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Reducing Workplace Injuries Among Advice Registered Nurses

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Abstract

An area of concern for clinical nurse leaders (CNLs) is the increasing incidence of workplace injuries in integrated healthcare systems with call centers where repetitive stress injury (RSI) is among the leading causes of workplace injuries. Recurring pain and discomfort that call center Advice Registered Nurses (ARNs) experience hurts them and their teams, influences the operation of the call center, and decreases the quality of care provided to the healthcare system members. Due to high call volumes ARNs do not adequately use breaks or other measures to reduce physical strain. There is an opportunity to reduce RSIs through deployment of management support and existing resources utilizing small interventions that don't interrupt workflow. To determine interventions for this evidence-based change of practice project an initial microsystem assessment was conducted using ARN safety report data to reveal the number and types of injuries. A subsequent microsystem assessment followed at six months, to identify any changes in the data. The assessments and safety report data suggested possible interventions, from which hotkeys, ForgetMeNot reminders, and microbreaks were chosen. The family of measures were completing ergonomic assessments, decreasing repetitive movements, and stretch break education. The ARNs benefited from the use of hotkeys and microbreaks and in contrast to the teams that do not use ForgetMeNot reminders, the project ARN team did not sustained any RSIs. This change of practice project showed that RSIs could be reduced through interventions specific to call center ARN work practices without interrupting workflow or decreasing productivity. Sustainability of the change of practice depends on leadership and manager support, safety pair engagement, and buy-in from the ARNs who benefit from a reduction in RSIs.

Introduction

Advice nurses are registered nurses whose role is to triage and determine the safest outcome for healthcare system members. Advice registered nurses (ARNs) work remotely from a call center and are often the first contact for members of a healthcare system. ARNs are gatekeepers who control consumer access to care by providing surveillance and disease monitoring, (Haynes, 2016). Calls have five possible outcomes ranging from patient advice, prescription requests, messaging, appointments, to consultation with an emergency room physician. Healthcare system members have the option to seek medical advice from the convenience of their homes, 24 hours-a-day, 365 days-a-year. The advice nurse telephone line provides members direct access to healthcare and in return members feel they are valued by the provider (Smith, 2014).

An area-of concern is the increasing incidence of workplace injuries at a call center in an integrated healthcare system where repetitive stress injury (RSI) is the leading cause of workplace injuries. RSI falls under the umbrella of musculoskeletal disorders (MSD) as one of the most common occupational diseases in all countries, regardless of their degree of industrialization (Fonseca & Fernandes, 2010). The ARNs primary work tools throughout their shifts are the computer, keyboard, mouse, and headset, which they use repeatedly with the same motions. Newman (2017) reported that office work is a main cause of RSI, attributed to individuals holding the same posture for prolonged periods of time or overuse of muscles. The Centers for Disease Control and Prevention (CDC) recommended assessment, planning, data analysis, and implementation of strategies and interventions to prevent these injuries (CDC,

2016). This evidence-based change of practice paper focuses on reducing ARN RSI injuries at the call center.

Problem Description

The healthcare call center represents the front medical office for the Northern California region. Of the call centers in Northern California, this is the main center and the only one that remains open 24 hours-a-day, 365 days-a-year. This call center, on average, receives one million calls per month. The call center provides a range of services to all healthcare members from advice to appointment booking for Internal Medicine, OBGYN, Pediatrics, and specialty departments such as Optometry, Occupational Health, Travel, and Health Education. At close to 35,000 calls a day, ARNs are often immersed in triaging calls, resulting in a lack of stretching for two hours or more at a time.

The safety year runs from October 1st to September 30th, with the regional safety goal of 3.3 full-time employees (FTE) per 100 ARNs. Closing out the 2017 safety year, the 44 accepted claims equated to 7.26 FTE injuries, more than double the regional goal (Ranada, 2017). Recurring pain and discomfort that ARNs experience result in increased frequency of time off to recover, impacting the operation and efficiency of the call center. The impact of these injuries affects the ARNs, healthcare system members, and the organization. Healthcare system members experience longer wait times and diminished quality of care due to the pressure placed on the ARNs triaging high call volumes with fewer people. The organization is also affected by the financial impact of paying workers sick time, overtime, and having dissatisfied members leave the system.

Available Knowledge

The PICOT question used to guide the search for evidence in this project is: Among call center ARNS, how do ergonomic assessment and intervention compare to no assessment or intervention reduce workplace repetitive stress injuries? A literature review was conducted to help guide the project.

Six studies were evaluated (See Appendix C) using the Johns Hopkin Nursing Evidence-Based Practice research evidence appraisal tool (See Appendix J). The study designs were exploratory mixed methods, cross-sectional, integrated literature review with a double-blind peer review, meta-ethnography, qualitative study, and systematic review. The study samples consisted of call center workers, random selection of surveys, literature review sample from one meta-analysis and eight randomized clinical trials, multiple qualitative studies, and a combined RCT and non-RCT sample. The evidence ratings were three Level III B; one Level II A, one Level III A, one Level V A.

Poochada and Chaiklieng (2015) conducted a study to assess ergonomics risk for musculoskeletal stress disorders in call centers. Data was collected using the Rapid Office Strain Assessment (ROSA), measuring sitting posture and workstation set up (i.e., chair height, pan depth, armrest, computer monitor, mouse and keyboard, duration of spending time for each activity or posture). ROSA consists of 4 levels of ergonomic risk: low, medium, high, and very high. ROSA can be used at the call center to assess ARN's ergonomic risks.

Odebiyi et al. (2016) examined a random selection of surveys to describe how work-related musculoskeletal disorders and workplace injuries affect daily job activities at call centers, contributing to loss of work hours. The prevalence of workplace injuries is 78% among nurses

and 93.2% among computer users in Nigeria. Women at the Nigerian call center suffered higher injury rates by simultaneous use of computer, phone, and communication with members while meeting deadlines, contributing to high occurrence of injuries.

Souza-Junior et al. (2016) explored how telehealth care can be effective, safe, and low cost while improving health costs. ARNs require greater competency as they do not have the ability to make visual contact with their patients. The authors concluded that ARNs require certain distinctive skill sets in order to perform their jobs.

Purc-Stephenson and Thrasher (2010) reviewed 16 qualitative studies, exploring factors that facilitate or impede ARN's decision-making process. The results provided concerns and challenges experienced by ARNs. One concern is the physical work environment where extended time is spent in front of the computer. Four studies identified workspaces being too small, and too much time spent sitting in front of a computer, resulting in strains and injuries.

D'Alleo and Santangelo (2011) used an organizational climate instrument and the Maslach Burnout Inventory to detect climate of organization and burnout among call center workers. The organizational climate instrument refers to how an employee perceives the organization they work for and how it is structured. Burnout is associated with psychosocial factors, representing a negative response to stress.

