysphagia. The SLP results were 67% passed the MASA evaluation, while 33% failed the MASA showing signs of dysphagia resulting in a modified diet, nothing by mouth order, or a videofluorscopic study ordered (Table 2 and 3).

Results of sensitivity analysis.

		Nurse #1 – Water Assessment Results		
		Fail	Pass	Total
SLP Evaluation	Fail	16	1	17
	Pass	8	27	35
	Total	24	28	52

Table 2: Crosstabulation of RNBSS results from nurse #1 with SLP evelation results.
Study sample N=52 Adult stroke/TIA patients September – December 2009.

Crosstab Count		Nurse #2 – Water Assessment Results		
		Fail	Pass	Total
SLP Evaluation	Fail	16	1	17
	Pass	8	27	35
	Total	24	28	52

Table 3: Crosstabulation of RNBSS results from nurse #2 with SLP evaluation results.
Study sample N=52 Adult stroke/TIA patients September – December 2009.

Two RNs disagreed on two different patients, and in both cases, the patients were passed

by the SLP and one case the patient was passed by both RNs and failed by the SLP; resulting in

strong sensitivity of the RNBSS at 94% (Table 2 and 3). Sensitivity is the ability of an

instrument to sense the attribute being measured (Spitalnic, 2004). This test property answers

the question; did the RNBSS correctly identify patients with dysphagia? Specificity is the

statistical test used to determine the probability that when testing negative, there is absence of a

condition (Spitalnic, 2004). Specificity of the RNBSS was found to be 77%. This test property

answers the question; did the RNBSS correctly identify patients without dysphagia? Positive

predictive value statistically measures the probability that a patient does have a condition if they

have a positive test finding (Spitalnic, 2004). This test property answers the question: does the

patient have dysphagia when they test positive for dysphagia? The RNBSS positive predictive

value was found to be 67% in this study. Negative Predictive Value = 96% Negative predictive

value measures the probability that a patient will not have a condition given a negative finding

(Spitalnic, 2004). This test property answers the question: does the patient not have dysphagia

when they pass the dysphagia screen? The data analysis indicated the RNBSS to have a strong

negative predictive value at 96%. Therefore, if the patient fails the RNBSS dysphagia is present

and are kept NPO and referred to the SLP. The SLP conducts a swallow evaluation to

differentiate the severity of dysphagia and recommends appropriate oral intake. If the patient

results are negative for dysphagia the physician orders a diet and oral medications.

Study question 2: Does the RNBSS for dysphagia have strong inter-rater reliability?   Fifty-two

patients were each screened independently by Nurse #1 and then followed by Nurse #2, keeping

their results confidential. Patient #11 and #26 one nurse passed the patient and the other nurse

failed the patient on the RNBSS; there was not agreement on these two patients between

screeners. Agreement percentage between screeners was calculated by using Cohen's Kappa

statistic. This measure is used to test how well the measurement tool is consistently carried out

(SPSS, 2010). A value of 0.92 is considered outstanding, demonstrating that the RNBSS can be

administered time and time again with the same results (Table 4).

Below is the table data analysis showing inter-rater reliability using Cohen's Kappa statistic

Nurse #1 – water assessment * nurse #2 water assessment cross tabulation

Crosstab count		Nurse #2-water assessment		
		Fail	Pass	Total
Nurse #1 water assessment	Fail	23	1	24
	Pass	1	27	28
	total	24	28	52

Symmetric measures association of agreement

		Value	Asymp. Std error[a]	Approx.T[b]	Approx. sig.
Measure of agreement	Kappa	.923	.054	6.653	.000
	N valid cases	52			

a. Not assuming the null hypothesis
b. Using the asymptotic standard error assuming the null hypothesis.

Table 4: Analysis of data showing association between agreement of nurse #1 and nurse #2 as
raters using the swallow screening tool of .92 with .000 significance.

Study question 3: Did the education methods (lecture, video, quiz, and return demonstration) confidently prepare the RN staff to administer the swallow screen protocol? Nine questions were asked on the RN staff survey pre and post education sessions (see tables 5-14) below by question) each of the nine questions was entered into chi-square formula. The questions were presented using a Likert scale of 1-4 as follows: strongly disagree (rank=1), disagree (rank=2), agree (rank=3) and strongly agree (rank=4). Chi -square test is used to determine if there was significant relationship between the results of the group from the pre training and post educational training. Pearson value is used if the minimum expected count is 25. Fisher's exact test is a chi square statistical significance test used in the analysis of contingency tables where sample sizes are small, five or less. Power is set according to sample size. For this sample size $p<.01$ is considered a significant finding. (Houser, 2008; UCLA, 2010, Munro, 2005). There were 21 nurses in the pre-training group out of 24 nurses, an 87.5% response rate. The post-training survey group was comprised of 20 out of approximately 24 nurses, an 83.3% response rate. There was minimal attrition in the RN staff on this unit. Questions 1, 4, and 8 (noted with *) revealed significant differences between the group from pre- and post-educational training. An additional table (Table 14) was created to demonstrate which questions showed a positive trend post-education. All questions with the exception of #3 showed positive trend post training, see "RN Bedside Swallow Screen Education Survey Trend" charts below for results of each survey question.

