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Decreasing Medication Errors Through the Reduction of Avoidable Interruptions

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Abstract

In recent years, the media has been rife with stories of medical mistakes in hospitals or other health care settings that lead to patient injury or death. While most of the media attention rightfully focuses on the horrific psychological and emotional toll such injuries and deaths impose upon patients, their loved ones, and the healthcare providers involved, there is also an enormous economic cost associated with the results of such mistakes that, if not resolved, will continue to strain an already heavily burdened system. Progressive step down units are fast paced and highly demanding. This type of unit is placed between the intensive care units and medical/surgical units. The staff is in constant motion however there has been an increase in medication errors that has lead to a halted workflow and ultimately a less efficient unit. The cause of this increase is multifactorial however the focus of this paper will be on the interruptions occurring during medication passes, interruptions that can have severely detrimental effects on patients and their safety.

Statement of the problem

"Medication errors can occur at any stage of the medication process including prescribing, dispensing, preparation, administration and monitoring" (Bennett, Dawoud, & Maben, 2010). Medication errors arise in many ways, including, wrong patient, wrong medication, wrong dose, time and route and these errors are occurring with greater frequency with the increasing amount of interruptions that those who administer medication endure during the hours of medication pass. "Interruptions were defined as an event that occurred in the surrounding area that averted the nurses' concentration away from the primary focus of safely administering medication… they affect staff cognitively by interfering with working memory, causing a lack of focus…" (Bennett, 2010). When a nurse is directly interrupted while on medication pass, the nurse is responsible for assessing the significance of that interruption and deciding on an appropriate response. Simultaneously, the nurse is focusing on a direct task (administering medications) while performing other tasks that deal with indirect peripheral distractions in the environment. "The institute of medicine was among the first to suggest that interruptions could contribute to medical errors" (Smeulers, Hoekstra, van Dijk, Overkamp, & Vermeulen, 2013).

During the study done for this paper, observations and surveys were conducted revealing evidence that the leading cause of interruptions during medication pass is related to phone calls and call lights. It is the responsibility of the unit clerks to triage phone calls and call lights during their shift, especially during medication passes. This paper will address the current problems at an urban level 1 trauma center on the west coast with regard to medication administration errors related to interruptions, methods on

how information was obtained, the study used, interventions and implementations

instituted and the results of those implementations.

Rationale

A needs assessment was conducted on the Step Down unit at this this hospital.

Assessments revealed many issues directly leading to medication errors, however phone

calls and call lights took the lead in number of interruptions during a typical two-hour

medication pass. Medication errors hospital wide must be reduced, beginning on a

smaller scale. After meeting with the hospital administrators, it became clear that with the

decrease of interruptions, thus leading to a decrease in medication errors, this will not

only improve patient outcomes, but the satisfaction of nurses will also improve due to the

improving process flow on the unit. The data collected revealed that nurses are

interrupted on average, 61% of the time during one typical medication pass, leading to

slower patient delivery time, less time at the bedside and an increased medication error

rate.

Once the assessment phase of this project was complete, it was clear what this

unit needed in terms of education/implementation and with that, the cost of implementing

on the unit. For this project to have the best chance of success, certain financial

responsibilities needed to be accounted for, including: how much it would cost to have a

resource nurse cover the phones/call lights during the three hour time slot allotted for unit

clerk education, which would be approximately time and a half of what the unit clerk

makes per hour ($26 * 1.5 = $39/hour = $117/ resource nurse per unit). Another

consideration is the person doing the educating, which would be the Clinical Nurse

Leader (CNL) whose average hourly wage is $37, for three hours of education would be

$111. The biggest financial factor for this project is the average cost of one medication error, which is approximately $4700.

Root Cause Analysis

A root cause analysis was conducted (see appendix A) and revealed that the culture on the step down unit is one of constant movement, patient requests, rounding, transferring, medication administration and family/visitor questions. Their were many different factors leading to medication errors on the unit, which included equipment malfunction, lost or decreased supplies, unit culture regarding nurse personal conversations and patient/family distractions and a lack of staff to turn over tasks too. The culture of the unit was one of teamwork and cohesiveness in terms of helping one another, however nurses and other providers did not respect the hours of medication passes (i.e. interruptions were abundant). Personal conversations between nurses run rampant in the medication room which diverts the nurses from their original focus and corners are constantly being cut to get tasks done quicker in order to move on with other tasks. A major cause of interruptions on the unit is due to the lack of staff. Certified nursing assistants (CNA's) are not staffed on each shift, leaving those shifts floundering for people to triage too (i.e. patient requests & ADL's, family requests, and other tasks within the scope of CNA practice).