Luger (2017) reported that repetition and monotony increase employees' risk of developing work-related injuries. Luger proposed work-breaks—defined as temporary disengagements from work—to decrease long periods of repetitive workloads or periods where employees work in awkward postures. Types of breaks include microbreaks, which can be up to 2 minutes, and are practical and efficient without disrupting operative time.

Evidence from the RCT and non-RCT studies (Luger, 2017; Souza-Junior et al., 2016) supported the hypothesis that ARNs need to take breaks to relieve muscle stress. Luger (2017) reviewed different types of breaks and provided support for their effectiveness to prevent or reduce workplace injuries, contributing evidence-based validation for the direction of this project. The exploratory mixed methods study ("Ergonomic Risk Assessment," 2015) used an ergonomic risk assessment scoring system that can be applied to assess the ARNs ergonomic risk for RSI. The cross-sectional study (Odebiyi et al., 2016) described how workplace injury affects daily job activities. The study provided evidence that lost time at work directly affect patient care. The integrated literature review (Souza-Junior et al, 2016) showed that ARNs require greater competency for interviews as they lack visual contact with their patients. This study informed the project of the different skill sets required by the call center nurses who do not have direct patient contact and where interaction is limited to communication via telephone. The meta-ethnography (Purc-Stephenson et al., 2010) study described the concerns and challenges of telenurses, providing insight on the trending concerns in the call center ARN environment.

Rationale

The call center's microsystem assessment findings showed repetitive stress injuries rates among ARNs exceeded the healthcare system's annual safety goals of no more than 3.3 injuries per 100 FTEs, with negative consequences for the organization and its members. Recurring pain and discomfort that ARNs experience result in increased frequency of time off to recover, impacting the operation and efficiency of the call center. The impact of these injuries affects the ARNs, healthcare system members, and the organization.

To reduce RSIs to acceptable levels, the Kotter change model (Kotter International, 2014) was utilized as a guide to reducing workplace injuries among advice nurses at the call center.

The Kotter model is a step by step process to make change which provided insight and supported the Clinical Nurse Leader (CNL) in understanding the status of the microsystem and making appropriate changes.

Kotter's change model (2014) consists of the following eight-step process: a) creating urgency, b) form a guiding coalition, c) create strategic vision and initiatives, d) enlist volunteer army, e) remove barriers, f) generate short-term wins, g) sustain acceleration, build on the change, and h) institute change.

In analyzing the microsystem, leadership was concentrating on step six of the Kotter change model generating short-term wins, without having gone sequentially through the steps of the model. The nurses' concentration was on short-term wins rather than the goal of keeping themselves safe, an approach that is unlikely to reduce RSIs.

This project proposed to take the medical call center step by step, sequentially through the Kotter model, for lasting change and reduction of RSIs. The CNL's role was to guide the team through the implementation of change via Kotter's change model. Since there was a lack of familiarity with the CNL role in the microsystem, the role and responsibilities needed to be fully explained.

The first step was setting a sense of urgency to capture the targeted audience's attention, in this case the ARNs. As a leader of change, creating a sense of urgency inspired others to engage in behavior to achieve the desired change. Next, step two, built a guiding coalition. In the case of the call center, the CNL was a change agent to recruit the sponsoring leadership to champion and finance the project. Then, step three, forming a vision, enabled staff members to visualize the goal and the steps to achieve it. The ARNs, through helping create the vision, would be more vested in its realization. Step four was gathering volunteers. While the CNL

provided leadership, in the medical call center, ARNs as 'volunteers' drove the project through engagement with their teams. Step five in the Kotter model is where potential barriers are anticipated prior to implementation and steps are taken to remove them. For the medical call center, engaging in steps one through five of the Kotter model actively mitigates obstacles in the path to effective change.

Kotter's sixth step, short-term wins, occurs with celebrations of small achievements. For the medical call center, the purpose of celebrating short-term wins is to sustain the effort to reach the long-term goal. Step seven, sustaining acceleration, reminds the staff of the big picture, with small victories leading to achievement of the goal. For the medical call center, this step involves dedicating meeting time to revisit the vision, review achievements, and modify processes as needed. Finally, step eight, formally implements the change. ARNs participate in the planned interventions (e.g., hotkeys and ForgetMeNot reminders).

Specific Project Aim

To reduce the number of workplace repetitive stress injuries among evening shift Advice Registered Nurses at the medical call center from the baseline of 44 injuries per year to 33 injuries/year, or no more than three injuries per month by June 2018.

Context

The mission of the medical call center is to provide convenient access to high quality medical services and information. The medical call center team staff of over 1300 individuals is comprised of 400 ARN FTEs, 21 nurse managers, several senior nurse managers, an operational director overseeing nursing practice, 378 emergency room doctors working remotely, medical directors, multiple IT personnel and application developers, 460 tele-service representatives (TSR), a TSR operational director, 27 TSR managers, and 10 administrative support staff.

Additionally, there is the Script and Protocol Oversight Committee (SPOC) team comprised of regional department chiefs, regional RN content experts, quality assurance staff, and RN educators.

The call center microsystem process is for TSRs to answer all healthcare system member calls. TSRs handle non-symptomatic calls (i.e., scheduling routine appointment and providing directions). If the healthcare system member is symptomatic, the TSR transfers the call to an ARN. There are two ways of transferring calls to the ARN: a cold transfer with a screen prompting the member's information with a brief description of the issue; or a warm transfer (emergent transfer) where the TSR speaks with an ARN and relays the member's condition, location, and call back number. During the call, the ARN conducts a comprehensive assessment to select the appropriate protocol outcomes from five options: advice, appointment, prescription request, message to primary care provider, or emergency room recommendation. If the call outcome is emergent, a consultation with the emergency room physician occurs.

ARNs complete a regional training program on advice nursing. They are trained to select appropriate protocols, utilize resources, and escalate issues by proper chain of command. However, with hundreds of protocols to navigate when taking a call, selecting the right outcome for each protocol is not straightforward. Monthly call center team meetings are held separately for ARNs and TSRs. Managers lead these meetings, taking priority on urgent information, new safety tips and workflow changes. If staff experience discrepancies, such as confusing protocols, or protocols with incorrect information, they can submit a responsible reporting form (RRF) to initiate an investigation.

ARNs have a monthly one to one coaching with their managers on their call times, quality, and safety. One goal is to manage each call within twelve minutes or less. The healthcare

medical call center has a main safety committee called the Integrated Safety Committee (ISC) with 22 members. Within ISC are three subcommittees: Systems of Safety Committee, Root Cause Analysis Committee, and Safety Communication Committee.