Results of RNBSS Education Survey results. Each question is analyzed for pre and post education significance in tables 5-14 below.

Survey Question 1*:
I feel knowledgeable to carry out the RN bedside swallow screen standard of care.

Pre_Post * Question 1 Pretest Crosstabulation

	Question 1 Pretest		Total
	disagree	agree	
Pre_ Pre	13	7	20
Post Post	1	19	20
Total	14	26	40

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	15.824(b)	1	.000		
Continuity Correction(a)	13.297	1	.000		
Likelihood Ratio	17.957	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	15.429	1	.000		
N of Valid Cases	40				

a Computed only for a 2x2 table
b 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.00.
Table 5: Data analysis-Twenty-one nurses completed the pre-training survey and 20 completed the post-training survey. However, one nurse did not answer this question in pre-training group. The results for this question showed significance in pre and post training group on feeling knowledgeable to care out the screening post training (p<.0001).

Survey Question 2:

Implementing the RNBSS standard of care enhances the job satisfaction of nurses on the unit.

Pre_Post * Question 2 Pretest Crosstabulation

		Question 2 Pretest		Total
		disagree	agree	
Pre_	Pre	5	16	21
Post	Post	2	18	20
Total		7	34	41

All nurses in both groups rated this question.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.380(b)	1	.240		
Continuity Correction(a)	.577	1	.448		
Likelihood Ratio	1.422	1	.233		
Fisher's Exact Test				.410	.225
Linear-by-Linear Association	1.346	1	.246		
N of Valid Cases	41				

a Computed only for a 2x2 table

b 2 cells (50.0%) have expected count less than 5. The minimum expected count is 3.41

Table 6: Data analysis-The results show no significance on job satisfaction with the training. However, there is a 9% positive increase in the post-training group on agreement on job satisfaction. It is of note that 76.2% were in agreement with pre-training that implementing the RNBSS would enhance their job satisfaction (see trend chart below).

Survey Question 3:

I feel supported in my efforts to implement the RNBSS standard of care.

Pre_Post * Question 3 Pretest Cross tabulation

		Question 3 Pretest		
		disagree	agree	Total
Pre_ Post	Pre	2	19	21
	Post	2	18	20
Total		4	37	41

All nurses completed this pre and post-training question.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.003(b)	1	.959		
Continuity Correction(a)	.000	1	1.000		
Likelihood Ratio	.003	1	.959		
Fisher's Exact Test				1.000	.678
Linear-by-Linear Association	.003	1	.960		
N of Valid Cases	41				

a Computed only for a 2x2 table

b 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.95.

Table 7: Data analysis- The results for this question did not show significance in the post training group. This question actually showed a decrease in agreement between the pre and post-training group. However, the pre-training rating was high at 90.5 in agreement in feeling supported by efforts to implement the RNBSS. This is important in that the staff do not feel as supported by efforts to implement the RNBSS post-training, a decrease of 5%. The PI could elicit further clarifying comment by asking in the next staff meeting what would help them to feel more supported. Obtaining further input on this question would help if the RNBSS training moves to other units in the hospital to improve on supporting staff during implementation.

Survey Question 4*:

I feel well prepared to carry out the RN bedside swallow screen standard of care.

Pre_Post * Question 4 Pretest Crosstabulation

		Question 4 Pretest		
		disagree	agree	Total
Pre_ Post	Pre	15	5	20
	Post	4	16	20
Total		19	21	40

Only 20 of the 21 pre-training nurses completed this question, all in the post-training group.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	12.130(b)	1	.000		
Continuity Correction(a)	10.025	1	.002		
Likelihood Ratio	12.842	1	.000		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	11.827	1	.001		
N of Valid Cases	40				

a Computed only for a 2x2 table
b 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.50.
Table 8: Data analysis-The results for this question found significance between the pre and post-training group in feeling well prepared to carry out the RNBSS (p<.001).
Study Question 5:
I am able to indentify factors that relate to CVA/TIA patient dysphagia risks.