Literature Review

The purpose of the literature was to first introduce the idea that medication errors occur too frequently in hospitals leading to adverse patient affects, second to discuss where and why medication errors take place and lastly to hone in on the interruptions

during medication passes and the solutions to reducing those interruptions, ultimately reducing the rates of medication errors.

In one medication administration accuracy report conducted between 2008-2013, there were nine leading causes of medication errors. In a total of 232 errors, 30% of errors resulted from medication being delivered at the wrong time (Cuttler, 2014). This same study revealed that from 2008-2013 the reason for the wrong time error is directly related to distractions and interruptions (Cuttler, 2014).

Researchers have evaluated data and studied interventions that have lead to a reduction in medication pass interruptions. According to Freeman et al. (2013), there are a multitude of situations that lead to medication errors, "but the more common classifications of sources contributing to medication errors include the following: (1) interruptions, (2) environmental distractions, (3) nurse workload, (4) alarms, (5) cognitive function and education, (6) look-alike and sound-alike medications and packages, and (7) communication"(Freeman et al., 2013). Through further research, based on the above causes of medication errors, the leading contributors are interruptions, distractions and communication.

Several studies have indicated that through the use of apparel designed to alert others that medication administration is taking place, a decrease in interruptions has occurred. A study conducted by Smeulers et al. (2013), discussed that while the goal is to reduce interruptions, realistically there are certain interruptions that will never be eliminated in a hospital. Those are considered to be positive interruptions, such as cardiac monitors, emergency alarms, bed alarms, etc. Reducing those interruptions could lead to adverse patient outcomes. There is a fine line between those situations where nurse

interruptions are necessary for proper patient care and those that cause the nurse to unnecessarily veer from the task at hand, mentally and physically, thereby putting patients in danger.

According to Mitchell (2013), Lippitt's theory of change is concerned with diagnosing the problem, seeing the need for change and making that change happen. This theory uses a series of phases to map out and initiate the process of change. The phases begin with developing a plan or guideline of the proposed change, which is initially given to all those involved and that are likely to be affected. Mitchell (2013) emphasizes the importance of leaving room for 'change' within the proposed change in order to allow people to use initiative. "It is also important to have an agreed and appropriate timescale, which can prevent alienation and increase the likelihood of success (Mitchell, 2013). The phases then emerge to understanding the capacity for change and whether or not your intended group is ready for change and if goals are realistic. This involves communication, interviews, surveys and observation.

In Lippitt's planning phase, he discusses three different change plans, which include: the empirical-rational strategy that "assumes that people are rational and will adopt change if it can be justified and is in their self-interest" (Mitchell, 2013). The power-coercive strategy is a top down theory that "assumes that people obey instructions from higher authorities…accompanied with a sense of threat, such as loss of job" (Mitchell, 2013). Lastly, the normative re-educative strategy "assumes that providing information and education will change people's usual behavior patterns and help them develop new ones" (Mitchell, 2013). This phase is focused on communication and feedback between staff and researchers to promote teamwork and a successful project.

"Strong, open communication across teams strengthens the chance of firmly embedding change by supporting the development of therapeutic relationships and removing barriers" (Mitchell, 2013).

The final phase consists of post-implementation evaluations. Those conducting the study observe the change in it's natural setting to determine whether or not the interventions were successful. Quiet observations are done to see the type and number of interruptions occurring during the medication administration process. The staff is given a trial period to acclimate to the change and integrate it into everyday clinical practice, they are then evaluated and observed to determine success. Mitchell (2013) recommends that a change agent remain available for advice and reinforcement, since past behaviors re-emerge, leading to an unsuccessful change.

Freeman et al. (2013) conducted a study over a three month period on a cardiac/thoracic step-down unit consisting of 36 beds with telemetry monitoring, 59 direct nursing observations were conducted prior to the implementation of interventions and of those 59 observations, there were 194 interruptions. That was an average of 3.29 interruptions per nurse per medication administration. After the implementation of interventions to reduce interruptions, 40 observations took place with only 47 interruptions averaging 1.18 interruptions per nurse per medication pass, a drastic decrease compared to the pre-implementation interruptions.