A SWOT analysis (See Appendix D) was completed for the microsystem to determine strengths, weakness, opportunity, and threats. Strengths of the microsystem are support and partnerships between staff and management. Multiple resources are available in addition to assigned safety pairs who work in assessing ARNs, educating, and advocating on proper ergonomic stretches.

A weakness is with multiple safety programs creating a challenge for ARNs to know which program to focus on. This results in lack of 100% participation in the programs. Ergonomic assessments are conducted, and ergonomic equipment provided, but on multiple occasions there is no follow-up or instruction on how to correctly use the new equipment.

There is an opportunity to reduce RSIs through deployment of management support and existing resources. Management is in favor of the safety and wellness of ARNs, so there is an opportunity to engage management in effective change to reduce RSIs. A second opportunity is to standardize processes and workflow. For example, once ergonomic equipment is delivered, ideally there would be instruction on use, initial follow up by a safety pair, and consecutive follow up to determine efficacy of the intervention.

A threat related to high call volumes contributes to ARNs not utilizing breaks and adds to the stress level of feeling the need to be on the phone at all times to meet members' needs. A second threat is related to the ARN not having consistent access to a chair that is ergonomically appropriate. ARNs have to select from chairs that are available when they start their shifts, even if the chair is not a good fit. A third threat is from the perspective of the healthcare system

members. If their calls are not handled in a timely manner and provide a positive experience, there is a chance that the member will switch to another healthcare facility.

A return on investment (ROI) analysis was completed for the microsystem (See Appendix G). The initial cost of the project for the first year was $1,900 for 20 ARNs, including all set-up costs and factored for wages and training time. If the goal of reducing RSIs to 36 per year in the first year is met, the expected ROI is $32,000, for a benefit/cost ratio (BCR) of 16.8%. The projected ROI for the second year is $44,000, for a BCR of 46.31% based on RSI reduction to no more than 24 RSIs in that year.

Interventions

To determine interventions, an initial microsystem assessment was conducted on one of ten evening shift ARN teams using safety report data to reveal the number and types of injuries. This team was selected to participate in the project. All results and interpretations in this study are based on this team of 20 ARNs. A subsequent microsystem assessment was conducted after six months, to identify any changes in the data that may have occurred. The data from the safety reports revealed the numbers and types of injuries, through which patterns emerged showing the prominence of RSIs. Possible interventions were suggested by the data.

A driver diagram served as a guide to systematically move from the aim to the specific ideas to test. Primary and secondary drivers were determined, from which the specific ideas were developed. The driver diagram can be found in Appendix B.

Additionally, a survey of the ARNs was conducted shortly after the second microsystem assessment to determine who had access to hotkeys and ForgetMeNot reminders, if they used them, and if there was interest in them by those ARNs who did not have access. For the survey, see Appendix K. Results of the survey revealed that only 50 percent of the team had hotkeys.

The majority of the ARNs did not have access to ForgetMeNot reminders. No patterns emerged to reveal the reasons behind access or lack thereof for individual ARNs.

Interventions consisting of hotkeys, ForgetMeNot reminders, and microbreaks were chosen based on injuries per the safety report, the driver diagram, and survey findings. Hotkeys are keystrokes of smart phrases used to decrease the amount of typing, which decreases key strains, thus lowering the risk of repetitive stress injuries. The higher the number of hotkeys the lower the keyboard strain. Each ARN was set up with individualized hotkeys.

ForgetMeNot reminders are pop up notifications that cycle every 15 minutes on a computer screen. ForgetMeNot reminders were installed for each ARN as prompts to encourage microbreaks. Microbreaks are short work breaks of 30 seconds to two minutes that interrupt the constancy of repetitive work and reduce both stress and monotony. The ForgetMeNot reminders contain prompts to move, stretch, look away from the screen, or simply switch from typing to a resting position.

An initial test of change with two components was conducted with approval from senior leadership. The first component consisted of a request for a safety pair to set up the hotkeys to the work profile of a volunteer ARN. Once approved, the safety pair and ARN set up hotkeys for single and double clicking as an alternative to using the mouse and adding shortcuts for frequently used phone numbers to reduce key strokes from eleven to two. The hotkey codes were typed and printed to provide a reference for the ARN. The second component, a request for ForgetMeNot reminders, involved a discussion with stakeholders (i.e., safety pair, manager, safety manager, ergonomist, and IT supervisor) to determine the proper implementation process.

Workflow evaluation consisted of having all ARNs complete ergonomic assessments, measure hotkey usage by a risk guard program that captures all key strokes and participate in

monthly safety coaching that reviewed keyboard strains, mouse strains, and hotkey utilization for each ARN. The data for the safety coaching was collected for each ARN. Keyboard strains were calculated by the frequency of key presses and key force pressure. Average keyboard and mouse strains were 37-69 meters. The goal was to remain under 100 meters for keyboard and mouse strains as ARNs with keyboard or mouse strains of 100 meters or greater are at risk for injury.

Study of the Interventions

Institute for Healthcare Improvement (IHI) is a not-for- profit organization that provides resources for leaders in the healthcare setting. IHI recommends Plan Do Study Act (PDSA) cycles in developing and documenting tests of change to save time and resources. Three PDSA cycles were carried out to test the interventions and help determine whether to adopt, modify, or abandon the interventions. The PDSAs and the additional study of the intervention were completed in June 2018.

The first PDSA (See Appendix E*)* was installation of hotkeys and education on how to use them to expose any barriers and work process issues for one ARN in adopting the use of the hotkeys. The volunteer ARN went from using zero hotkeys to averaging 460 hotkeys per shift within two weeks. The ARN was educated on the importance of microbreaks and was able to return demonstration on appropriate microbreaks for her situation. The ARN provided feedback on how ForgetMeNot reminders were useful in reminding her to take microbreaks. Once the first PDSA proved successful, it was adopted and the second PDSA was initiated.

The second PDSA consisted of hotkey setup for the rest of the ARN team. The approach was to encourage the ARNs to try out hotkeys and incorporate them into their practice. There

were no specified levels of hotkey use that the ARNs needed to achieve. The ARN's chose to practice a couple of commonly used phrases as their hotkeys.

The third PDSA was installation of ForgetMeNot reminders for the entire team and education on microbreaks. The survey prior to installation had revealed interest in ForgetMeNot reminders and microbreaks. Additionally, a follow-up survey was conducted among ARNs to get feedback on the interventions in the third PDSA and the ARNs' satisfaction with them.

The interventions were determined to be successful based on the PDSA analyses. The second and third PDSAs were developed based on the findings from the first PDSA cycle that indicated the need for education on microbreaks and hotkeys. The second and third PDSAs confirmed the appropriateness of the interventions and that the team accepted them. Subsequently, the team was able to adopt the interventions into their practice.