Pre_Post * Question 5 Pretest Crosstabulation

	Question 5 Pretest		
	disagree	agree	Total
Pre_Post Pre	5	16	21
Post Post	1	19	20
Total	6	35	41

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.901(b)	1	.089		
Continuity Correction(a)	1.591	1	.207		
Likelihood Ratio	3.144	1	.076		
Fisher's Exact Test				.184	.103
Linear-by-Linear Association	2.830	1	.092		
N of Valid Cases	41				

a Computed only for a 2x2 table
b 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.93.
Table 9: Data analysis-The results of this question found no significance between groups on ability to identify factors that relate to CVA/TIA patient dysphagia risk. There is a 14.2%

positive increase who did agree in the post-training group, 76.2% agreed pre-training they had this ability.

Study Question 6:

I am able to identify and carry out the essential activities of the RNBSS standard of care.

Pre_Post * Question 6 Pretest Crosstabulation

| | | Question 6 Pretest | | Total |
		disagree	agree	
Pre_ Post	Pre	8	12	20
	Post	2	18	20
Total		10	30	40

Twenty of the 21 rated this question in the pre-training group, all rated in the post-training group.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.800(b)	1	.028		
Continuity Correction(a)	3.333	1	.068		
Likelihood Ratio	5.063	1	.024		
Fisher's Exact Test				.065	.032
Linear-by-Linear Association	4.680	1	.031		
N of Valid Cases	40				

a Computed only for a 2x2 table

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.00.

Table 10: Data analysis-The results did not find significance between the pre and post-training groups on ability to identify and carry out the essential activities on the RNBSS. There was a 28% positive trend between groups with 57.1% agreement pre and 85.7% in agreement post training on carrying out essential activities for the screen.

Study Question 7

I had enough time to learn about the RN bedside standard of care before it was implemented.

Pre_Post * Question 7 Pretest CrosstabulationCount

		Question 7 Pretest		
		disagree	agree	Total
Pre_ Post	Pre	9	12	21
	Post	5	15	20
Total		14	27	41

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.453(b)	1	.228		
Continuity Correction(a)	.767	1	.381		
Likelihood Ratio	1.469	1	.226		
Fisher's Exact Test				.326	.191
Linear-by-Linear Association	1.417	1	.234		
N of Valid Cases	41				

a Computed only for a 2x2 table

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.83.

Table 11: Data analysis-The results did not find significance between groups on having enough time to learn. There was a 14% positive trend in the post training group. This is an important finding the trainer should consider adding more time to the session if further training will be provided to other nursing units.

*Question 8
The teaching methods used to learn about the RNBSS standard of care were appropriate.

Pre_Post * Question 8 Pretest Crosstabulation

| | | Question 8 Pretest | | |
		disagree	agree	Total
Pre_	Pre	9	12	21
Post	Post	1	19	20
Total		10	31	41

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.961(b)	1	.005		
Continuity Correction(a)	6.040	1	.014		
Likelihood Ratio	8.931	1	.003		
Fisher's Exact Test				.009	.006
Linear-by-Linear Association	7.767	1	.005		
N of Valid Cases	41				

a Computed only for a 2x2 table
b 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.88.
Table 12: Data analysis- The results for this question indicated that teaching methods used to learn about the RNBSS were appropriate. The teaching methods used were a live demonstration DVD viewing, which included scenarios of dysphagia, return demonstration on a fellow nurse with the SLP observing, and a follow up quiz to be completed within two weeks post-training.

Study Question 9:
We are managing CVA/TIA patient dysphagia screen guideline requirements better with the use of the RNBSS standard of care.

Pre_Post * Question 9 Pretest Crosstabulation

Count

| | | Question 9 Pretest | | |
		disagree	agree	Total
Pre_	Pre	4	17	21
Post	Post	1	19	20
Total		5	36	41

All nurses in both groups completed this question.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.888(b)	1	.169		
Continuity Correction(a)	.804	1	.370		
Likelihood Ratio	2.014	1	.156		
Fisher's Exact Test				.343	.187
Linear-by-Linear Association	1.842	1	.175		
N of Valid Cases	41				

a Computed only for a 2x2 table
b 2 cells (50.0%) have expected count less than 5. The minimum expected count is 2.44.
Table 13: Data analysis- The results indicated no significance between groups on managing stroke/TIA patients better with the use of the RNBSS. It is of note that the pre-training rating was 80.1% with a 10% increase in the post-training ratings. This can be attributed to the fact that keeping patients NPO until swallow screen was a required standard of care prior to the RNBSS study.