In a study conducted by Kliger et al. (2010), six hospitals were chosen to take part in an intervention to reduce medication errors. What they found was that medication accuracy, was at 85% prior to implementation, increased to 92% six months after and increased even more to a 96% accuracy rate 18 months after the implementation. They

discuss the importance of adhering to six safety processes to reduce the rate of errors, including: comparing medication to the MAR, keeping medications labeled throughout process, explaining drug to patient, charting immediately after administering, checking two patient forms of identification, and lastly being free from distractions and interruptions. "At 18 months, the observed nurses followed five of the safety process for more then 95% of the time. The exception was freedom from distractions and interruptions, however the amount of doses administered while the nurse was free from distractions increases from 60% to 84%" (Kliger, Blegen, Gootee, & O'Neil, 2010). This study leads researchers to believe that while interruptions and distractions are the most difficult obstacle to overcome during medication passes there is still an increase in rate of delivery to patients when their are no distractions accounted for.

"An observational study design was employed for the purpose of documenting the type and frequency of interruptions experienced during medication administration" (Craig, Clanton, & Demeter, 2014). This study conducted its observations during the morning medication pass for two hours, and was done in a two-week period prior to implementing the interventions. This study utilized the white vest intervention which had 'Please do not interrupt while passing medications' written on the back, to alert all on the unit not to interrupt the nurses.

"In addition to implementing the white vests, unit secretaries and overnight nursing staff in each of the participating units attended in-service training designed to reduce interruptions" (Craig, Clanton, Demeter 2014). The in-service touched on many areas to aid in the reduction of medication errors, one in particular included educating the unit clerks how to communicate effectively with family members/visitors via phone calls

or in person while the nurse was on medication pass. The results of this study came in two forms, first showing the leading cause of interruptions, which were staff interruptions, phone calls and gathering supplies which remained the top three most frequently observed interruptions after implementation. The second part of the results revealed that nurses experienced fewer interruptions during the morning medication passes when they wore the white vests.

Methods

The change theory used for this study was Lippitt's Theory, which is comprised of the assessment, planning, implementation and evaluation phases. The microsystem assessment that was initially done on the unit directed this study on the path of reducing medication errors, which lead to the planning phase where surveys were created and distributed amongst the nurses on the unit. The study utilized a mixed method design that involved observation of the unit and individual nurses to detect why errors were taking place. The observation was then followed by focus groups where a subsample of nurses, chosen at random, were surveyed and audited. Sixteen nurses were surveyed (8 day-shift, 8 night-shift) and an additional six nurses were audited during a full medication pass (3 day shift, 3 night shift) with each nurse administering medications to 2-4 patients per medication pass. The surveys and audits revealed that interruptions were the leading cause of medication errors and that those interruptions were coming from phone calls and call lights.

In the next phase of Lippitt's theory, interventions and implementations were developed to reduce phone call/call light interruptions and were brought to the unit. Nurses and unit clerks were educated on the interventions and asked for further input to

move this project in the right direction. This study's approach is most effective because it allows nurses to get involved, give personal input and recommend alternative ways of intervention and implementation to help make this project a success. Change will not occur unless those being affected by the change are willing participants in the changes needed.

This approach allows those involved to be at the forefront of intervention and implementation of changes intended to reduce errors during medication passes. The one to one access to nurses from the start of a medication pass to the end (starting with the line outside of the medication room, entering the room, pulling meds from the Omni cell, entering patients room, educating patients on medications to be received, administering medications, and charting), allows for one to understand the process as well as see where steps are being missed and why errors are being made. The accessibility to nurses helps to pinpoint where and why the medication errors are occurring. Once the interventions were implemented, the final phase of Lippitt's theory was put in motion, evaluation.

Interventions

The interventions implemented for this study, focus on the unit clerks, based on evidence revealing that much of the medication pass interruptions come in the form of phone calls or call lights. The interventions created and used for this study were a script for the unit clerk to announce the start and end of medication passes (see appendix E), a triage algorithm (see appendix H) to assist the clerk in knowing when it's appropriate to triage and when the nurse needs to be called, a script for the clerk to use over the phone (see appendix H), a messaging system (see appendix F) to ensure that all nurses receive messages properly after they have administered their medications, as well as a nurse sign

up sheet (see appendix G), which alerts the unit clerk to when each nurse has started their individual medication pass.