Measures

The family of measures for this project are completing ergonomic assessments, decreasing repetitive movements, and an education piece consisting of completing stretch breaks. The process measures are education on microbreaks and the number of ergonomic assessments. The education measures consist of hotkey training, stretch breaks prompted by ForgetMeNot reminders on the ARNs screen, and instruction on microbreaks with a return demonstration. The balancing measure is a staff satisfaction survey on the RSI reduction interventions. Reducing RSIs is the specific outcome measure. In addition to the family of measures, a risk guard program is installed to each ARN profile at time of hiring that tracks keyboard, mouse strains, and ergonomic needs.

Ethical considerations

The project was reviewed by faculty and is determined to qualify as an Evidence-based Change in Practice Project, rather than a Research Project. Institutional Review Board (IRB) review is not required (See Appendix A, IRB Non-Research Determination Form).

The CNL functions as a risk analyzer for the medical call center. After completing assessments, the CNL noted trends and opportunities for improvement while adhering to senior leadership's vision and goals. The CNL served as an advocate to the ARNs and senior manager. In addition, the CNL ensured the process was understood by champions prior to implementation and continues to act as an educator and resource for further questions and or issues.

Results

Since the realignment of ARN evening shift teams in December 2017, there have been three injuries to the project team, none of which were RSIs. The first injury, in February 2018, was a fall that was not accepted as a workers' compensation claim. The second and third injuries were accepted as claims: a trip and fall which occurred on March 2018, and a hand laceration in April 2018. Among the other 20 teams in the medical call center there were 28 RSIs during the first nine months of the current safety year.

Key strains under 100 meters are ideal to decrease risk of RSIs. Increased hotkey usage enables the ARNs to type fewer strokes, creating less key strain. After installation and use of hotkeys for approximately one month, the project ARN team ranked highest in hotkey usage among all 21 teams at the call center. Average hotkey usage for the ARN team in January was 1095, in February 1043, and in March 1159, April 1099, and May 1805, June 1960. The project

team ARNs recognized the benefit of hot keys and continued to be the team with the highest hotkey usage.

ForgetMeNot reminders were installed for each ARN and have become a part of each ARN's practice. The program was cycled to remind ARNs to take a microbreak every 15 minutes, with the option of changing the setting to every 30 minutes. A satisfaction survey of the team showed positive feedback on use of ForgetMeNot reminders for microbreaks. In contrast to the teams that do not use ForgetMeNot reminders, the project ARN team has not sustained any RSIs.

Summary

A key finding from the project was that once hotkeys were installed, ARNs incorporated their use into their daily practice. The ARN team that was the subject of this project had the highest hotkey usage among all ARN teams, decreasing the risk of RSIs. A second key finding was that use of the ForgetMeNot reminders resulted in a higher frequency of breaks, with the ARNs performing microbreaks in between calls, a substantial improvement from infrequent breaks or not taking breaks at all.

Some lessons learned were the CNL must be open and flexible to realities, constraints, and pressures of the workplace. Each ARN prioritizes their responsibility to the calls and pressures of meeting call time goals. The CNL must recognize the competing priorities when encouraging ARNs to modify their work habits. Other key attributes for the CNL that became apparent are resilience and creativity. Creativity is necessary to find what works for the ARNs in their specific environments as each microsystem is unique. In a large organization, accessibility by the CNL to necessary resources may not be straightforward and thus require finding

alternative paths to achieve the project aim. The CNL needs to find a balance of time and patience in explaining the issues versus creating a sense of urgency so the goals can be met.

Lack of leadership support would be detrimental to the success and sustainability of this evidence-based change in practice project. The preceptor's support was crucial to the success of this project as her role as senior leader in the organization provided approval for interventions to be tested and implemented. Sustainability of a change of practice depends on leadership and management support, safety pair engagement, and buy-in from the ARNs who benefit from a reduction in RSIs.

Conclusion

Repetitive stress injury (RSI) is one of the leading causes of workplace injuries for Advice Registered Nurses (ARN). Due to high call volumes ARNs do not take adequate measures to reduce physical strain. Deployment of existing resources using small interventions that don't interrupt workflow presented an opportunity to reduce RSIs. This evidence-based change of practice project showed that RSIs could be reduced through interventions specific to call center ARN work practices with no impact on workflow or productivity. The project team ARNs benefited from use of hotkeys and microbreaks and did not sustain any RSIs. Leadership support was key to the successful implementation of the project and will ensure its sustainability in reducing RSIs.

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Appendix A

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CNL Project: Statement of Non-Research Determination Form

Student Name: ___Mey Saephanh_____

Title of Project:

Reducing workplace injuring among Advice Nurses at the AACC.

Brief Description of Project:

The project will focus on reducing repetitive stress injuries among advice nurses at the call center. The focus group will be Michelle Vas' evening shift advice nurse team.

A) Aim Statement:

Reduce repetitive stress injuries (RSI), among AACC advice nurses by 2% at end of safety year October 2018: 17 RSI injuries/safety year accepted claims.

B) Description of Intervention:

- Forget me not pop ups: installed for every RN's profile
- Decrease OES mouse strain: less than 100 meters/month
- Implementation and usage of hot keys: short cut key, use of up and down arrows instead of mouse usage.

C) How will this intervention change practice?

Reduces number of advice nurse workplace injuries. Being mindful, taking microstretches between calls, using hot keys will prevent injuries by decreasing mouse usage which enables members access to care in a safe and timely fashion.

D) Outcome measurements:

- By end of safety year October 2018, RN RSI will be 17 or below.
- RN OES strain will be less than 100 meters/month.
- Increase 10% use of hotkeys by RNs.

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To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: (http://answers.hhs.gov/ohrp/categories/1569)

X This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

XThis project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title:	YES	NO
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	X	
The specific aim is to improve performance on a specific service or program and is a part of usual care. ALL participants will receive standard of care.	X	
The project is NOT designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does NOT follow a protocol that overrides clinical decision-making.	X	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does NOT develop paradigms or untested methods or new untested standards.	X	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does NOT seek to test an intervention that is beyond current science and experience.	X	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	X	
The project has NO funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	X	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., not a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	X	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-*	X	

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based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."		

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence based activity that does NOT meet the definition of research. **IRB review is not required. Keep a copy of this checklist in your files.** If the answer to ANY of these questions is **NO**, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print):

Mey Saephanh

Signature of Student:_____DATE____2/03/2018_____

SUPERVISING FACULTY MEMBER NAME (Please print):

_____

Signature of Supervising Faculty Member

_____**DATE**_____

Appendix B
Project Charter

Project Charter: Reducing repetitive stress workplace injury among Advice Registered Nurses at the healthcare medical call center.