Question number	Pre-test agree	% Pre-test agree	Post-test agree	% Post-test agree
1*	7	33.3%	19	90.5%
2	16	76.2%	18	85.7%
3	19	90.5%	18	85.7%
4*	5	23.8%	16	76.2%
5	16	76.2%	19	90.5%
6	12	57.1%	18	85.7%
7	12	57.1%	15	71.4%
8*	12	57.1%	19	90.5%
9	17	80.1%	19	90.5%

*significant at p<.01
Table 14: RN Bedside Swallow Screen Education Survey Trend

In summary, the pre and post education survey results showed a significant difference

between the pre and post education group in three of the nine questions; on feeling

knowledgeable and prepared to carry out the RNBSS. The results also indicated that the

teaching methods used were appropriate to learn about the RNBSS. Five of the nine questions

indicated a positive trend from pre to post education. These indicated that the RNBSS would

enhance their job satisfaction, they were able to identify factors that relate to stroke patient

dysphagia risk, able to carry out RNBSS, had enough time to learn, and were managing the

dysphagia guideline requirement better with the use of the RNBSS. The only question which

indicated a decrease from pre and post education was #3 (highlighted in yellow) feeling

supported in efforts to implement the RNBSS. Before training the score was 80.5% of staff felt

supported and post training there was a 5% decrease. Obtaining further input on this question

would help to assist is learning how to improve support to staff during implementation if this

education is conducted on another unit. Overall, the data showed strong evidence that the

educational methods used positively influenced confidence and knowledge to carry out the

RNBSS protocol. In conclusion, these educational methods will be used when an additional

nursing unit is trained to conduct the screening protocol.

8.2 Analysis of the Fiscal and System Impacts of the Project

Cost benefit analysis is used to compare the costs and benefits of implementation

of a best practice or program. Project goals, benefits, and costs are essential components of the

analysis to determine if a program should be implemented (Finkler, Kovner, & Jones, 2007).

Adherence to evidence-based practice guidelines with a multidisciplinary team can impact

current costs and economic burden of strokes (Carlo, 2009). The overall organizational goal of

the swallow screen protocol was to keep patients from aspiration pneumonia by following the

recommended evidence based clinical practice guideline put forth by The Joint Commission

(2008) for primary stroke center designation. The benefits in having the RN staff conduct the

swallow screening program was to expedite continued care of the newly diagnosis TIA/Stroke

patients 24 hours a day. This prompt patient screening, if passed, allows them to receive oral

medications and nutrition. The costs of implementing the RNBSS protocol included training of

RN staff and their time in conducting each patient screening. A comparison chart of ED

physician, RN, and SLP program costs of conducting the screening are provided below. The

training costs included competency education of 1.5 hr video, return demo in class, quiz, and 3

patients observation of screenings initially with the SLP or stroke unit manager approval check

off, thereafter annual competency will be 2 observed RNBSS by an SLP or deemed expert**.**, unit

educator time (prep, class, ongoing competency) (Table 15).

Care provider	Average hourly rate by provider	Initial training cost 1.5 hours	Annual training cost – 1hour	Time to conduct screening	Cost per screening
Emergency Dept. physician training N=15	**$150.00**	**$3375.00**	**$2250.00**	**5 minutes**	**$12.50**
RN stroke unit N=24	**$27.00**	**$972.00**	**$648.00**	**5 minutes**	**$2.25**
SLP N=1 For 24hour, 7day week coverage N=4.2 added 3.2 $62,400 Annually plus benefits per full time employee	**$30.00**	**$45.00**	**$30.00**	**30 minutes**	**$15.00**

Table 15: Cost comparison of physician, RN, or SLP administered swallow screen.

In comparing the cost benefit between the swallow screen being administered by the ED physicians, RN, or the speech language pathologist, it is evident that the RN program is the most cost-effective method. The RNBSS study data indicated 46% of patients failed the RN screen with 54% passing. The RN screen takes approximately 5 minutes. The SLP evaluation is conducted in 30 minutes. The cost benefit savings is 30 minutes of the SLP time for those who pass as they need no further SLP evaluation. For those who fail the RNBSS they must undergo a full SLP evaluation. For the first month the RN staff independently performed the screening on 78 stroke and TIA patients. With 54% pass rate the hospital realized approximately $650 a month savings annual approximately $8,000 savings of SLP costs. As the stroke population grows the savings will increase. In addition there is a significant savings of $200,000 in labor costs associated with hiring 3.2 full time SLPs to run this program 24 hours a day, seven days a week. Total annual savings of more than $210,000. In addition, to program costs the system can realize a financial reduction in morbidity and mortality by preventing aspiration pneumonia in the stroke population. The societal cost of aspiration pneumonia in the United States are $8,949-$23,961, per single episode to be treated in the hospital, with some resulting in death (Caprio, Holloway, McCann, 2007).