Current literature that discusses other studies focusing on medication errors related to interruptions and distractions has shown that through implementation of a "vest, apron, sash, button or other clothing item to indicate that the nurse is administering medications and should not be interrupted" (Freeman et al., 2013) the number of interruptions has decreased. Although medication errors result from a multitude of sources, the leading cause is directly related to interruptions. "On average, a nurse is interrupted 22% of their time and were frequently interrupted while performing safety critical tasks" (Freeman et al., 2013).

Expected Results

After effectively implementing interventions, the expected results and outcomes are as follows: a decrease in the number of interruptions resulting in a decrease in medication errors. This decrease is possible if the unit clerks are routinely using the overhead announcement scrip and those on the unit are respecting the hours of medication pass, and the clerks are effectively triaging phone calls and call lights to other staff members, unless there is an emergency, in which case the nurse would be called.

With these expectations met, one can expect the nurse to spend more time at the bedside leading to a higher patient satisfaction rate and lower rate of patient injury, death and error.

Limitations/ Barriers

This study had several limitations. It was performed in one hospital on one step down unit and was done in a very short amount of time, leaving the sample population

small and the evaluation period almost non-existent. The generalization of the results may be limited since only one unit was studied and, since only the two daytime medication passes were observed, never the night shift. Another limitation is referred to as the Hawthorne effect, which is a phenomenon where individuals improve or modify an aspect of their behavior in response to their awareness of being observed. The major limitation this unit encountered was the lack of certified nursing assistants (CNA) per shift. In order to effectively triage phone calls and call lights, the unit clerks must have staff to triage to, the CNA.

Project Summary

Interruptions of nurses during medication passes are a real problem in the complex reality of nursing practice because of their high frequency and the risks they introduce into the medication process. Reducing medication errors and increasing medication safety has been at the forefront of healthcare initiatives for years. Understanding the causality between interruptions and medication errors is a key component in reducing those errors, and one way to do this is by implementing interventions geared toward reducing interruptions during medication passes. By doing so, we expect to see an increase in medication safety and a reduction in medication errors. This project's outcomes have indicated that by implementing these interventions, success in decreasing interruptions was achieved. After implementation, there was little time to evaluate the long-term effects of the interventions. However the hope is that a reduction in interruptions does contribute to the decline in medication errors and that a larger study in the future will bear this out.

One conclusion that could potentially emerge is the idea that phone calls and call lights are major causes of hospital distraction, leading to a more chaotic environment and an increase in the number of medication errors. It is the hope of this project that the implementations/interventions put in place for this study will not only decrease the interruptions coming from phone calls and call lights but those from all other sources.

Results:

For this study, a primary baseline data collection (see appendix D) was gathered in order to understand what the leading cause of interruptions was. Six nurses were involved in this data collection, revealing a total of 21 interruptions (see appendix B). Of those 21 interruptions, 48% were due to phone calls and call lights, while the remaining 52% of interruptions were divided between a variety of sources.

A secondary baseline data collection (see appendix D) was conducted prior to implementing the interventions, and with that data, during a two-hour medication pass the nurses were interrupted with a phone call or call light, 41 times (see appendix C). Of those 41 interruptions, 19 (46.3%) were emergent and required the primary nurse; and 22 (53.6%) of those interruptions could have been triaged to another staff member on the unit. Although only 19 calls/call lights required a nurse, the nurse was paged 25 (61%) times during the two-hour pass.

Once the interventions were implemented, nurses were interrupted by phone calls/call lights a total of 38 times (see appendix C) during the two-hour medication pass. The nurse was necessary to call for 19 (50%) of those 38 interruptions, but was actually called 22 (57.8%) times. These results indicate a slight reduction in interruptions during a two-hour medication pass.

Recommendations

There are many different ways in which one can help to reduce medication errors related to interruptions in a hospital setting. One of those ways was put into action on the step down unit, however this unit was left with recommendations for future attempts at reducing error. These recommendations include nurse visuals such as a vest or a lighted lanyard, an in-service and/or simulation day to equip nurses with techniques to assert themselves during medication pass & to change unit culture to one of respect for professional practice, education for other disciplines (i.e. MD, OT, PT) including scripts on how to communicate with nurses effectively and efficiently, as well as educate the other disciplines on why medication pass is important and alternative ways of getting their questions answered if the primary nurse is on medication pass, patient/family education including brochures and lastly, signage on the unit (patient rooms & medication room). One recommendation for this unit would be to hire more CNA's per shift in order to allow the unit clerks triaging access. Without a CNA present, clerks have no one but the primary nurse to turn to with phone calls and call lights.