Global Aim: To promote safety of staff by reducing workplace injury among Advice Registered Nurses at the integrated healthcare medical call center thus serving as a resource for other call centers, reducing cost of workplace injuries.

Specific Aim: To reduce the number of workplace repetitive stress injuries among evening shift Advice Registered Nurses from the baseline of 44 injuries per year to 33 injuries/year, or no more than 3 injuries per month by August 2018.

Background: Advice nurses are registered nurses whose role is to triage and determine safest outcome for healthcare members while working remotely from a call center. ARN's often are the first contact for members the healthcare system. ARNs are gatekeepers, who control consumer access to care by providing surveillance and disease monitoring, (Haynes, 2016). Call outcomes range from providing patient advice, prescription requests, appointment setting to communication with a provider or urgent emergency room care. Healthcare members have the option to seek medical advice from the convenience of their home, 24 hours-a-day, 365 days-a-year. The Advice nurse line provides members direct access to healthcare and in return member's feel they are valued, (Smith, 2014). One area of concern is the increasing incidence of workplace injuries at the healthcare medical call center, where repetitive stress injury (RSI) is the leading cause of workplace injuries. According to John Hopkins Medicine, repetitive motion injury is carpal tunnel syndrome commonly seen in people who use a computer keyboard. The ARN's primary working tools are the computer, keyboard, mouse, and headset making them a repeat offender of these tools thus increasing risk of injury. While the ARN's are taking care of members on the phone, they often fail to take care of their immediate needs. RSI falls under the umbrella of Musculoskeletal disorders (MSD) as one of the most common occupational disease in all countries, regardless of their degree of industrialization (Fonseca and Fernandes, 2010). Newman (2017), reports

one main cause of RSI is office work, holding the same posture for prolonged periods of time, overuse of muscle. ARN's are often immersed in triaging calls, with few breaks between calls, resulting in lack of stretching for prolonged periods of time.

Sponsors

Senior Manager	Teresa Ranada
Manager	Michele Vas

Goals The goal of this project is to reduce workplace injuries among the Advice Registered Nurses at the healthcare systems call center from the baseline of 44 injuries per year to no more than 3 workplace injuries per month. Promotion of proper ergonomics by ARNs can prevent repetitive stress injuries leading to reduce cost for workplace injuries, decreasing absence from work and increasing productivity by meeting healthcare member needs.

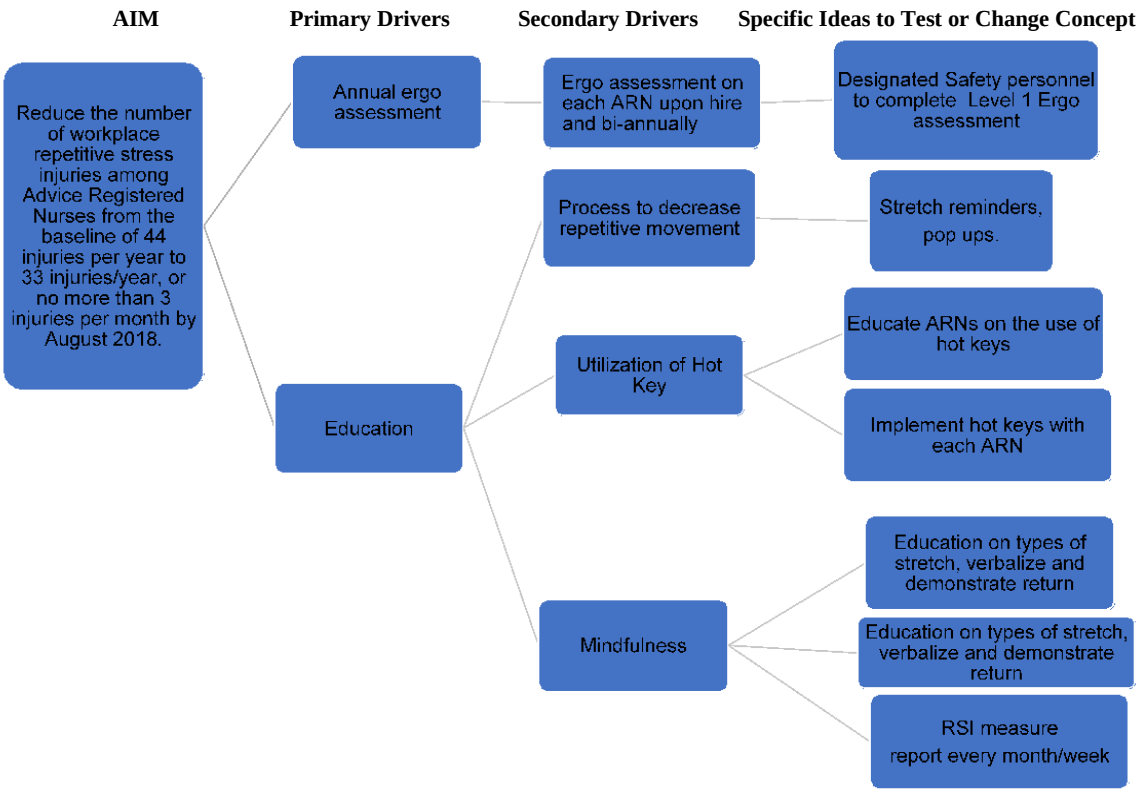
Measures

Measure	Data Source	Target
Outcome		
Reduce workplace repetitive stress injury to no more than 3 injuries/month	Workplace safety report	90%
Process		
Education on stretches and proper use of equipment	Education: training on microbreaks	90%
Implementation of safety ques	RSI reports conducted to see how often Advice Registered Nurses are utilizing this program.	90%
Balancing		
Staff satisfaction	Survey conducted on advice registered nurses after education and test of change	80%

Team

Senior Manager	Teresa Ranada
RN/CNL student	Mey Saephanh
Safety pair/Charge Nurse	Charlotte

Driver Diagram



Measurement Strategy

Background (Global Aim):

This goal of this project is to promote workplace safety among Advice Registered Nurse by promotion of practicing proper ergonomics.

Population Criteria: Advice Registered Nurses at the integrated healthcare systems call center

Data Collection Method: Data will be obtained from OES Ergonomic assessments report on Advice Registered Nurse, Repetitive stress injury reports at the healthcare systems call center. Workplace injuries from SIIR database. Review of previous safety year will be conducted to note for trends, correlations of injuries.

Data Definitions

Data Element	Definition
Workplace injury report	Report generated monthly showing claims and injuries filed.
RSI- repetitive stress injury report	Report generated q week by RSI program tracking risk of injury based on mouse usage
Safety Committee	Bi-Monthly meetings to discuss risk factors and improvement practices
Root analysis	Weekly meeting exploring workplace injuries its cause.