There are several benefits to having the RN staff conduct the swallow screen which are difficult to quantify, however, are significant benefits for the stroke program. Secondary to fiscal benefits of the program there was a system impact realized with this program which included improved patient satisfaction. There was little wait time when the stroke unit nurse was available to conduct the screening 24 hours a day, 7 days a week. Physician satisfaction improved as they were more readily able to adhere to the NPO until dysphagia screen clinical practice guideline without the patient dissatisfaction pressures. Lastly, RN staff job satisfaction

was also positively impacted. This new evidence-based skill to effectively detect dysphagia and aspiration allowed the staff to provide screening upon admission to the unit and only failed patients needed to wait for full speech evaluation. In conclusion, the benefits of improved patient, physician, and staff satisfaction to expedite care are important. Lastly, adherence to this evidence-based guideline is essential to achieve the goal of safe care of stroke patients and stroke center designation.

8.3 Evaluation of Issues Related to Organization/Providers/Population/Evaluation

8.3.1 Changing systems.

The Joint Commission (2008) disease-specific stroke designation practice guidelines aimed at "keeping patients NPO until dysphagia screen" have been found to create medical system practice changes nationwide. There was sufficient evidence to require this practice standard as nationally 42-76% of acute stroke patients experience dysphagia, placing them at risk for aspiration pneumonia. Many hospitals struggled to meet this guideline requirement, because most do not staff a speech pathologist 24 hours a day to perform swallow evaluations. Many hospitals chose to change their practice by having the emergency room physician, hospitalists, or RN staff be trained to conduct swallow screenings (Turner-Lawrence, Peebles, Price and Asimos 2009). Developing a swallow screening protocol for physicians and nurses was a change to their current practice and skill set. The first step making this clinical practice change was to design an evidence-based swallow screen and test for validity and inter-rater reliability when hospital quality data indicated variability in adherence to evidence-based stroke clinical practice guideline to administer swallow screening prior to giving patients anything by mouth. Many hospitals are developing and testing screening tools to contribute to the evidence on valid reliable bedside swallow screening (DiPippo, Holas, Reding, 1992; Massey, Jedlicka, 2002; Mann, 2002;

Nishiwaki, et al., 2005; Suiter, Leader, 2008; Turner-Lawrence, Peebles, Price, Singh, Asimos,

2009). As The Joint Commission came to realize that there was not a well-tested consistent

screening tool available, they have dropped this guideline requirement for stroke center

designation (2010). They still monitor swallow-screening rates at survey time; however, this

requirement is on hold until future evidence-based screens have been tested for generalized use.

The RNBSS protocol continued on the stroke unit. Subsequently, education was brought to the

intensive care unit. The nurses on the stroke and ICU units were hospital experts and the only

nurses to conduct RNBSS for all inpatient stroke patients. Annual competency standards were

put in place for these nurses to maintain accuracy of administering the RNBSS. Overall

adherence to this swallow screening guideline significantly increased to highest compliance of

97% in June 2010.

8.3.2 Attitudes.

Attitudes impact how hospital staff use new practice protocols. Analysis of patient

quality outcome data assists in showing how practice changes make a difference and then

organizational change can occur. Saint, et al. (2009) found some staff to be active resistors who

pose barriers to evidence-based practice change. They found communicating quality outcome

data and collaborating to gain key champions, assists in making organizational practice change.

The attitudes of the organization and providers for this study project were strained as patient

satisfaction was affected by current practices. The organization initially did not want to spend the

extra time to evaluate implementation RNBSS, with the rationale that the screen was evidence-

based. Why test the tool? The mounting pressure from physicians, RN, and administration to

expedite and evaluate the swallow screen was curtailed after discussing the importance of the

impact of changing practice from SLP to an RN screen. This is the kind of political context one

may experience when there is a changing climate and attitudes must change to accept evidence

based practice changes into a system. Some resistors continued putting up barriers to the practice

change until the evaluative data were presented and showed the impact on practice. Then

organizational change occurred.

8.3.3 Patient Perspective

Included in the swallow screening evaluative study were two questions for the stroke

population to understand their experience with the RNBSS protocol. Patient feedback is valuable

to make necessary changes to the protocol as part of this evaluative study. The questions asked

of the patients able to answer were: 1. How would you rate the RN swallow screen experience?

The patients were asked to use a 1-5 (1-poor – 5 excellent) when answering this question.

2. Do you have any suggestions to improve the swallow screen experience?   It is imperative to

include the patient perspective when developing and implementing clinical practice guidelines to

make improvements as they are being applied to the population (Matyka, 2009).

The following are the results from patients who were able to answer the questions. Fifty percent,
26 out of the 52 participants responded to the survey.

Patient survey question 1: How would you rate the RN swallow screen experience? (1-5, 1
poor - 5 excellent).