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Appendices

Appendix A. Root cause analysis

MEDICATION ERRORS

Individual: Nurses taking short cuts; Nurses did not follow the standard medication pass protocol; personal conversations in med room, about non-healthcare related topics

Equipment/Supplies: Broken; cannot be found; not enough in stock

Culture: constant movement, patient requests, rounding, transferring, medication administration and family/visitor questions. Nurses, other disciplines, visitors etc. are constantly asking questions and interrupting medication pass; phone calls/call lights constant

Leading cause of interruptions on the unit

Time: 2 hour time frame with a number of patients, is not always enough time to deliver meds on time

Nurse spends less time at patient bedside – decreasing patient satisfaction

Staff: CNA's are not staffed for each shift

Appendix B. Primary collection chart

Not many options for triaging phone calls/call lights
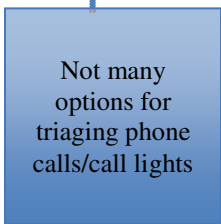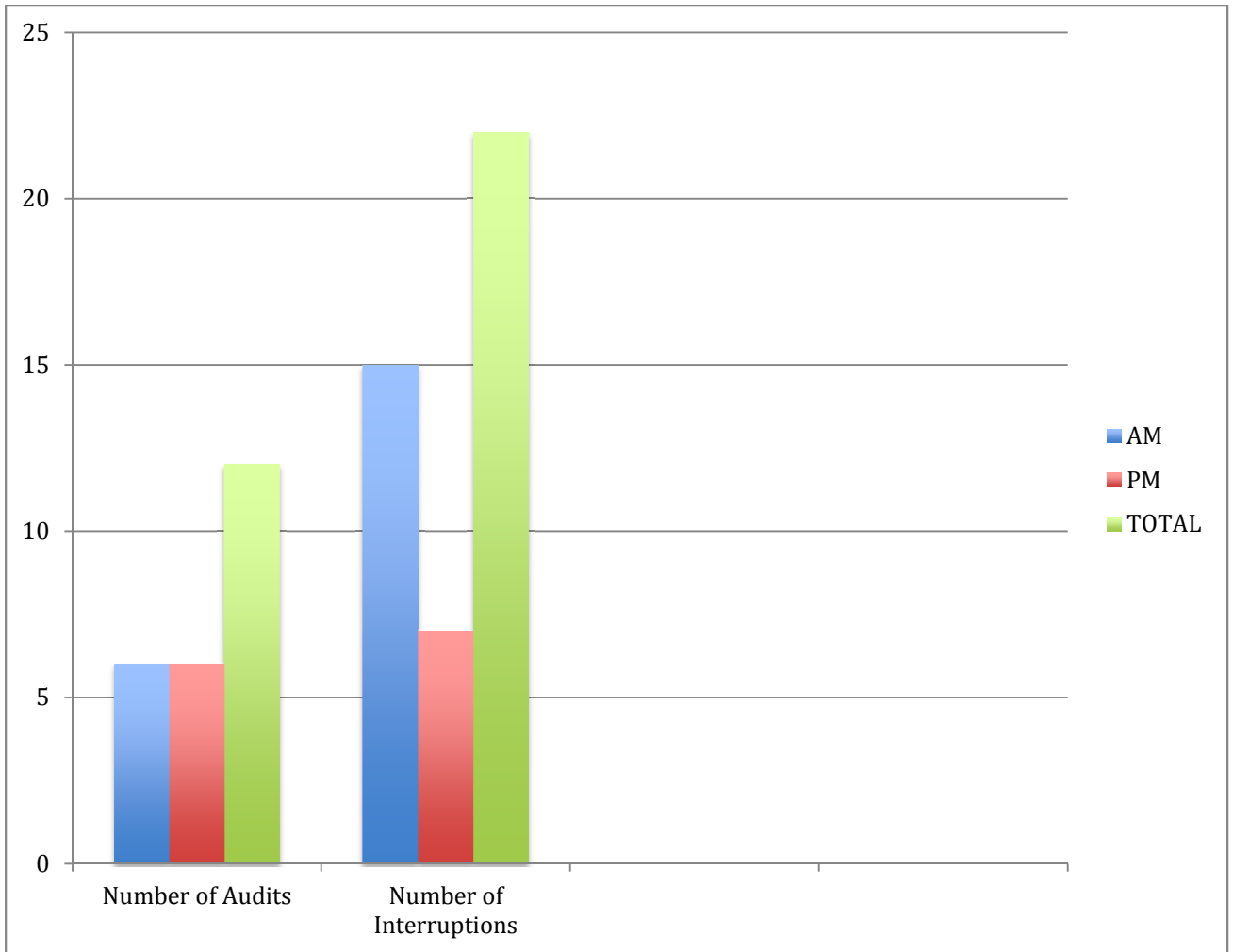
Appendix C. Secondary pre & post implementation chart
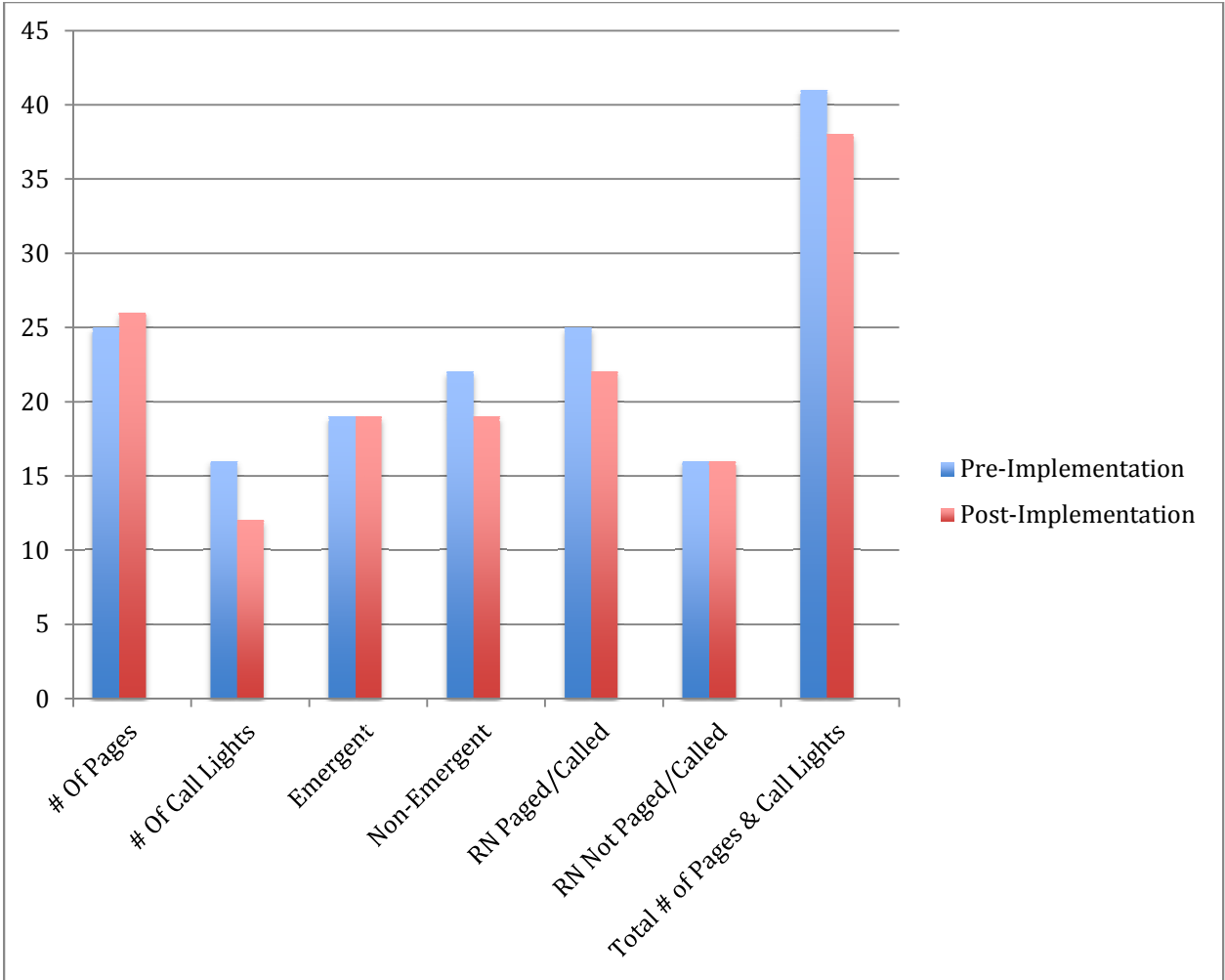
Appendix D. Timeline
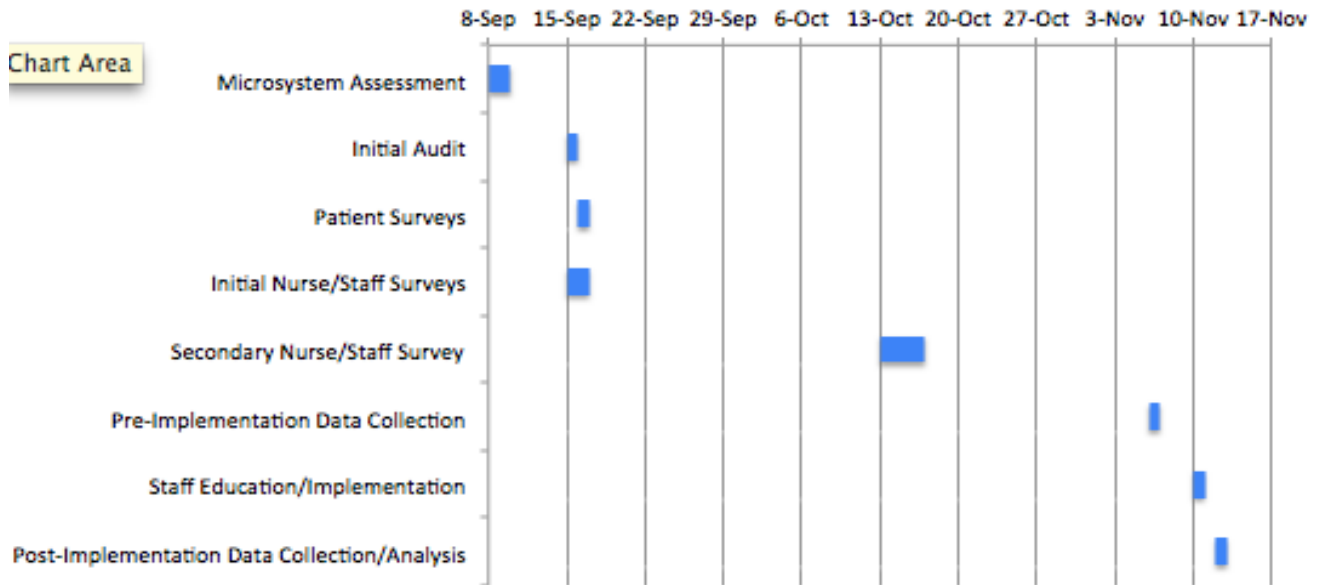
Appendix E. Overhead Medication Pass Script