Measure Description

Measure	Measure Definition	Data Collection source	Goal
Number Ergo assessment	N=# advice registered nurse completing ergo assessment D=# advice registered	Ergo Assessment/OES report on integrated healthcare medical system call center	90%

Education:
decrease repetitive movement
	N= # repetitive movements, mouse clicks, mouse wheeling
	D=# min allowance of repetitive movements
		RSI report	80 %

# ARNs completing stretch module/education	N= # ARNs completing stretch during shift 	
	D=# of ARNs
		Intradiem report
		Off call details
			90 %

Changes to Test

- Monitor repetitive stress movement
- Monitor workplace injury reports
- Monitor ARN's repetitive movements via Office Ergonomic Suite application
- Develop standardized work place safety education for staff
- Implementation of guideline regarding stretching, utilization of short cut keys "hotkeys"
- Process to decrease repetitive movements: ergonomic assessment, determine appropriate ergo equipment based on assessment
- Ensure ergonomic assessments are conducted for each ARN by designated safety/ergo personnel
- Educate ARN's on mindfulness
- Educate ARN's on type of stretches
- Testing improved workflow

Timeline

Timeline	8/2017	9/2017	9/28/17	10/01/17	10/17/17	11/7/17	11/18/17	8/2018	8/2018
Define Topic									
AIM Statement									
Microsystem Assessment									
Data Collection									
Measures Development Charter									
Driver diagram									
Finalize Charter									
Final Presentation									

CNL competencies

The Clinical Nurse Leader (CNL) functions as a risk analyzer for the healthcare systems call center Advice Registered Nurses. After completing the microsystem assessment, the CNL will note trends and opportunities for improvement while adhering to Senior leadership's vision and goals. The CNL also serves as an advocate to the Advice Registered Nurse and Senior Manager. The CNL acts as an educator to ensure the process is understood by champions prior to implementation and will continue to act as an educator and resource for further questions and or issues.

Lessons Learned

Assessing the microsystem:

- Identify data
- Remain curious
- Seek resource from key individuals
- Be patient and flexible

As a CNL student there were multiple barriers, one is the challenge being a part of an established team. Established teams have dynamics and a certain culture. During a root cause analysis meeting as an observer, there were side conversations. One common theme was communication barrier, it was also noted key information to drop during initiative roll out.

For a CNL to be successful, one must open, curious and patient. If one area didn't provide information requested, try asking in a different manner. At one point setting a sense of urgency was successful in connecting with the appropriate person. Support is imperative in success of the project. Seeking appropriate key stake holders will aid in success of project.

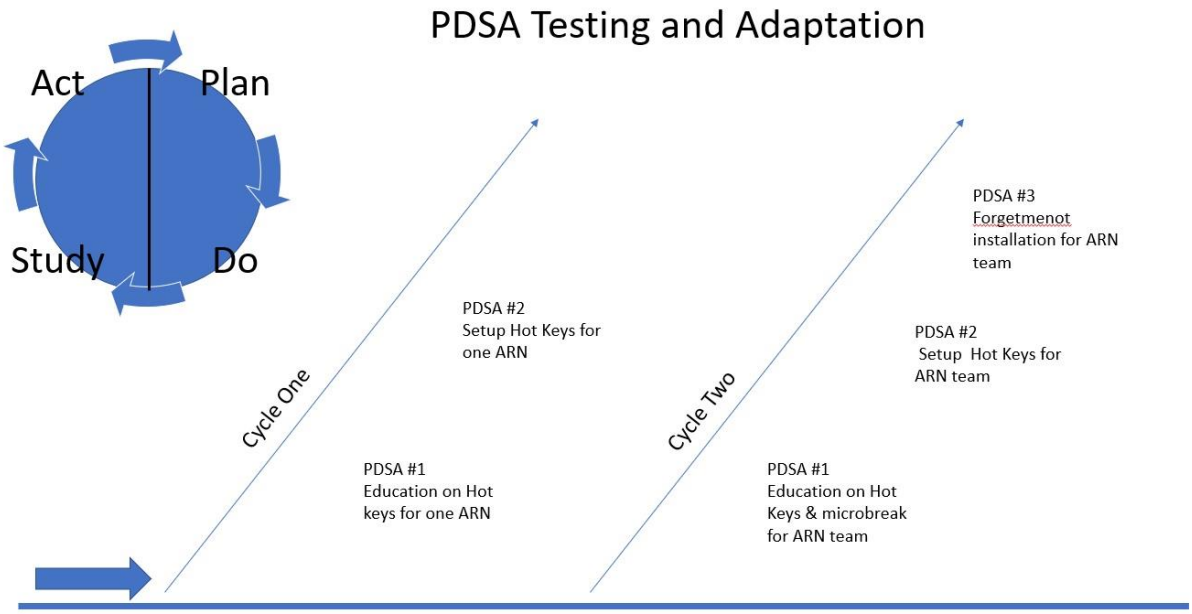
Appendix C
Evaluation Table

Study	Design	Sample	Outcome/Feasibility	Evidence rating
Ergonomic risk assessment among call center workers. (2015). Retrieved from: https://www.sciencedirect.com/science/article/pii/S351978915005442	Exploratory mixed methods descriptive study	216 female call center workers	Top three highest ergonomic risk scores were 5, 4, and 3 points with a mean score of 4.5. Most call center workers were exposed to high risk for MSD development. Can be applied to assess advice nurse ergonomic risks at the healthcare medical call center.	Level III B Ergonomic risk assessment.pdf
Odebiyi, D. O., Akanle, O., Akinbo, S., Balogun, S. C., (2016). Prevalence and Impact of Work-related Musculoskeletal Disorders on Job Performance of call center operators in Nigeria. *International Journal of Occupation & environmental Medicine*, 7(2), 62. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/27112718	Cross sectional study	Random selection of 25 from 100 surveys.	Describes how workplace injury effects daily job activities, contributes to loss of work. Provides evidence for project, lost time at work affects patient care.	Level III B Prevalence and Impact.pdf
Souza-Junior, V. D., Mendes, I. C., Mazzo, A., & Godoy, S. (2016). Application of telenursing in nursing practice: an integrative literature review. *Applied Nursing Research*, *29*(1), 254-260. doi:10.1016/j.apnr.2015.05.005 Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/26856523	Integrative literature review. Double blind peer review.	Literature review sample from one meta-analysis and eight randomized clinical trials.	Explores how telenursing requires greater competency for interviews as nurses lose ability to visually see their patients. Telehealth care can be effective, safe, and low cost while improving health outcomes.	Level V A Application of telenursing.pdf
Purc-Stephenson, R.J. & Thrasher, C. (2010) Nurses' experiences with telephone triage and advice: a meta-	Meta-ethnography	Review of 16 qualitative studies	Describes concerns and challenges experienced by tele nursing, one being physical work environment, too much time spent in front of the computer.	Level III A

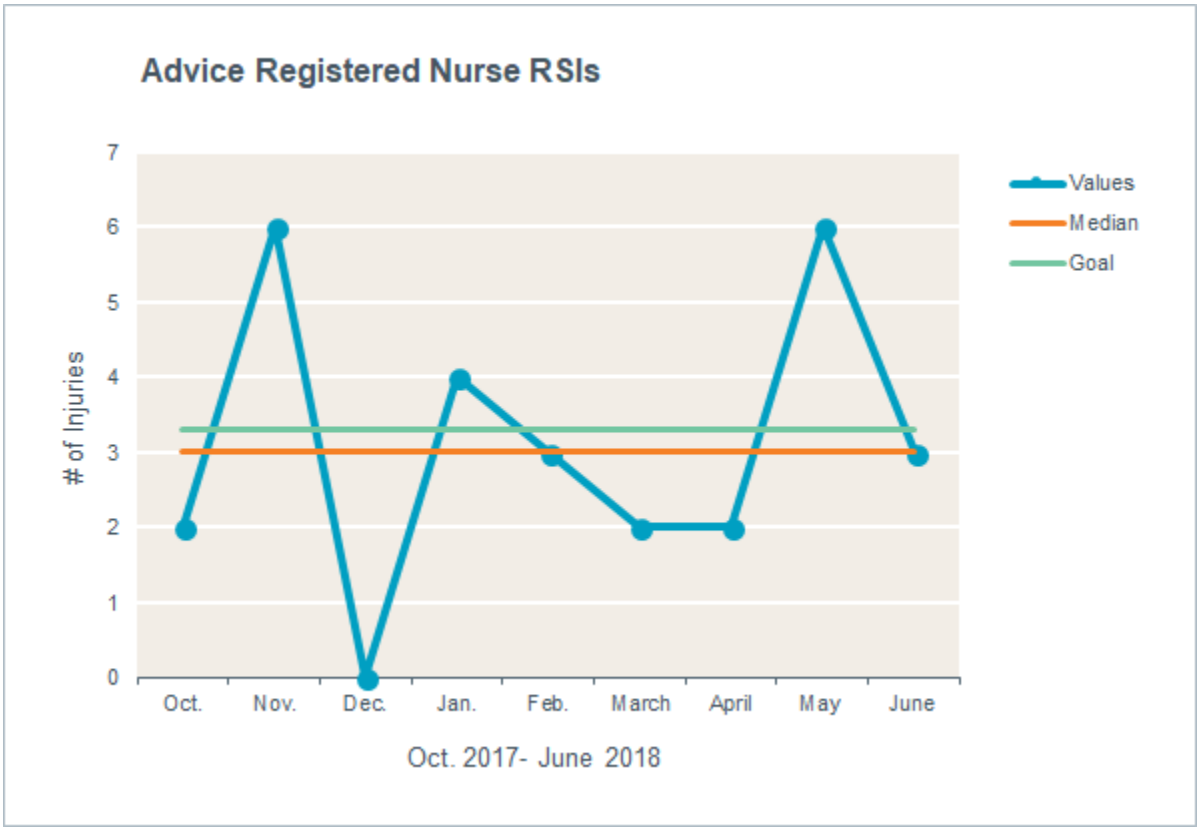
ethnography. *Journal of Advanced Nursing* 66(3), 482–494. doi: 10.1111/j.1365-2648.2010.05275.x Retrieved from: http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2648.2010.05275.x/abstract			Gives insights on trending concerns within telenursing environment.	Nurses' experiences meta-ethnography.pd
D' Alleo, G, Santangelo, A. (2011) Organizational climate and burnout in call-center operators. *Social and Behavioral Sciences* 30 (2011), 1608-1615 Retrieved from: https://www.sciencedirect.com/science/article/pii/S1877042811021379	Qualitative study	none	Organizational climate instrument and MBI (Maslach Burnout Inventory) used to detect climate of organization and burnout among call center workers Provides awareness to burnout factors among call centers staff.	Level III B Organizational climate and burnout.p

Appendix D
SWOT Analysis

Appendix E


PDSA Testing and Adaptation
Act
Plan
Study
Do
Cycle One
PDSA #1
Education on Hot keys for one ARN
PDSA #2
Setup Hot Keys for one ARN
Cycle Two
PDSA #1
Education on Hot Keys & microbreak for ARN team
PDSA #2
Setup Hot Keys for ARN team
PDSA #3
Forgetmenot installation for ARN team

Appendix F


Advice Registered Nurse RSIs
# of Injuries
0
1
2
3
4
5
6
7
Oct.
Nov.
Dec.
Jan.
Feb.
March
April
May
June
Values
Median
Goal
Oct. 2017- June 2018

Appendix G

Table 1. Estimated Cost for Labor and Materials

Materials and Labor	First Year Cost	Second Year Costs
Advice Registered Nurses wages - training on usage of program	20 ARNs pay x 1 hour Avg. pay of $75/hr./RN $1500	Training new RNs estimated at 10ARNs pay x 1 hr. Avg. pay $75/hr./RN $750
IT personnel hourly wage & time to install forget-me-not reminder program	$40/hr. x 10 hr. = $400	N/A
Program	$0-organization previously paid	N/A

Appendix H

Table 2. Benefit Cost Ratio

Implementation of Safety Forget-me-not Pop up Reminder Program	Benefits Year 1 No more than 3 RSI/ month = 36 RSI	Cost Year 1	Benefit- cost Year 1-ratio (BCR)	Benefits Year 2 No more than 2 RSI/month= 24 RSI	Costs Year 2	BCR Year 2
	36 RSI x $4000= $144,00 2017 RSI cost $176,000-2018 RSI cost $140,000= benefit *Benefit= $32,000*	$1900	16.84% (32,000/ 1900)	24 RSI x $4000= 96K 2018 RSI total cost 140k – 2019 RSI cost 96k =benefit *Benefit= $44,000*	$950	46.31% (44,000/950)

Appendix I
Timeline

Timeline	8/2017	9/2017	9/28/17	10/01/17	10/17/17	11/7/17	11/18/17	8/2018	8/2018
Define Topic									
AIM Statement									
Microsystem Assessment									
Data Collection									
Measures Develop Charter									
Driver diagram									
Finalize Charter									
Final Presentation									

Appendix J

Johns Hopkins Nursing Evidence-Based Practice

Appendix F: Non-Research Evidence Appraisal Tool

Evidence level and quality rating:		
Article title:	Number:	
Author(s):	Publication date:	
Journal:		
Setting:	Sample (composition and size):	
Does this evidence address my EBP question?	❑ Yes	❑ No Do not proceed with appraisal of this evidence.

❑ **Clinical Practice Guidelines LEVEL IV** **Systematically developed recommendations from nationally recognized experts based on research evidence or expert consensus panel** ❑ **Consensus or Position Statement LEVEL IV** **Systematically developed recommendations, based on research and nationally recognized expert opinion, that guide members of a professional organization in decision-making for an issue of concern**		
▪▪Are the types of evidence included identified?	❑ Yes	❑ No
▪▪Were appropriate stakeholders involved in the development of recommendations?	❑ Yes	❑ No
▪▪Are groups to which recommendations apply and do not apply clearly stated?	❑ Yes	❑ No
▪▪Have potential biases been eliminated?	❑ Yes	❑ No
▪▪Does each recommendation have an identified level of evidence stated?	❑ Yes	❑ No
▪▪Are recommendations clear?	❑ Yes	❑ No
Complete the corresponding quality rating section.		

❑ **Literature review LEVV** **Summary of selected published literature including scientific and nonscientific such as reports of organizational experience and opinions of experts** ❑ **Integrative review LEVEL V** **Summary of research evidence and theoretical literature; analyzes, compares themes, notes gaps in the selected literature**		
▪▪ Is subject matter to be reviewed clearly stated?	❑ Yes	❑ No
▪▪ Is literature relevant and up-to-date (most sources are within the past five years or classic)?	❑ Yes	❑ No
▪▪ Of the literature reviewed, is there a meaningful analysis of the conclusions across the articles included in the review?	❑ Yes	❑ No
▪▪ Are gaps in the literature identified?	❑ Yes	❑ No
▪▪ Are recommendations made for future practice or study?	❑ Yes	❑ No
Complete the corresponding quality rating.		
❑ **Expert opinion LEVEL V** **Opinion of one or more individuals based on clinical expertise**		
▪▪ Has the individual published or presented on the topic?	❑ Yes	❑ No
▪▪ Is the author's opinion based on scientific evidence?	❑ Yes	❑ No
▪▪ Is the author's opinion clearly stated?	❑ Yes	❑ No
▪▪ Are potential biases acknowledged?	❑ Yes	❑ No
Complete the corresponding quality rating.		

Organizational Experience

Quality improvement LEVEL V

Cyclical method to examine workflows, processes, or systems with a specific organization

Financial evaluation LEVEL V

Economic evaluation that applies analytic techniques to identify, measure, and compare the cost and outcomes of two or more alternative programs or interventions

Program evaluation LEVEL V

Systematic assessment of the processes and/or outcomes of a program; can involve both

Setting	**Sample Composition/Size**		
▪ Was the aim of the project clearly stated?	❑ Yes	❑ No	
▪ Was the method fully described?	❑ Yes	❑ No	
▪ Were process or outcome measures identified?	❑ Yes	❑ No	
▪ Were results fully described?	❑ Yes	❑ No	
▪ Was interpretation clear and appropriate?	❑ Yes	❑ No	
▪ Are components of cost/benefit or cost effectiveness analysis described?	❑ Yes	❑ No	❑ N/A
Complete the corresponding quality rating.			
❑ **Case report LEVEL V** **In-depth look at a person or group or another social unit**			
▪ Is the purpose of the case report clearly stated?	❑ Yes	❑ No	
▪ Is the case report clearly presented?	❑ Yes	❑ No	
▪ Are the findings of the case report supported by relevant theory or research?	❑ Yes	❑ No	
▪ Are the recommendations clearly stated and linked to the findings?	❑ Yes	❑ No	
Complete the corresponding quality rating.			
Community standard, clinician experience, or consumer preference LEVEL V ❑ **Community standard:** Current practice for comparable settings in the community ❑ **Clinician experience:** Knowledge gained through practice experience ❑ **Consumer preference:** Knowledge gained through life experience			
Information Source(s)	**Number of Sources**		
▪ Source of information has credible experience.	❑ Yes	❑ No	
▪ Opinions are clearly stated.	❑ Yes	❑ No	❑ N/A
▪ Evidence obtained is consistent.	❑ Yes	❑ No	❑ N/A
Findings That Help You Answer the EBP Question			

Quality Rating for Clinical Practice Guidelines, Consensus, or Position Statements (Level IV)
A. High quality Material officially sponsored by a professional, public, or private organization or a government agency; documentation of a systematic literature search strategy; consistent results with sufficient numbers of well-designed studies; criteria-based evaluation of overall scientific strength and quality of included studies and definitive conclusions; national expertise clearly evident; developed or revised within the past five years. **B. Good quality** Material officially sponsored by a professional, public, or private organization or a government agency; reasonably thorough and appropriate systematic literature search strategy; reasonably consistent results, sufficient numbers of well-designed studies; evaluation of strengths and limitations of included studies with fairly definitive conclusions; national expertise clearly evident; developed or revised within the past five years. **C. Low quality or major flaw** Material not sponsored by an official organization or agency; undefined, poorly defined, or limited literature search strategy; no evaluation of strengths and limitations of included studies; insufficient evidence with inconsistent results; conclusions cannot be drawn; not revised within the past five years.
Quality Rating for Organizational Experience (Level V)
A. High quality Clear aims and objectives; consistent results across multiple settings; formal quality improvement or financial evaluation methods used; definitive conclusions; consistent recommendations with thorough reference to scientific evidence. **B. Good quality** Clear aims and objectives; formal quality improvement or financial evaluation methods used; consistent results in a single setting; reasonably consistent recommendations with some reference to scientific evidence. **C. Low quality or major flaws** Unclear or missing aims and objectives; inconsistent results; poorly defined quality; improvement/financial analysis method; recommendations cannot be made.
Quality Rating for Case Report, Integrative Review, Literature Review, Expert Opinion, Community Standard, Clinician Experience, Consumer Preference (Level V)
A. High quality Expertise is clearly evident, draws definitive conclusions, and provides scientific rationale; thought leader in the field. **B. Good quality** Expertise appears to be credible, draws fairly definitive conclusions, and provides logical argument for opinions. **C. Low quality or major flaws** Expertise is not discernable or is dubious; conclusions cannot be drawn.

Appendix K

ARN Survey

Name_____

Please circle your answers where applicable.

1.	**Do you have ForgetMeNot reminders?**	**Yes**	**No**
2.	**If yes, do you use it to stretch?**	**Yes**	**No**
3.	**Do you stretch in between calls?**	**Yes**	**No**
4.	**How do you stretch? _____**		
5.	**How often do you stretch?_____**		
6.	**Do you have hotkeys (smart phrases) keys?**	**Yes**	**No**
7.	**If not, would you be interested in setting up hotkeys?**	**Yes**	**No**