Question 2: Do you have any suggestions to improve the swallow screen experience?
5 of the 27 responding participants had a suggestion to improve the swallow screen experience.

Overall, 92.3 percent of the patients who responded felt the RNBSS experience was

positive with two of the 26 having a poor experience. The patient suggestions were primarily

geared towards the need for more instruction and communication when screening, with two

process improvement suggestions. Findings were shared with staff to improve the patient

experience with the RNBSS.

8.3.4 Values and beliefs.

Larrabee, Sions, Fanning, Withrow, and Ferretti (2007) found evidence-based practice change occurs in organizations that have senior leadership support and a systematic program that guides practice change. The nursing division involved in this study did operate under a systematic "evidence-based model of practice". The organization's mission is: "We serve people through high quality care, medical research and education. The organization vision was: We will be a world class innovator providing exceptional patient care and research. The corporate values were "ICARE": Integrity, Collaboration, Accountability, Respect and Excellence". This organization, provider, and population values and beliefs were in agreement with providing the safest care to avoid aspiration pneumonia in the stroke population. However, the mission of high quality medical research was challenged when the study was introduced. The research mission was not supported by all staff members. Administrators and physicians challenged the study protocol. Healthcare occurs in a rapidly-changing environment. The pressure to obtain stroke designation holds high value in hospitals that do provide high standards for stroke care. However, evaluative studies of evidence-based practices take time to ensure appropriate validity, reliability, and staff confidence so appropriate implementation of evidence-based practice change can permeate the organization.

8.4 Analysis of Technology in Problem

At the time the original study was conducted, all documents including the RNBSS, the MASA screen, and the staff survey were on paper. A preliminary meeting was held with the electronic medical record team and a request was made to build the screen electronically to accommodate the screening documents. The team stated they would reconvene to build the screen with a cascading sequence when validity and reliability had been established. When

completed, the electronic RNBSS will enable ongoing monitoring of compliance and success and failure rates with the ease of an electronically generated report. At this time, RN-trained staff can obtain a copy of the de-identified screen results and place them in a notebook as dysphagia rates continue to be gathered. It will be a few months until the RNBSS can be built in the electronic medical record.

9. Reflections

9.1 Creative Approach

A quality work group through the Great Lakes Regional Stroke Network was formed in late 2008 and continued through June 2010 when their Centers for Disease Control and Prevention funding for all stroke networks ceased. Members of the network conducted a cross analysis of 35 hospital approaches to screenings. The University of Illinois Speech and Language Department was sought for expertise advice on failure criteria for the swallow screen. The education DVD, PowerPoint, and quiz were used to educate the RN on this new skill and protocol. All of these efforts assisted in the development of an evaluation of the evidence-based screen which led to the establishing of inter-rater reliability with staff confidence for this new standard of care. Continued collaborative communication occurred between the principal investigator (PI) and stroke team members during the evaluation study. Several team members requested results and wanted to know when the start date would be set for the RN staff to begin independent screening**.**

9.2 Evaluation of Study Process

The evaluation process was positive to assess for measureable outcomes of the study project. Entering the swallow screen results of each patient and applying the appropriate calculation to run the data taught the PI a great deal related to testing a screening tool. Some of

the barriers encountered was pressure from stakeholders to implement the screening prior to

obtaining IRB approval. Patient and staff dissatisfaction was mounting and posed a time

pressure. In the end all parties understood the importance of completing the study project as and

IRB approved study. A replication of this evaluation would include developing clear measurable

organizational program evaluation outcomes and a distribution of these objectives to all

stakeholders to establish a clear understanding of the scope of the project.

9.3 Replication

Replication of this study in other hospitals and settings is encouraged to strengthen evidence as a

valid and reliable RNBSS for dysphagia. The Joint Commission is awaiting more general

consensus on bedside swallow screens that show validity and reliability prior to reinstating this

requirement for stroke center designation.

10. Conclusions

10.1 Broad Summative Statements

10.1.1 Relate to evidence.

The first major finding of this evaluation study was that the RNBSS study project

analysis demonstrated strong validity with a sensitivity of 94% and strong negative predictive

value of 96%. Secondly, inter-rater reliability for the two RN raters was found to be outstanding

with the Kappa at .92(p<.001). The pre and post training survey demonstrated a significant

change in knowledge gained to carry out the protocol, feelings of preparedness, and that the

teaching methods used were appropriate. Lastly, organizational practice change was to occur

resulting in adherence to the clinical practice guideline "NPO until Dyphagia Screen" for

stroke/TIA patients. Compliance with this requirement has increased to 93% for March 2010, up

from below 20% in 2008. Monthly monitoring occurs in the stroke program quality committee

meetings. The results of this program analysis provided strong evidence, that the RNBSS is a

safe method for testing patients for dysphagia and can be used for further testing in other stroke

units and populations who experience dysphagia.