Beginning of medication administration - time: _____

"Attention [UNIT]. Medication administration has now begun. Please refrain from interrupting nurses at this time. Medication pass time will end at _____. Thank you."

End of medication administration - time: _____

"Attention [UNIT]. Medication administration has now ended. Thank you."

Appendix F. **MESSAGES**
UNIT:_____

DATE: _____

NURSE	CALLER & CONTACT INFO	MESSAGE	TIME

Appendix G. Nursing Medication Administration Sign up Sheet

Nurse Name	**ON** Med Pass	**OFF** Med Pass

Appendix H. Triage Algorithm

CALL RECEIVED

CALL LIGHT

Hi, (your greeting).

_____ is on med pass right now. How can I help you?

IS THIS AN EMERGENT ISSUE?

YES

NO

PAGE NURSE OR NOTIFY CHARGE NURSE FOR TRIAGE

DOES CALLER NEED IMMEDIATE ASSISTANCE?

NO

YES

TAKE MESSAGE AND ASK IF CALLER CAN CALL BACK AFTER MED PASS HOURS

PAGE PCA OR ALTERNATE STAFF TO ASSIST PATIENT IN ROOM

PHONE CALL

Hi, (your greeting).

_____ is on med pass right now. How can I help you?

IS THIS AN EMERGENT ISSUE?

YES

NO

PAGE NURSE OR NOTIFY CHARGE NURSE FOR TRIAGE

TAKE MESSAGE AND ASK IF CALLER CAN CALL BACK AFTER MED PASS HOURS

EMERGENT ISSUES (Manager, please update per unit's needs):

- **Critical Lab Value**
- **MERT response**