10.1.2 Relate to data supporting the existence of the problem.

The protocol developed for this project study was based on recommendations from The

Joint Commission (2008) "NPO until Dysphagia Screen Performed." Barriers to this

recommendation exist. As this screening was traditionally performed by a speech therapist,

often patients wait for extended periods of time before the screening can be done. Patients do not

receive any medications or nutrition during this time. There is no generally recognized swallow

test.

Program evaluation uses a systemic approach to examine the effectiveness of an

intervention to determine if it did "do good." Program evaluation must adjust to the political

and organizational environments that are present in every program. There are legislative

supporters with careers and dollars behind them which are impacted by evaluation findings

(Veney, & Kaluzny, 2004**).** How accurate is the information about the problem? Another

program component to question the adequacy of the program is to establish if the program

adequately addressed the problem? What is the progress of the program, program activities must

track and analyze efforts to assess the degree of program implementation (personnel and

financial). A further question is that of efficiency, does the program show health improvements

which outweigh the resources expended. Does the program have effectiveness; evaluators must

examine how well the program results meet the set objectives and overall improved health

benefits. Does the program show long term impact, and produce the intended health effect?

Lastly, does the program have sustainability, evaluators must determine how the program

sustains itself (Aday, Begley, Lairson, & Balkrishnan, 2004; Rossi, Lipsey, & Freeman, 2004; Bamberger, Rugh & Mabry, 2006; Veney, & Kaluzny, 2004). This program evaluation could have more clearly been evaluated using these evaluation objectives as well as testing the RNBSS.

The RNBSS protocol addressed the relevant problem of a need for a valid, reliable tool and readily available competent staff to promptly complete a cost effective swallow screen for dysphagia to benefit the health of stroke victims. The evaluation process identified the importance of politics when making organizational practice changes. Political issues are a challenge as organizations move forward to mandate evidence-based clinical practice guideline changes. Program developers must be cognizant of the resistant practitioners who feel their autonomy to practice is being threatened. And, just as important, change agents must communicate and use collaboration to manage practice changes. One of the strong physician resistors of the RNBSS did order the screening on a patient a few weeks post RN implementation, which demonstrated provider changes, can take place; therefore, early adopters of change must be tenacious to impact change. Sustainability of this new clinical practice on this stroke unit is strong, with the increase in staff knowledge and confidence. The next step is to spread the training and practice to the surgical intensive care unit, which will further test sustainability of this protocol.

10.2 Recommendations

As a result of this evaluation study project, continued testing of this RNBSS is recommended in order to contribute to the body of knowledge, ultimately obtaining generalizability of its use to screen patients for dysphagia. To obtain generalizability the study has to be larger, contain more patients, and be replicated in different units and in more hospitals.

The significance of this proposed study was to contribute to the body of work aimed at establishing an evidence-based, valid, reliable RN-administered bedside swallow screen that can be promptly completed for acute stroke/TIA victims. Acute stroke patients will receive appropriate continued care according to the swallow screen results so the patient can safely receive medications and nutrition by mouth. Organizations must support such evidence-based practice changes to translate research findings into clinical practice guideline adherence; resulting in cost-benefit, quality care to the patients they serve. A systematic evaluation plan must be utilized from the start of the program to ensure appropriate measures are in place to determine if the program met the goal and had positive impact to continue.

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12. Acknowledgements

Appendix A

 The Joint Commission Required Guideline Metrics:

- Thrombolytic therapy administered (t-PA within 3 hours known well)

- NPO until Dysphagia screen performed

- A-Fib receive anticoagulation therapy (Coumadin)

- Antithrombotic therapy by end day 2 such as ASA

- Deep vein prophylaxis (non-ambulatory) day 2

- Pt. education (risk factors, warning signs, 911, medications, and follow up)

- History of smoking – cessation advice/counseling

- Assessed for rehabilitation services

- Discharged on cholesterol reducing medication

- Discharged on antithrombotic therapy

(The Joint Commission, 2008)

Running head: EVALUATION RN BEDSIDE SWALLOW SCREEN

Appendix B

RN Bedside Swallow Screening Date_____ Time of Assessment____ PT#_____

Needed for Assessment: 2 cups of water (1 with 3 oz of water – top of 4th line on clear plastic cup, the other cup will be used for oral care), 1 spoon, oral swabs, gloves, pen

Verify pt's name and DOB

RN Scripting for patient:

"Patients who are suspected to have had a stroke, TIA (transient ischemic attack), or a bleed in the brain are at risk for swallowing difficulties. Before allowing you to eat, drink, or take pills orally I will complete a short screening that should detect if you are having any difficulty with your swallowing. This will involve a few assessment items and possibly the swallowing of water. If the screening detects that you may have difficulty with your swallowing, you will not be allowed to eat, drink, or take pills orally until a speech-language pathologist can complete a full swallow assessment. Do you have any questions?"

Please answer the following questions. If the answers to any of the following questions are YES, please stop, keep the pt. NPO, and order a speech therapy consult. Keep in mind an answer of YES means that YES the pt. is at risk of aspiration.

	YES	NO
1. Pt. is unable to remain alert and follow commands	□	□
- ask pt. to smile, stick out tongue, wiggle fingers, etc.		
2. Pt. is drooling	□	□
- look at the pt. straight on for any drooling from either side		
3. Pt. has visible facial weakness	□	□
- look at the pt. straight on for any weakness at rest		
- ask pt. to smile and assess for weakness on either side		
4. Pt. has a weak or absent cough on command	□	□
- ask pt. to cough strongly, you may demonstrate a cough		
5. Pt. has a gurgly vocal quality	□	□
- ask the pt. to count to 10, listen for gurgly vocal quality		

If the answers to ALL of the above questions are NO, proceed with the water test portion.

1. Clean mouth with damp oral swab.
2. Raise the head of the bed as close to 90 degrees as possible
3. Give the patient 1 tsp of water. Have patient count to 10 out loud.
   **Stop if patient coughs, clears throat, or has a change in vocal quality voice quality. Keep patient NPO, order a speech therapy consult. If none of the above is observed proceed to step #4.

4. Ask pt. to drink 3 oz. of water uninterrupted. Have the patient count to 10 out loud.
   **If there are signs of aspiration (coughing, throat clearing, or a change in vocal quality) during the 3 oz. water test or for 1 minute following the test, stop, keep the pt. NPO, and order a speech therapy consult.

If the pt. does not show signs of aspiration during the 3 oz. water test then obtain an order for a regular diet if the pt. has adequate dentition. If the pt. has inadequate dentition or is edentulous order the pt. a puree diet and order a speech therapy consult.

Remember that CVAs can evolve. If pt. has a decline in neurologic status as defined by a change in the neurological assessment, call a code stroke, pt. should be made NPO and the above swallow screening should be repeated.

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Appendix C

Dear RN Staff:

I am conducting a research study at Carle Foundation Hospital on RN bedside swallow screening.

We hope to learn your satisfaction with the education methods and confidence level you have **PRE and POST TRAINING** in implementing the RN bedside swallow screen standard of care. We would greatly appreciate your participation in this study. Your decision to participate will require you to complete the attached questionnaire **BEFORE AND A FEW WEEKS AFTER TRAINING.**

Your participation is **completely voluntary** and your decision whether to participate or not will have no effect on your job status at Carle Foundation Hospital.

Completing the questionnaire carries minimal risk to you. Fill out the questionnaire in a private place. All responses will be examined as a group and there will be no link to you as an individual. You may place your questionnaire in a locked box in the R8 staff lounge.

Your completion of the enclosed survey implies your informed consent. If you have any questions, please feel free to contact me by phone at (217) 383-3214 or by e-mail at edith.matesic@carle.com. The Carle Institutional Review Board has approved this study and may be contacted by phone at 383-4366 for any questions or concerns.

Thank you for your time,

Edith Matesic, MS, RN

Director of Nursing

Carle Foundation Hospital

RN Bedside Swallow Screen Training Survey

Directions: Please circle the number that best communicates your perception about your use of the RN Bedside Swallow Screen standard of care. **RETURN TO THE BOX IN YOUR NURSE LOUNGE**

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I feel knowledgeable to carry out the RN bedside swallow screen standard of care.	1	2	3	4
2. Implementing the RN bedside swallow screen standard of care enhances the job satisfaction of nurses on the unit.	1	2	3	4
3. I feel supported in by efforts to implement the RN bedside swallow screen standard of care.	1	2	3	4
4. I feel well prepared to carry out the RN bedside swallow screen standard of care.	1	2	3	4
5. I am able to identify factors that relate to CVA/TIA patient dysphagia risks.	1	2	3	4
6. I am able to identify and carry out the essential activities of the RN bedside swallow screen standard of care.	1	2	3	4
7. I had enough time to learn about the RN bedside standard of care before it was implemented.	1	2	3	4
8. The teaching methods used to learn about the RN bedside standard of care were appropriate.	1	2	3	4
9. We are managing CVA/TIA patient dysphagia screen guideline requirements better with the use of the RN bedside swallow screen standard of care.	1	2	3	4

Please provide any comments which will assist us in providing better training of the RN bedside swallow screen standard of care: