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Walden University
2016

Abstract

Developing Policies and Guidelines to Prevent Medication Errors and ADEs in Nursing

Homes

by

Marion Johnson

MS, Walden University, 2013

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

February 2016

Abstract

According to the National Patient Safety Foundation, more than 1.5 million Americans are affected by medication errors because of varied factors including miscommunication, bad handwriting, name confusion, poor packaging, and metric or other dosing unit errors. This project addressed medication errors and adverse drug events by developing policy and practice guidelines to support and aid the utilization of health information technology (HIT) systems in addressing medication errors and adverse drug events at a local nursing home in Cincinnati, Ohio. The National Quality Strategy Framework was used by a team of interdisciplinary stakeholders as a guide for the development of policies and practice guidelines. An interdisciplinary project team of institutional stakeholders was led by the DNP student through a review of literature to assess the effectiveness of current policies and guidelines and explore areas for improvement. New policy, practice guidelines, and educational materials were developed, along with plans for implementing and evaluating the policies in the institution. Policy and practice guidelines were shared with 4 scholars possessing expertise in health information technology to validate content of the products. Feedback was used to inform revision and preparation of final policy, practice guidelines, educational materials, and plans for implementation and evaluation. The implementation plan advocates a process that includes multiple stakeholders and institutional preparatory stages. The evaluation plan addresses multiple outcomes related to efficiency and patient safety, and proposes both intermediate and long-term evaluation based on comparisons of pre-post metrics routinely collected by the institution. Following implementation and

evaluation, dissemination of results of the project may stimulate positive social change by reducing medication errors in similar health care institutions that adopt related measures.

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Section 1: Overview of the Evidence-Based Project

Introduction

Medicines are one of humankind's greatest inventions, because they can cure, prevent, and ease pain. However, medicine can also lead to harm and serious complications if not handled correctly, creating the need to address errors associated with the medicine use and administration. *Medication errors* have been defined by the U.S. Food and Drug Administration (FDA) as any form of preventable incident that may lead or cause harm to a patient or inappropriate medication use (FDA, n.d.). According to the Institute of Medicine of the National Academies (2006), more than 1.5 million Americans are affected by medication errors, which translates to at least one patient per day in each hospital is a victim of medication errors. These errors have been attributed to various factors including miscommunication; bad handwriting; and confusion in names, poor packaging, and metric and other dosing unit errors. In most cases, the errors occur because of several complex factors throughout the health care system generated by both health care providers and patients. The results can be devastating, ranging from worsening the patient's condition to causing death.

As a result, the health care system has undergone several changes through interdisciplinary collaboration to reduce or eliminate these incidents. Health information technology (HIT) has been revolutionary in overcoming these issues. An example of such solutions is the computerized physician order entry (CPOE) system, which has marked a great milestone in health care delivery. Current statistics still indicate a worrying trend in medication error incidents, despite major improvements. In this section, I introduce the

problem, highlight the significance of the issue, discuss implications for social change, and identify some the project's limitations.

Problem Statement

One of the primary reasons for introducing and implementing HIT systems into the health care system was to minimize or prevent medication errors. However, current literature suggests that medication errors are still a major problem and a danger to patient safety in most health care settings. According Byrne et al. (2010), a HIT system provides five important benefits to health care institutions: decrease in expenses, eliminated redundancy, freed space, reduction in workload, and prevention of medication errors. Blumenthal (2009) indicated that medication errors are significantly reduced by HIT systems. Consequently, research has also indicated that the rise of medication errors and adverse drug events has been of great concern in the past decade (Levinson, 2010). The Centers for Disease Control (CDC) reported in 2010 that "700,000 emergency department visits and 120,000 hospitalizations are due to adverse drug events (ADEs) annually" (para 1). In 2005, a CDC report on death and hospital mortality rates indicated that medication errors were the sixth leading cause of patient mortality. Eight years down the line in 2013 after the CDC report, medication errors was identified as the third leading cause of patient mortality (CDC, 2005; MacDonald, 2013).

The problem addressed in the current project study is the lack of appropriate policies and guidelines to help nursing homes effectively use HIT systems in preventing medication errors and adverse drug events. The project was carried out at a nursing home

in Cincinnati, Ohio. The nursing home was most appropriate for the project because it uses the Sigma Care system, which is a system adopted by most nursing homes.

Purpose Statement

The purpose of the project is to develop policies and guidelines that support and aid the use of HIT systems in addressing medication errors and adverse drug events at a local nursing home in Cincinnati, Ohio. The project achieved this through gathering information on policies and guidelines that have been successful in other health care settings. These include acute care and general hospitals pertaining to using HIT systems in managing medication prescription and administration. I then analyzed the gathered information to develop appropriate guidelines and policies for HIT system use. These policies and guidelines can benefit not only the nursing home I examined in this study but also other nursing homes.

Project Goal and Objectives

The goal for this project was to reduce medication errors and manage treatment of patients following medication errors in nursing homes. I was able to draw conclusions on the best practices and provide pertinent policies and guidelines for nursing homes. To achieve the project purpose and goal, I focused on achieving the following objectives

a. Identifying the advantages and disadvantages of using HIT in addressing medication errors

I conducted a literature search to gather information on both advantages and disadvantages of HIT systems in addressing medication errors. Several recent studies addressed HIT systems from different angles. These studies outlined benefits, identified

the fallacies associated with HIT systems, portrayed developments, and outlined consequences. The information that I gathered from this search can be used by nursing administrators to build an evidence-based practice ground that supports the developed guidelines and policies.

b. Compare and contrast HIT policies and guidelines across other health care settings that have successfully managed the rate of medication errors

Some of the acute care and general hospitals have been successful in using HIT systems, thus significantly reducing the rate of medication errors. Such hospitals were useful to this project as I was able to evaluate their policies and guidelines for HIT systems.

c. Develop an education plan that help nurses understand effective ways of using EHR systems to reduce or eliminate medication errors

The third objective of the current study was to create an educational plan that will be implemented by the nursing home, which will help nurses to understand electronic health records (EHRs). The plan includes scheduling educational meetings where nurses will attend tutorials on using the EHR systems. These meetings will also help nurses understand errors associated with EHR systems and will explain how to address these issues to avoid patient harm and other adverse events. The plan also included the provision of charts, manuals, booklets, or pamphlets on how to operate the various machines linked to the HIT systems.

d. Develop and plan for implementation of policies and guidelines that address the effective use of HIT systems in nursing homes

To collaborate with nursing home administrators and find effective policies and guidelines that will guide nurses on effective use of HIT systems. The next task was to provide a comprehensive plan to be followed by the institution when implementing the set guidelines. In addition, a strategy for monitoring the institution's adoption of the guidelines and policies was created to enable early detection and addressing of any concerns that may arise during the implementation stages.

Project Outcomes

The outcomes of the project included gathering broad information on HIT systems and current medication error prevention policies and guidelines. The information was then used to develop new policies and guidelines that help reduce patient medication errors. Other projects outcomes were to develop a comprehensive plan for the institution to implement the policies and guidelines that will support and aid the use of HIT systems. Finally, the project had a clear strategy that was used to evaluate the program by measuring the rate and management of medication errors within time.

Definitions of Key Terms

The following key terms were used in this study: *health information technology*, *human error*, *medication errors*, *adverse drug events*, and *human factor*.

Health information technology, or *HIT*, is a general term used to describe a wide array of technological products: inclusive of infrastructure, hardware, software, and services. They are designed to coordinate between health care departments and are used by all health care teams in collecting, storing, and exchange of patient data and information in clinical practice (AMA, 2014).

A *medication error* is "a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient" (Aronson, 2009, p. 601).

The World Health Organization (WHO) defines *human factor* as, "the organizational, environmental, work factors, individual and group characteristics that influences working behavior, which affects heath care delivery and safety" (WHO, 2009).

Human error is defined as undesirable human behavior or decision that results in reduced safety, effectiveness, and a system's performance (Saunders & McCormick, 1992).

The final common term that will be used in the study is *adverse drug event*, which is described by the U.S. Department of Veteran Affairs as harm associated with normal usage or dosage of a drug.

Limitations

As a policy-level project, the main concerns, or limitations, of this project were the stakeholders' acceptance of the proposed change, as well as financial, practical, and technological barriers. For any change initiative that involves institutions policies, all stakeholders must be involved in the process to ensure a smooth adoption process and address any arising problems early during the development process. The project development process involved work with top management in nursing homes to ensure that the new guidelines and policies do not conflict with institutional goals, missions, and objectives (May & Winter, 2009). It is also important to involve the users of the guidelines, or, in this case, the nurses. Policy implementation may receive resistance from its end users because of the way the change might affect their normal working conditions.

On the other hand, researchers have found that end users might fail to meet the change goals brought by the new initiative because they failed to understand the policy or program objectives, they disagree with the set objectives, or they lack the resources and capability to achieve the desired change (O'Connor, 1979).

End-user collaboration is a major limitation that should be addressed early in the project to ensure a smooth adoption and transition into the change initiative. Financial, practical, and technological aspects coincide, because the project is designed to provide new policies and guidelines aimed at effectively using HIT systems. There is need for a standard working system, which would accrue extra expenses to set up. An effective HIT system should be updated to current standards and technological advancements, which means nursing homes will have to invest further in their HIT systems. This could be a limitation to the project because the nursing homes might not have a budget to upgrade their systems.

Relevance to Nursing Practice

Medication errors can be caused by any of the members of a health care team; however, nurses report the highest number of these incidents. Most of the end users of HIT are nurses; therefore, guidelines and policies are needed to improve their understanding of the system in terms of operation, its benefits, and its drawbacks. Cheragi, Mohammadneja, and Ehsani (2013) found that more than 64% of medication errors are caused by nurses. In the study, of the 237 nurse participants, 42.1% admitted to having committed at least one medication error in a span of 3 months. An explanation for these statistics can be attributed to Lehman, Conner, and Cox's (2004) findings, which

found that nurses spend approximately 40% of their time administering medicines to patients at a health care facility. Further, medication errors are part of nursing sensitive indicators; therefore, nurses must identify ways to effectively address this issue. Using HIT system has been highly recommended across several nursing care platforms, therefore, nurses have the right to understand why the problem still exists and whether to be alarmed.

Liang, Dickson, Xie, and Suh (2012) found that nurses were more likely to be at the forefront in medication-error inception practices if they are placed in a supportive practice environment. One of the important factors in creating a supportive environment is providing information and the need to encourage teamwork and collaboration between physicians and nurses. With the rising need for evidence-based practice, the results of the project are a significant contribution to the nursing practice in providing evidence-based information to guide nurses in effectively using HIT systems.

<div align="center">**Evidence-Based Significance**</div>

Medication errors are a current issue in health care delivery that has been addressed by both individualized studies by researchers and large organizations such as the CDC. The topic is of importance, because it has a significant role in the quality of care provided by health care institutions. Levinson (2010) provided various reasons that medication errors and adverse drug events have been a growing concern in recent years. The reasons include increase in mortality rate and low levels of patient satisfaction. Society stands to lose many lives and millions of dollars because of medication errors. A large sum of public funds, at least $3 billion per year that could be directed toward

sdevelopment is wasted through salvaging medication error victims and related adverse

drug events (Kelley, 2009). According to Melnyk, Fineout-Overholt, Gallagher-Ford, and

Kaplan (2012), the use of evidence-based practice is an important aspect toward

prevention or mortality, morbidity, and medication errors. Therefore, the rate of

medication errors happening at a particular health care organization can provide

significant insight into evidence-based practice for that particular organization.

HIT systems are the best mechanism to combat medication errors; however, a

large amount of current statistics, data, and information handled by the government and

private organizations from institutional or individualized research indicate that the issue

is still a major concern (James, 2013). With many of the studies carried out on the issue,

the problem has been comprehensively addressed starting with causes to recommended

strategies of handling the issue. For example, a study by Mrayyan (2012) addressed the

various causes of medication errors and rate of reporting of these errors, and improper

use and lack of proper guidelines in using HIT systems is one of the major contributing

factor. As I have understood from the literature review process, several studies have been

carried out in search of the best strategies to solve the problem, and most of them

advocate for policy change, proper education, and guidelines for appropriate use of HIT

systems. For examples, one of the proposed strategies that has posted positive results is a

guideline that emphasizes the five stages of passing medication, which involve ordering,

prescribing, dispensing, administering, and monitoring (Hodgkinson, Koch, Nay, &

Nichols, 2006).

Implications for Social Change in Practice

When discussing medication errors, it is important to consider the community's contribution to the problem. As we will see in some of the study findings, medication errors are not only caused by health care providers, but patients and their families, who have a significant role in committing these errors. Patient's attitude towards taking medication, their inability to read and patient's inappropriate use of medicine are all part of social problems that need to be addressed. According to Haralambos and Holborn (2004), social change involves alteration of behavior, culture, or norms in the society. In a move to address the various factors contributing to medication errors, the project will focus on social change. The DNP program is designed in a way that it prepares nurses to "Design, direct, and evaluate quality improvement methodologies to promote safe, timely, effective, efficient, equitable, and patient-centered care" American Association of Colleges of Nursing (AACN), 2006). Using this knowledge the project also addressed the various social change needs that arise while carrying out the project.

The project also exposes the role played by the society in complicating the medical errors in the health care system. In particular, it points out the various weaknesses in society that makes it hard for change to occur in the health care system. Patients also contribute to the observed medication errors. Society is ignorant of the laws and regulations that seek to safeguard the health and safety of the health services. Illiteracy and ignorance contribute heavily to the problem, particularly in non-hospitalized cases. Older adults find it challenging to stick to the doctors' guidelines particularly in the medicine prescription (Lemieux-Charles & McGuire, 2006).The

existing problems are mainly contributed by the undeveloped relationship between the medical practitioners and the patients. The medical supervisor is obligated to oversee efficient communication avenues in the health care sector. A positive relationship should be developed between the patients and the medical practitioners.

Another social problem is the negative attitude and disregard for drugs in society. The project identified that cultural behavior, social norms, and negative attitude towards medical care contribute to the current medical errors. In response to the issues existing in the public, the health care supervisor should invest in creating awareness to the public. In this regard, society should be involved in the problem-seeking techniques applied in the health care sector. For example, the medical practitioners should collect and consider the opinions given by the patients in the nursing homes. Most of this information is vital for solving problems associated with an inappropriate health care provision (Agrawal, 2009).

Summary

This chapter provided an overview of the project plan and the desired outcomes. It is an overview of the DNP's role in demonstrating an advanced level of providing clinical judgment, accountability, and systems thinking. In addition, the chapter also outlined the designing, delivery, and evaluation plan to achieve evidence-based care and improved patient outcomes (AACN, 2006). As explained in the project goal, purpose, and project's significance to nursing, the project will significantly contribute to an improved use of HIT systems in health care delivery.

Section 2: Review of Literature and Theoretical and Conceptual Framework

Introduction

Medical errors present danger to patient safety in the U.S. health care system. One of the primary reasons for introducing and implementing HIT systems into health care was to help minimize or prevent medication errors. The health information technological systems are essential for many reasons, including reduction of expenses, eliminating redundancy in the health care system, reducing overcrowding, reducing the amount of workload within a health care facility, and assisting health care teams in preventing medical errors. The rise of medication errors and adverse drug events is of great concern over the past few years, keeping in mind that health care facilities, including nursing homes, adopting HIT systems have also been on the rise (Agrawal, 2009). In 2010, the CDC reported that more than "700,000 emergency department visits and 120,000 hospitalizations are due to adverse drug events (ADEs) annually" (Para. 4) In 2005, the report given by CDC on hospital mortality rates ranked medication errors as the sixth leading cause of patient mortality. In 2013, the report indicated a worrying trend as medication errors were now ranked as the third leading cause of patient mortality. Following these contradicting results in these reports, this project is designed to investigate and identify detailed information on the effects of using HIT systems in relation to preventing medication errors and adverse drug events (Nebeker, Hoffman, Weir, Bennett, & Hurdle, 2005). This involved comparing the advantages and disadvantages of using the HIT in combating medical related errors, contrasting the use

of HIT systems to the traditional paper filing systems, and demonstrating the effectiveness and efficiency of using HIT systems (James, 2013).

Literature Review

One of the main reasons that seniors are admitted to nursing homes is that they are prone to making medication errors and need assistance from nurses. Unfortunately, this has not been successful as several medication errors are reported from nursing homes on a daily basis (Levin & Perconti, 2013). In 2009, a study by Van Den Bemt, Idzinga, Robertz, Kormelink, and Pels revealed that, on average, 21.2% of medication errors are committed in nursing homes. A study in 2010 confirmed this fact, stating that medication errors are a common occurrence in nursing homes, which resulted in a serious backlash from the victims' families (Crespin, et al., 2010). Some of the reasons for such high incidences of medication errors within these facilities can be attributed to poor use of HIT, which is meant to leverage human error and provide accurate and efficient service (Lehman, Conner, & Cox, 2004). A background check on medical errors reveals that medication errors are an increasingly public concern in the health care system and among the experts and policy makers. According to health industry leaders, using HIT systems should enhance the safety of the patients by preventing medical errors, errors in assessment, and surveillance, as well as reducing the risk of harm associated with the errors. Medical errors that take place every day in the healthcare setting include errors during drug prescription, errors during treatment with wrong drugs prescribed, procedural errors, diagnostic and administrative errors (Services & Information, 2012). A significant number of these errors come from nursing homes (ASCP, 2013). Among the systems that

are used in preventing medical errors entailed in the HIT include the Electronic Health

Records EHRs, Computerized Physician Order Entry CPOE, clinical decision support

system CDSS, the Barcode Medication Administration (BCMA), and the radio frequency

administration gadgets (RFID). The integration of one or more methods provides for

efficiency and effectiveness in reducing medical errors, thus essential limiting the

associated drug reaction that may occur from the errors. If nursing homes could

effectively implement a comprehensive system of electronic health records complete with

guiding policies and regulations, they can achieve an efficient healthcare delivery system

by reducing medical errors through alerts, the internal intelligent capacities, as well as

reminders (Agrawal, 2009).

A substantial body of evidence illustrates the risks associated and posed by

medication errors and the resulting adverse effects that can be prevented. In the United

Nations, every year, errors in medication are believed to harm at least 1.5 million

patients, and approximately 20% of these errors occur in nursing homes (Van Den Bemt

et al., 2009). Among them, 400,000 cases are preventable with the use of the HITs. In

Australia, 2% of the patients received in the health, care setting suffers from associated

adverse effects that are associated with medical errors. These medical errors are costly to

the patients, their families, and clinicians as well as the entire health care systems (Vest,

2010). Patients who experience the ADEs have been found to transfer from care homes to

hospitals, thus increasing their cost of care compared with the patients who did not suffer

from any adverse reaction. Adverse drug reactions that occur in care facilities are

preventable at a rate of 28% to 95% (Crespin, et al., 2010). It can be done through

reducing medication errors by enforcing policies and guidelines on how health care

providers can use computerized monitoring systems installed at care homes and other

healthcare facilities. Studies have found that the prolonged hospital stay increases the

hospital spending rate, and if appropriate measures are taken, this spending can be

reduced by $500,000 each year. The commonly suggested means of achieving this is

through the proper use of computerized systems in the patients care (Ammenwerth,

Schnell-Inderst, Machan, & Siebert, 2008).

In general, errors caused by poor use of HIT systems may cost at least $5.6

million annually per health care facility; however, this cost might rise in cases where

errors are more frequent such as nursing homes. These estimates do not include those

reactions causing new admissions, litigation costs involved, malpractice, or injury costs.

The national expenses in hospitals to treat the adverse medication reactions are estimated

to be between $1.56 and$5.6 billion each year (Haux, 2006). This project's focus is on

the best solution to prevent the associated medical errors, which the development of safe

health care systems backed up by appropriate policies. Nurses can receive, appropriate

guiding to the appropriate paths of treatments as well as narrowing their chances of

making the medication errors (Mardon, Khanna, Sorra, Dyer, & Famolaro, 2010).

Therefore, the application of policies and guidelines on the use of HIT systems is very

important to the healthcare setting to help in reducing the occurrence of these errors.

Nursing facilities will then be able to integrate the best practices, provide education as

well as promote technological advances towards improved care (Nebeker et al., 2005).

The prevention of medical errors has, therefore, grown to be a global concern and priority, especially at nursing homes. Mounting evidence has been provided regarding appropriate policies and guidelines in using information technological systems, and the same could be effectively enforced in nursing homes. Healthcare systems that utilize the CPOE, the bedside bar code medication, and automated dispensing cabinets have evidenced significant reduction of medication errors. The health facilities that have incorporated automated records and notes, clinical support in decisions, and order entry have reported fewer complications resulting from errors in medication, resulting in reduced costs and associated mortality rates (Agrawal, 2009).

The medication management process

Medication management entails a complex operation that should involve multiple people and numerous steps. The use of health information systems enables a seamless flow of information throughout the mediation management system. The development of information and communication technology is one of the most recent developments in the healthcare sector. This innovation is supposed to have an essential impact on the organization of the health care facilities: patients care, performance of then health care practitioners and treatment management options (Yusof, Papazafeiropoulou, Paul, & Stergioulas, 2008). However, a seamless adoption in nursing homes accompanied by proper policies and guidelines seems to be hindering their appropriate use in this health care setting (see Appendix A).

CPOE, computerized physician order entry

Researchers in the national health industry recommend using information and technological systems a way to improve the patients care quality. This is essential as it enhances the safety of the patients by preventing the medical errors, as well as the associated adverse reactions resulting from the errors. These errors are becoming a concern to the public, because of their reported tendencies to cause damage to the human body such that they can lead to unrepairable damage to the human body system and organs. However, these errors can be avoided by enhancing and supporting human performance. This is through the use of the technological advances as well as conducting investigations as a source of information on the health of the organization that are mandated with improving the safety of patients. According to James (2013), medical errors are in the health care centers are the third leading cause of death in the hospitals and nearly 98,000 of these deaths can be prevented every year. Below each medical error, the various factors have been defined and the necessary information technological roles as well as the positive effects of reducing and preventing these medical errors have been outlined. Some of the available and clearly outlined advantages and recommended solutions to reduce these errors have been stipulated by the National Institutes of Health organization in their 2012 report.

Decision making in the clinical setting is a complex process that ought to depend on the abilities of the healthcare providers to provide attention, understand, memorize, recall, as well as synthesize large amounts of data that are critical for the patients care. Health information technological systems can improve the availability and access to the information, organize it, as well as provide the linkages to the information. The

healthcare providers are often conformant with the information, such as the patient's

allergies to different kinds of medication, drug-to-drug interaction, and drug recall

warning. However, they are also subject to forgetfulness when prescribing the medication

leading to adverse drug reactions. Thus, the healthcare technological ought to be very

effective in bridging the gap between knowing and doing through presentation of the

relevant information to the healthcare setting for the providers during decision-making

(James, 2013).

Use of technology in data entry and analysis will ensure efficiency and accuracy

in the medical care. Most of the common medical errors result from poor handling of

information collected and given to the patients. The health practitioners need to adopt

quality HIT systems that operate on computerized platforms. Healthcare supervisors

should make regular supervision on the performance of the medical systems. Technology

boosts the performance of the data-handling methods used on the health care. It will also

eradicate issues of data loss that costs the heath care a lot of problems. The data stored in

these secure and efficient platforms can also be retrieved and use for future references.

The HIT systems are better placed if they are inclined to the technological data handling

and computing platforms. There is also a need for the nurses and other medical

practitioners to learn how to operate the HIT systems. Technological platforms are

complex and require adequate knowledge on their usage at different situations (Levin &

Perconti, 2013). The medical supervisor should ensure that the nurses are educated on the

use of the systems.

Computerized physician order entry

Most medication errors occur during the prescribing step of the medication where a wrong drug is prescribed to the patient, or other reactions and interactions are not taken into consideration. The CPOE is thus very important in improving patient safety while prescribing medication since it provides patients specific decision support. This is important in the reduction of the common errors of medication such as the use of the wrong drug to the patient, incorrect dosage of the drug, utilization of a wrong dosage form, incorrect dosage for patients with renal or hepatic problems and lack of checking for drug allergies when administering medication (Lehman, Conner, & Cox, 2004). Thus correct policies and guidelines on the use of CPOE systems are very crucial in making sure that orders are legible, with all the necessary information (Miake-Lye, Hempel, Ganz, & Shekelle, 2013). Guidelines for example should explain, the dosage, route of administration, and correct dose form. Policies could be enforced requiring nurses to understand information concerning patient's drug allergies and interactions as well as provision of dosage adjustment calculations that ought to be based on the patients clinical features such as the renal function and weight. The computerized physician entry system is also essential as it provides baseline laboratory results in the hemoglobin and platelets levels for the patients receiving anti-coagulants. It computes, analyses the drug and laboratory interactions, and updates the prescriber on the latest drug information (Levin & Perconti, 2013). Hence, the need for nurses, especially new nurses to understand how the system works and why the health information technological systems are essential in the reduction of the adverse drug interactions resulting in the medication errors. Of the many systems utilized in the medication administration process, the CPOE systems

provide the greatest impact in the reduction of the medication associated errors. They

provide an error reduction of 55 percent to 83 percent in drug administration (Lopez &

Blobel, 2009).

Nursing homes dispense large volumes of medications thus high levels of

dispensing errors. To curb this problem, many care homes are resolving to the installation

of HIT systems at their facilities. This entails utilization of a variety of systems such as

the automated dispensing cabinets and the robots for drug dispensing for the packaging

and medication recognition by use of the bar codes. The utilization of the bar code

technology in dispensing medication is aimed at reducing the dispensation error by 31

percent as well as in the reduction of adverse drug events by 63 percent. This is crucial in

the reduction of the medication errors (Clarke & Donaldson, 2008). However, things are

not working out as smoothly as expected, because many of these nursing homes lack the

appropriate user guidelines to guide nurses on the use of these systems.

Importance of electronic medication reconciliation

Medication reconciliation provides a fair ground on which healthcare workers are

able to collaborate with families, patients, and other stakeholders to ensure a

comprehensive and accurate medication information across and consistently in all

transitions of care. Prior to developing policies and guidelines for HIT systems use, it

would be important to have a medication reconciliation amongst all stakeholders. This is

supposed to entail medication lists during transfer process, admission and the discharge

process, which provides framework on which policies and guidelines can refer to when

being enforced across nursing homes. If used appropriately CPOE systems are very

effective in the reduction of prescribing errors that result from the prescription and administration process (Kutney-Lee & Kelly, 2011).

Policies on adoption of personal health records

The personal health records are very essential as they enable the patients to empower their own medical care. Personal health records are computer-based tools that enable individual patients to access and coordinate their health records and information and make it available for utilization when needed. This is easier and better to manage in comparison to the paper-based records that become tiresome to manage. Unfortunately, most patients at nursing homes have been admitted because they require the assistance to manage their medication; therefore, it would be best if policies were developed to regulate the use of personal health records especially by older adults. The implementation may entail checklist for eligible patients who should have access to entry of their medical information or utilization of a hospital portal that grants the patients to their electronic data records. A patient enhanced medication reconciliation technology system will be an accurate way of prescribing medication, as patients are aware of their medications and their effects. Which brings us to the personal health records, which can provide decisional support tools checking drug interactions and allergies as well as providing information on the potential medication errors to the patients and the healthcare providers (Services & Information, 2012).

Conceptual Models/Framework

Many studies utilized the national strategy for quality improvement (National Quality Strategy) framework to provide guidance for their research work. The strategy

entails all the principles addressing each challenge in the development of adverse drug

reactions advancement and prevention. The model is normally a requirement contained in

the affordable care act, which is a national effort that brings together the private and

public interest in ensuring quality of care improvement (Isaac, Zaslavsky, Cleary, &

Landon, 2010). National quality strategy is a development from collaborative action from

different stakeholders that addresses the delivery of healthcare in the healthcare setting. It

acknowledges the roles played by the patients, the healthcare practitioners; the families as

well as the community. Their work is to include the local and federal health care

departments in achieving the health needs. The main aim of the framework is to enhance

the efficiency of the patient care and community health. The strategy provides six

priorities in attainment of this aim. This includes self-care, care coordination and

communication, informed patients and family engagement, promotion of the best

practices in the community and science driven treatment and prevention measures. The

health information technological systems (HIT) provide an example of this innovation.

This is in line with the reduction of the associated medication errors in the healthcare

facilities resulting to the adverse drug reaction that increases the healthcare cost as well

as causes harm to the patients. These priorities embody the main principles towards

reduction of the medication errors creating a culture of safety enhancing effective

utilization of medications (WHO (World Health Organization), 2008).

Role of the Student

Medication errors are a current issue in the healthcare delivery systems that

should receive great consideration by all the stakeholders. The topic is of great important

because it plays a crucial component in the quality of care provision in the healthcare

setting. It is important for the student to identify the factors causing these problems and

identify appropriate way to address such an issue towards improving the quality of health

care. With nursing homes facing the highest risk in medication error incidents, it would

be a great starting ground towards addressing the issue. The role of the student is come

up with ways that will help in the prevention of medication error, adverse drug reactions,

and reduce patients' length of hospitalization. In the end, the student will be contributing

towards reducing medical costs for both the patient and the facility during treatment

(Teng et al., 2009).

Summary

A look at the current literature reveals that medical errors are a major problem and

present health care settings such as nursing homes with great danger affecting patient

safety. Literature also reveals that one of the primary reasons for introducing and

implementing HIT best known as HIT systems, into the health care system, is to

minimize or prevent the occurrence of medication errors. However, further studies have

revealed that the rise of medication errors and adverse drug events is still a major concern

over the past few years. Important information to note is that with health information

technological systems, nursing homes can reduce expenses, redundancy in the health care

system, reduce workload, as well as prevent medical errors, as long as proper guidelines

and policies are enforced. Literature also provides significant information on the best

systems that nursing homes can utilize in the prevention of medical errors, which include

the electronic health records (EHR), CPOE, CDSS, the Barcode Medication

Administration (BCMA) and the radio frequency administration gadgets (RFID). The

integration of one or more methods provides good efficiency and effectiveness in the

reduction of the medical errors thus essential in the reduction of the associated drug

reaction that may occur from the errors. This project is to provide policies and guidelines

designed to help nurses and administration at nursing homes on the appropriate use of

HIT systems to prevent medication errors and adverse drug events.

Section 3: Methodology

Introduction

The main aim of this project was to address and reduce medication errors, as well as help manage patients following medication errors during drug administration. Several studies have been conducted that analyzed issues that affect HIT systems. In the project, I identified policies and guidelines for using HIT systems to reduce the associated medication errors. I also identified the advantages and disadvantages of using HIT in addressing medication errors and compared HIT policies and guidelines across other health care settings that have successfully managed the rate of medication errors. An education plan was also developed to help nurses understand effective ways of using EHR systems to reduce or eliminate medication errors and plan for implementing policies and guidelines that address the effective use of HIT systems in nursing homes. This will be in collaboration with nursing home administrators to help develop effective guidelines and policies that aid using HIT systems.

Overall Approach

In this section, I explain the approach that I used to carry out the project, which seeks to develop Policies and guidelines that support and aid the utilization of HIT systems in addressing medication errors and adverse drug events at the nursing home in Cincinnati, Ohio. This was done after the project approval by the institutional review board of Walden University, the health system's Nursing Research Committee, and the health system's institutional review committee. I then outline a comprehensive plan, which consists of gathering of information on policies and guidelines that have been

proven successful in other health care settings. An analysis plan was also identified, which was used to assess the gathered information and translate it into useful data that helped develop policies. The designed approach was instrumental in ensuring that I achieved the project's goals. The steps involved included:

1. Assembling an interdisciplinary team of institutional stakeholders.

2. Guiding the project team through a review of relevant literature and evidence.

3. Developing policies and practice guidelines.

4. Validating the policy and guidelines using external expertise.

5. Developed an implementation and education plan.

6. Developed an evaluation plan.

Assembling the project team

The success of the project is directly related to the competency of the project team and pulling together a suitable and effective project has its own challenges. One of the common challenges experienced at this stage was the availability of suitable members. Study has it that the most suitable team members tend to be the least available (ERP Software360, n.d.). Involving stakeholders from different interdisciplinary background was an effective way to ensure quality and diversity of ideas in the change process. It is essential to collaborate with the key stakeholders in the practice environment because they are likely to accept the proposed change if they are involved in the development process (Buljac-Samardzic, Dekker-van Doorn, van Wijngaarden, & van Wijk, 2010). For this project, the team members who were familiar with the policy implementation

process were from various departments in the health care delivery system regarding the use of the health information systems. Each member in the team brought in different skills to the team to help in identifying the issue, and brainstorming for solutions, evaluation of the process, and success of the project was dependent on each member.

Membership to the project was voluntary from members working in the healthcare facility and other stakeholders with an aim of reducing medication errors as it is both beneficial to the patients as well as the organization as it helps in cost reduction. Achieving the project responsibility was a shared responsibility for the team as no one individual would fully realize the full potentials of HIT systems in improving patient's safety. The team members of this quality improvement project were outsourced from various departments and disciplines (see Appendix C)

A literature review with the team

It is important to increase and enhance the quality and quantity of knowledge and information regarding the use of health information technological systems in enhancing patient's safety by reduction of medication errors to the team. In achieving the stipulated objectives of the project, a better understanding was needed in regards to the impact of HIT systems on patient care that was achieved through conducting a literature review with the team. Thus, the project together with the team members conducted a review of different studies that were carried out in analyzing on some of the issues affecting the Health Information systems as well as the associated benefits (Lemieux-Charles & McGuire, 2006).

The main aim of this project is to address reduction of medication errors, as well as help in the management of patients following errors in medications during drug administration. Different studies have been carried out analyzing some of the issues that affect the HIT systems. Using this information the project identified guidelines for utilizing the health information systems to reduce the associated medication errors. Thus, the project identified guidelines and policies for using HIT systems to help in the reduction of the associated errors of medication (see Appendices E, F, and G). During the literature review, the members were involved in identifying the advantages and disadvantages of HIT systems utilization in addressing the associated errors in medication as to whether the advantages of utilizing the systems outweigh the disadvantages. The team was also involved in identifying guidelines and policies across the health care setting that have successfully managed the rate of medication errors as a way of enhancing patient's safety and preventing patients harm. The literature review was therefore important to the team members, as it provided more information to be used towards the health information technological systems such as policies, guidelines, and benefits of the system thus enhancing their knowledge and incorporating them fully to the project (Schmutz et al. 2013; Maslin-Prothero, & Bennion, 2010).

To enhance knowledge towards the utilization of the Health Information Technological systems, the following actions and strategies were incorporated and proposed to the team and health care facilities.

1.   Establishment of mechanisms that facilitate reporting among developers

and users of HIT systems to make information available to the healthcare

systems.

2.   Enhancing the ability of the healthcare organizations and other entities in

identifying and addressing HIT systems related safety issues to make them

available to be addressed.

3.   Analyzing and aggregating information on HIT- rerated adverse hazards

and events to make it available to the users.

Health IT action & surveillance plan of the DNP project draft policy, standards and practice guidelines

The proposed DNP quality improvement project produced a draft policy and

practice guidelines outlining the approach used to carry out the project. To achieve this

the project team adopted a HIT policy decision checklist (see Appendix D). The

developed policies and guidelines support and aid the use of HIT systems in addressing

medication errors and adverse drug events at the nursing home in Cincinnati, Ohio and

other health care settings (see Appendices H and I). HIT has an enormous potential of

improving safety of the healthcare systems. When properly integrated into the system it

helps in identifying the patient's safety risks that is helpful in developing interventions to

use technology in advancing national health as well as safety aims of the patients

(Sherwood, Gwen and Jane, 2012)

The utilization of HIT to make healthcare delivery safe is important to enlighten the federal initiatives in improving safety of the patients for example the National Strategy for Health Care Improvement (Tan, Joseph, Payton & Joseph, 2010).

Practical guideline

This entails providing policies supporting, identifying and analyzing health IT safety events and hazard reports. A conducive environment for providers to report HIT-related safety concerns and hazards increases the quantity of data available on the impact of HIT on patients' safety. It is also, easy to provided ways of improving HIT systems utilization to enhance the patient's safety. An important consideration is to ensure that once data is reported it is used to increase knowledge on HIT patients safety as well as help in analyzing, identifying, and mitigating HIT-related hazards and events. It is also essential to share data in compliance with applicable laws so as it can be integrated and used to analyze HIT patients safety risks and trends. It is, therefore, important to provide policies and reports identifying and supporting HIT safety events and hazards to the team to help them in developing appropriate implementation strategies and policies are enhancing on the utilization of the HIT systems (see Appendix I).

Incorporation of HIT safety in post-market surveillance

It is important to monitor how certified EHR technology functions in the operational settings. The information is essential to provide insight on the specific capabilities of HIT systems i.e. CPOE how they are performing in the actual clinical environments that they are used. This enhances understanding of the risks associated with certain capabilities as well as on the ways of making them safer. The team was, therefore,

involved in monitoring EHR technological functions in different operational setting to improve on the understanding of the risks associated and determine ways of making utilization of HIT systems safer to help in reduction of the associated medication errors. This is important for them to develop appropriate guidelines and policies enhancing the utilization of the HIT systems (Rodrigues, 2010).

Collection of data on health IT safety events

The quality and safety review system is a software system that is designed to perform surveillance of adverse events resulting from medication errors (Page & Ann, 2004). The system incorporates common formats for broadening surveillance to harm from all the causes. It provides an estimate of adverse events making it possible to explore the role of HIT systems in these events (Tan, 2005). Thus, the team collected data to provide an insight to an extent to which adverse drug events are measured with integration of HIT systems.

Identification of opportunities

Health information systems have enormous potential of improving the safety and quality of healthcare delivery. Realizing this potential is an objective of this plan (McWay & Dana, 2014). The project team worked together with the National Quality Strategy and related sector initiatives in identifying opportunities of making safer care delivery with HIT. For example, through collaboration with patients at the facility to identify and share knowledge on clinical practices, interventions as well as quality measures to improve the patient's safety. Partnership with patients and quality improvement initiatives are essential in determining specific areas in which HIT has great

potential thus incorporating policies to make care safer. The work is also essential in

helping to provide focus on other sectors into specific HIT interventions i.e. CDS with a

great potential of improving the safety of the patients (Winter, Alfred, & R. Haux, 2011).

The health care providers can approach the medical errors issue from different

angles. The most significant aspect of the tasks is to learn the existing problems in the

provision of care. Based on the information collected, the healthcare providers can assess

the problems in the society. The patients hold a vital part of the data information that can

be used in tracing the source of the medical errors. Positive and transparent interaction

between the healthcare providers and the patients is vital in approaching the medical

issues. The health records of the patients should be used as sources of data in the analysis

of the medical problems. It can also assist the health supervisor to track down the

progress made in solving the issues at hand. HIT systems can be applied at various levels

in the health care operations (Bemt, Idzinga, Robertz, Kormelink, & Pels, 2009). The

systems provide a safe data-handling and analysis platform. The health care providers can

make use of the systems to improve the provision medical services. Medical errors can be

minimized by ensuring proper data handling of the information. HIT systems can also be

sued to create a reliable health delivery platform in both hospitalized and home care

cases. The systems can also be used to study and find solutions to the complex health

issues facing the society.

Content validation

After the development of guidelines and policies that are the major outcomes of

the project, content validation was also done. Validation is the process of checking

information against the expected standard of requirement whether it meets the required

criterion. It is an important step in ensuring quality in the project in meeting its stipulated

objectives. According to Kim & Oswald, (2009) validation is essential as it provides

independent means of quality assuring as validated information is less likely to be

incorrect, biased or misunderstood, thus is important in quality improvement projects. In

ensuing that, the project supported safe and effective clinical practice, feedback was

sought from four scholars who were external to the project. This ensured project

effectiveness and according to their recommendations, the necessary corrections were

made according to the corrections made.

An implementation plan and an education plan to be used to disseminate

information on the proposed guidelines and policies

HIT systems have an enormous potential of improving patients safety in

healthcare systems. When well integrated they are important in identifying patients safety

risks that is helpful to determine interventions to enhance patients care. Members of the

project reviewed and were provided with policies supporting, analyzing, identifying HIT

safety events, and hazard reports. This helped the team develop appropriate strategies and

policies enhancing the utilization of HIT systems. The team went ahead to develop

policies and strategies enhancing HIT systems utilization (McWay & Dana 2014).

The team was involved in monitoring the functions of EHR systems in their

different settings, and how these areas enhance patients care and help in reduction of

medication errors. This is important to provide insight on specific capabilities of HIT

systems as it enables the team to understand the associated risks involved. They were

involved in collection of information using the quality and safety review systems (QSRS) to provide an insight on the extent to which adverse drug events are measured to determine medication errors (Nakayama et al. 2008).

Once the policies and strategies enhancing HIT systems were developed by the team members, there was need to develop strategies of disseminating the information to the appropriate authorities in the healthcare setting to help in the reduction of the medication errors. Working systematically with key sectors and stakeholders such as the National Quality Strategy and collaboration with patients is an essential part of information dissemination as they are to be educated on the stipulated guidelines and policies enhancing reduction of the medication errors (Johnson 2009).

The project determines the end users of the policies and guidelines developed. This includes health care professionals, patients and caregivers, administrators, HIT staff, Quality improvement staff, health information technological developers, patient's safety and organizations as well as accrediting bodies of adoption of HIT systems that will benefit from the findings. The end users are the ultimate target for the dissemination efforts and determining them provides a focus on the dissemination plan and helps in tailoring their needs. It is important to describe the benefits associated with the utilization of the guidelines and policies. This is important in enhancing the adoption rate. As well, the project team needs to determine events and risks that are associated with utilization of the policies and develop ways of countering them. This includes barriers that the users may encounter while trying to implement the guidelines and policies of utilization of HIT systems to reduce medication errors (Nakayama et al. 2008).

Developing dissemination partners and working hand in hand is important to enhance the adoption of the policies and guidelines developed. It would have been difficult for the project members to work alone and reach the end users. Therefore, they need to consider working with trusted professionals and organizations that have influence in the field (Eccles & Grimshaw 2004) such as the National Quality Strategy. It was important for the project to develop working partnership with other organizations that the end users are part of, as they need to work as dissemination intermediaries amplifying the project to reach their target audience.

An effective education plan relies on the utilization of effective dissemination channels. Thus, to enhance the utilization of the proposed policies and guidelines the project team proposed a variety of channels for education. This involves training the end users on the HIT guidelines and policies through conferences, workshops, meeting, through computer based channels like websites, development of reports and publications and journal articles (Haines et al. 2004). Once the policies and guidelines are available to the end user, it is possible to reach the dissemination goals and it will be possible to incorporate the guidelines and policies of HIT systems utilization in an effort of reducing medication errors.

Planning for the Project

This entailed identification of the project time, resources, and budget that is important to ensure success for the project. Identifying cost and schedule requirements for the project with relative precision was important to help reducing the risks that are involved in running out of resources, time, as well as budget of the project. It was also

important to get ready for unpredictable events that can happen during the implementation phase of the project. Thus, the project utilized a project plan to help in achieving the objectives. Performing a detailed task analysis of the activities to be undertaken was also essential. The project utilizes a logic model that has a visual approach for project management to identify a realistic flow to projects by identifying goals of the project and identifying necessary resources and inputs that are required to meet the required goals (Martin & DiMatteo, 2014). The project team also held weekly meetings that happened twice a week for a period of four months until the project was complete while evaluating the progress and make any adjustments.

The budget used for the project was relatively cheap as the resources that were utilized for the project were locally available within the healthcare systems. Participation of the project team members was voluntary as the project was aimed at reducing the associated medication errors with the utilization of the health information technological systems. The project developed policies and guidelines that support and aid the use of HIT systems in addressing medication errors and adverse drug events at the nursing home in Cincinnati, Ohio and other health care settings. Membership to the project was voluntary from members working in the healthcare facility and other stakeholders with the aim of reducing medication errors as it is both beneficial to the patients as well as the organization as it helps in cost reduction (Wager, Karen A., Frances Wickham Lee and John, 2013).

Evaluation Plan Development

The project established a program "safety program" to help in coordination, implementation, and evaluation of the HIT plan. The plan is led by a "chief medical officer" who has the responsibility of coordinating with the office of policy development and planning to help in the attainment of success in the entire process (MacGlynn, 1998). (See Appendix B and Appendix K)

Summary

This section provided the overall approach/rationale, project team, and products of the project. The main aim of this project is to address the issues that will help to reduce medication errors as well as help in the management of patients following errors in medications during drug administration. Policies and guidelines have been developed that will support and aid the use of HIT systems in addressing medication errors and adverse drug events at the identified nursing home in Cincinnati, Ohio and other health care settings. HIT has an enormous potential of improving safety of the healthcare systems when properly integrated.

Section 4: Findings, Discussion, and Implications

Introduction

Medical errors are a major problem as they present a great danger to the patient safety in the healthcare system. One of the reasons for the introduction and implementation of HIT best known as HIT systems, into the health care system, is to minimize and prevent the occurrence of medication errors (Levinson, 2010). According to literature 'medication errors' is still a major problem and danger to patient safety in most the health care settings (Blumenthal, 2009). According to National Patient Safety Foundation, over 1.5 million Americans are affected by errors in medication, which translate to at least one patient per day in each hospital. Out of these cases, around 20 percent of these errors happen in nursing homes and 400,000 cases are preventable with appropriate utilization of the health information systems (Vest, 2010). These errors have been attributed to various factors that entail miscommunication in the care setting, dispensation errors, dosages errors, and confusion in patient's names, poor packaging, and metric and other dosing unit errors (Van Den Bemt, Idzinga, Robertz, Kormelink, & Pels, 2009). According to a CDC report in 2010, the results indicated that significant cases of hospitalizations were as a result of adverse drug reactions that occurred annually. This was greatly attributed to lack of appropriate policies and guidelines to help health care practitioners in effectively utilizing HIT) systems in the prevention of medication errors and adverse drug events.

This project addressed a potential gap in nursing practice related to the reduction of medication errors and the management of patients following medication errors in

nursing homes and other healthcare centers. The project developed policies and

guidelines to supports and aid the utilization of HIT systems in addressing medication

errors and adverse drug events at a local nursing home in Cincinnati, Ohio. The high

incidences of medication errors within these facilities have been attributed to poor

utilization of health information technological systems, which are meant to leverage

human error and provide accurate and efficient service (Agrawal, 2009). The

interdisciplinary project team identified information on policies and guidelines that were

proven successful in other health care settings. The team then drew up conclusions on the

best practices and provided pertinent policies and guidelines for nursing homes and other

healthcare facilities.

Project Products/Results

In attaining the study results, the interdisciplinary team met several times to

identify research on the literature on advantages and disadvantages of HIT utilization in

addressing medication errors, compared and contrasted guidelines and policies across the

healthcare setting. The project involved the development of a plan for educating the team

members to be able to understand the effective ways of Electronic Health Systems

utilization in elimination of medication errors and enhance the development of a plan of

guidelines and policies for addressing effective use of health information technological

systems. This was an important consideration because the DNP prepared nurse must use a

systems leadership approach to ensure that organization-wide changes in care delivery

have the ability to provide improvements in health outcomes and enhance patient safety.

HIT systems have an enormous potential for improving patients safety in the healthcare systems. When properly integrated into the system they help in identifying the patient's safety risks that is helpful in developing interventions to technology use in advancing national health as well as safety aims of the patients (Lehman, Conner, & Cox, 2004). The interdisciplinary team thus gathered broad information on HIT systems utilization to support the development and implementation of guidelines and policies for enhancing its utilization. A comprehensive plan was developed to support and aid the use of the systems and a clear strategy for evaluation was stipulated (see Appendices H, I, J, K).

Findings in the Context of Literature and Frameworks

The project recommended for a change in practice of the health care systems by enhancing the adoption of Health Information Technological systems in an effort to improving the quality of care and the safety of the patients (Mardon, Khanna, Sorra, Dyer, & Famolaro, 2010). In doing so, policies and guidelines were developed by the interdisciplinary team to enhance adoption. These guidelines and policies are described below in the manuscript of publication that explains the problem and solutions of the campaign. It is important for every element of the HIT systems utilized to conform to the appropriate guidelines and standards governing their utilization in an effort of enhancing quality care delivery (Agrawal, 2009). A uniform policies, standards and guidelines at all operational and technical level among organizations in health information technological systems delivery is crucial to interoperability.

One of the major barriers facing the adoption of HIT is a lack of connectivity between the providers (Crespin, et al., 2010). The guidelines and policies developed will enhance that connectivity needed. There is a significant push of adopting the technological systems as a solution of assisting the improvement of communication in the health care delivery system and to have the systems communicate beyond the boundaries of a single health care system to enhancing health care transition. The adoption of industry guidelines and policies by a range of partners is an effective way of enhancing harmony. Policies and guidelines are, therefore, essential as they help in sustaining and achieving secure interoperability among programs patterns (Levin & Perconti, 2013).

Approach of the Project

The project approach was to develop Policies and guidelines in aiding in the utilization of HIT systems to address medication errors and associated adverse drug events. Despite the excellent advancements in the health care setting the systems have remained plagued by poor care quality with errors in medication being the order of the day (Bemt, Idzinga, Robertz, Kormelink, & Pels, 2009). The projects results are applicable to the healthcare setting especially in the nursing homes. The guidelines put forward are thus, important to help in the achievement a quality and safety health care delivery system. Health Information Technological system provides important benefits to the health care institutions, and their utilization will be enhanced through the adoption of policies and guidelines in enhancing a successful process of achieving the stipulated objectives.

Policy Implementation Plan

This project comprises of numerous elements that dig deep into the issue of Health Information Systems in drug administration. The implementation plan of the project follows the laid down guidelines (Appendix J). The primary goal of coming up with the implementation plan was to oversee the full implementation of the stated policy. The implementation plan will further ensure that the stakeholders in the nursing department understand the tasks to be performed. It communicates the need for every individual in the Medicare sector to play a role in the success of the HIT systems. Additionally, the implementation plan breaks down the complex procedures that guide the use of the HIT systems. The implementation plan also creates a procedure to be followed in the use of HIT in medical care. It also shows the benefits that would be realized in the use of HIS in addressing medication errors. The implementation plan mainly caters for the ever-increasing issues that arise from medication errors and adverse drug effects.

Another significant use of the implementation plan is to guide the development of an education plan for the nurses. The training program will be aimed at instilling skills to the nurses on the use of EHR systems in reducing medication errors. The implementation plan will particularly, lay down elegant procedures that will guide the nurses on proper administration of drugs. It also seeks to create a link between the need for a short-term solution to health issues and a long-term goal of solving medication errors in different health fields. The plan also seeks to give a guideline that will be used in the management of nursing homes. A clear framework will also be provided to ensure a transparent

medical care and management of nursing homes. The guidelines offered in the

implementation plan will guide the health officers in identifying the existing loopholes

that contribute to medication errors. It will, therefore, combine various approaches that

seek to minimize the current medication errors particularly in the nursing homes. The

implementation plan will also act as a guide for the installation and use of the HIS in the

nursing homes. It gives the project leader some insights on the behavior and performance

of the HIT systems.

<p align="center">**Policy Evaluation Plan**</p>

Policy evaluation plan is another significant part of this project as it acts as a

measure of success in the implementation of the identified medical plans (Appendix K &

L). The vital part of the evaluation plan guides in the use of various indices in the

analysis of the implementation plan. It lays down the procedures that guide in the

occurrence of the policy evaluation. It also communicates the time frame in which the

policy evaluation is to be conducted. The evaluation plan is, therefore, vital in guiding the

stakeholders in the individual roles they play in the health sector. It will enable the

supervisor to access the performance of various sectors in the healthcare sector.

Additionally, the evaluation plan will guide the instructor in making a follow-up to the

nurses. It gives the guideline on how, when and what is to be done in solving the existing

medical errors. The evaluation plan is, therefore, a crucial part of the projected change

and use of the HIT systems.

A significant part of the evaluation policy will act as a guide to the supervisor in

the management of nursing homes. The instructors will also use the laid down procedures

to evaluate the performance of the implementation plan. The evaluation policy plan seeks to support a successful application of the implementation plan. It provides the gauges that will be used to measure the effectiveness of the applied HIT systems. Use of the evaluation plan acts as a virtual measure of the success of the applied Medicare plans. It also guides the medical practitioners in the nursing homes as they address the various medical errors.

Implications and recommendations from the project

Implication on policy

This project has several implications including the potential to advance health system policy, improve patient outcomes by reducing gaps in nursing practice, and creating positive social change (Levin & Perconti, 2013). Policies arise from identified need of promoting interoperability, quality, as well as commonality in care practice. They may be developed formally in an industry association, as a result of legislation by the government or either they can gain acceptance through the widespread adoption and their utilization in a particular field. Especially in the isolated rural setting where there has been little adoption of the HIT, the 'de facto standards' that are aimed at gaining acceptance through the widespread adoption hold their greatest promise providing vital links ensuring quality health care provision, as well as effective communication (Ammenwerth, Schnell-Inderst, Machan, & Siebert, 2008). This project proposes policies and guidelines that enhance the adoption of HIT systems and poses the institutions and organizations in the health care setting to adopt these policies.

It is important for every element of the HIT systems utilized to conform to the appropriate guidelines and standards governing utilization (Levin & Perconti, 2013). The project advocates considered adoption of industry guidelines and policies by a range of partners as one of the most effective ways of enhancing harmony in attaining the stipulated goals. It is important to make follow-up to ensure that the HIT systems development projects guidelines and policies are widely adopted by the healthcare organizations and also comply with the fullest extent with the US health system standards as well as the standards endorsed by the Human and Health Services as highlighted in the manuscript of publication below.

Implications of action

Despite the world-class advancements and talents the health care systems has been faced with problems of overuse, underuse and misuse of the delivery systems that has contributed to the poor quality issues resulting to exacerbated long-term health issues at the individual and population levels (Mardon, Khanna, Sorra, Dyer, & Famolaro, 2010). Patients together with their families experience problems in the quality of healthcare almost every time they encounter the health care system that results from a lack of coordination in the delivery system. This results in increased cases of medication errors, misdiagnosis, treatment and testing duplication as well as negative care experiences (Agrawal, 2009). As a result, the patients are often sent out of the facilities without support and information that is required for them to take good care of themselves and will not receive the appropriate follow-up (Hodgkinson, Koch, Nay, & Nichols, 2006). This project calls for action in the adoption of the Health Information

Technological systems as tools for enhancing quality care, reducing the associated care

disparities as well as for enhancing the care outcomes for the patients and family

experiences. To ensure effective coordination and harmony in health care delivery

improvement it is crucial for all the stakeholders involved to adopt the system (Levinson,

2010) successfully.

Implications for future research

Incentives and policies alone will not ensure that the Health Information

Technological implementation will be a safe process or that it will be utilized effectively

in making health care delivery safe. In attaining a successful process, there needs to be a

concentrated effort among all the relevant stakeholders in the industry in addressing and

understanding the potential risks and harms that are associated with HIT systems

implementation at every stage of the design development and use. This can be better

facilitated through strategies and actions of knowledge improvement of HIT safety to

enhance the process of adoption and implementation (Melnyk, Fineout-Overholt,

Gallagher-Ford & Kaplan, 2012). It is thus, important to synthesize the available

knowledge and make it available for those who need it to make sure that it is essay to

understand the practicability relevant for adoption of the HIT systems (Levinson, 2010).

The research project, therefore, support research and development of interventions and

evidenced based tools that are designed for various stakeholders such as the

HITdevelopers, clinical staff, implementers and other stakeholders. It advocates for more

research related to HIT adoption, utilization and safety practices to enhance the use the

Electronic Health systems. It is important to make knowledge available, disseminate

information, and HIT tools in an effort to improving the ability of the users and implementers of the system to readily assess data in their organizations as well as benefit from the latest knowledge of HIT safety that will be better achieved through furthering the research process.

Implications of social change

One great milestone in the direction of achieving a safe and quality health care system is the introduction of HIT to clinical care. An example of such solutions is the CPOE system, which marks a great milestone in health care delivery. Despite the improvements, statistics still indicate a worrying trend in the high incidence of medication errors contrary to the expectations (Haralambos and Holborn, 2004). A primary benefit of HIT utilization is the ability to ensure that the correct information is available at every stage of the care delivery process more specifically during the transition period. This is important to ensure that all the members of the healthcare team such as the family members have access to crucial pieces of information in an effort of making care transition effective, safe and smooth (AACN 2006). Through the dissemination of information available through research studies, all the relevant stakeholders have, an ability to access information recurred. In order to achieve a successful process, the project calls for change across all the relevant health care institutions whether private or public to ensure that the adoption of the system becomes a success. The health care communities should make an effort of enhancing research, examining and evaluating the different approaches to improving HIT system widespread adoption that it is lacking.

Project Strengths and Limitations

Project Strengths

The success of the project was directly related to the competency of the project team in pulling together a successful team project. One of the common challenges experienced in conducting an evidenced based practical research was availability of suitable members in the project study as the most suitable team members tend to be the least available to take part when they are needed (Buljac-Samardzic, Dekker-van Doorn, van Wijngaarden, & van Wijk, 2010). However, the team involved in the project consisted of members that were familiar with the policy implementation process of HIT systems, from various departments in the healthcare delivery system. Each team member brought different skills to the team to help in identifying the issues of concern and brainstorm for solutions and in evaluating the entire process to ensure the attainment of the project goals.

Involving stakeholders from a different interdisciplinary background in the project was an effective way of ensure quality and diversity of ideas in the change process. This ensured that the policies and guidelines developed will be supported by a vast number of institutions since its members were involved in the project. It was essential to collaborate with the key stakeholders in the practice environment to enhance support and change in the proposed outcomes of the research project that is a main advantage that the project enjoys (petri, 2010). Moreover, by conducting a literature review with the team, the team members were better acquitted with the purpose of the project and it was necessary in enhancing their knowledge in enhancing a smooth team

project. In achieving the stipulated objectives of the project, a better understanding was needed regarding the impact and policies of HIT systems on the patients' care that was achieved by conducting a literature review with the team (Lemieux-Charles & McGuire 2006).

Limitations

A suitable and effective project has its own challenges. The project objective was to develop policies and guidelines that will support and aid the use of HIT systems in addressing medication errors and adverse drug events at a nursing home in Cincinnati, Ohio and other health care settings. In achieving this, the project team was to compare and contrast HIT policies and guidelines across other health care settings that have successfully managed the rate of medication errors. With the limited adoption of the HIT systems in the health care setting, it was a challenge of getting these policies and guidelines and comparing them. However, a sustainable number of policies and guidelines were identified ensuring further progression and completion of the research. The project team had to integrate different team members in an effort of enhancing diversity and success. However, achieving collaboration and coordination among the members proved to be a challenge at the beginning of the project. As the project progressed, the team leader was able to unify the team members in one direction (Blindler, Richardson, Daratha, &, Wordell, 2012). The Time factor was another challenge as there was limited time for collecting the study results and drafting policies and guidelines to enhance the utilization of HIT systems in the health care setting. The project took only four months and more time was necessary.

Other limitations were in relation to the project implementation process in the health care system. Being a policy level project, the main concerns for its implementation was the stakeholders' acceptance of the proposed change, financial, practical, and technological barriers. For any change initiative that involves institutions policies, there is need for all the stakeholders to be involved in the process to ensure a smooth adoption process and address any arising problems early during the adoption process (Lemieux-Charles & McGuire 2006). Sometimes, policy implementation may receive resistant from its end users because of the way the change might affect their normal working conditions. In the other hand, end users might fail to meet the change goals brought by the new initiative because they failed to understand the policy or program objectives, they disagree with the set objectives, or they lack the resources and capability to achieve the desired change (Walt et al., 2008).

Recommendations to Remedy Limitations Future Researches

To ensure that there is adequate information on HIT systems utilization, the research recommends and advocates for more research studies. This will make the information readily accessible to the relevant users and stakeholders. Integrating different team members from different organizations is essential in enhancing diversity. However, lack of coordination and miss understanding are bound to occur as a result of the different cultural backgrounds. The team leader has a responsibility of encouraging the members to understand and accommodate each other to enhance success in the project. Members should be encouraged to forego their individual differences for the benefit of the project success (Blindler, Richardson, Daratha, &, Wordell, 2012). In the planning phase of the

project, it was necessary to consider the appropriate time for the project completion and necessary adjustment could have been undertaken to sustain the project in attaining it full objectives.

In relation to the project implementation process, the necessary information needs to be provided to the relevant stakeholders such as the proposed guidelines and policies to enhance adoption of the HIT systems. Managers have a responsibility for addressing resistance that is bound to result as well as technological, practical and financial barriers achieved through collaboration, seeking for support from private and governmental organizations, and educating the end users of the policies to prevent resistance (Walt et al., 2008).

Analysis of Self

As scholar

Medication errors is a current issue in the healthcare delivery systems that should receive great consideration by all the stakeholders (Teng et al., 2009). The topic is of significant importance as it plays a crucial component in the quality of care provision in the healthcare setting. As a student scholar, it is important to understand and identify the underlying factors causing the problems and identify the appropriate way to address such an issue in an effort to improving the quality of health care. As a scholar, I contributed to the enhancement of the health care system by taking part in the research. I was able to come up with ways of helping in the prevention of medication error, adverse drug reactions, and reduce patients' length of hospitalization through the development of guidelines and policies for utilization to enhance HIT systems adoption and use. As a

student scholar, I was able to gain knowledge in the healthcare area of practice that will help me further as a health care practitioner.

As practitioner

As a healthcare practitioner, I was able to contribute positively towards the enhancement of the health care system. Medical errors are a major problem as it presents a great deal of dangers to the patient safety in the healthcare system. This project provided an excellent platform for my development as a leader and transition into the role of Doctor of Nursing Practice (DNP). One of the primary reasons for introducing and implementing HIT systems into health care is to help minimize or prevent the occurrence of medication errors (Kutney-Lee & Kelly, 2011). As a practitioner, I was able to gain more insight into the issue and understood the importance of HIT systems utilization. The adverse drug reactions that take place in health care facilities are preventable and out of these occurrences, about 28 to 95 percent can be prevented through the reduction of medication errors by enforcing policies and guidelines for utilization of the Health Informational Technological systems (Lopez & Blobel, 2009). Thus, as a practitioner involved in the sector I was able to create policies and guidelines for utilization to enhance patient's safety in improving the health care delivery system. I will continue in my capacity as a practitioner to advocate for more HIT systems adoption in the health care setting and support for more policies and guidelines development to enhance the adoption the Electronic Health systems. I will take leadership positions in the healthcare sector and nursing homes and enhance the adoption of HIT systems to improve the health care delivery system.

As project developer

To enhance a successful implementation of the Health Information Technological systems, it is important to have policies and guidelines to aid in the process. As an initiator and developer of the of the project, I feel positive about myself in making a contribution to the research process to enhance the utilization of the electronic systems to improve the health care delivery system. The development of incentives and guidelines is essential in ensuring the adoption of HIT systems but their achievement recurs continues support researches as well as the development of user tools and best tools related to Health IT safety. This can be achieved through the enhancement of future research studies (Crespin, et al., 2010). Thus, I will be involved in undertaking more future research studies to enforce my current project and another project in an effort of enhancing safe health care delivery to improve the health care system. Medication development is considered as one of the man's greatest inventions because medications are involved in curing, preventing as well as easing the pain. However, as we have all come to understand medicine can also result to harm and serious complications if not handled correctly, hence, the need to address errors associated with the administration and use medicines and other issues resulting that can be achieved through future projects (Agrawal, 2009). Moreover, Governmental and non-governmental institutions in enhancing patients care on the safety issue (HIT systems adoption) will use the project, and it can be further used in complementing and supporting further related research.

Summary and Conclusions

The essential message of this project was to provide guidelines and policies to aid in the implementation of HIT systems. Medical errors present a great challenge and danger to the patient's safety in the health care setting and as a result, the Health Information Technological systems have been introduced and are under implementation in an effort of preventing and minimizing the occurrence of medication errors. These errors have been attributed to various factors that include poor communication in the care setting, dispensation errors, dosages errors, confusion in patient's names, poor packaging of drugs and poor patient's follow-up. The health information technological systems are thus, essential in a number of ways in medication errors reduction. This entails the reduction of associated medication expenses, elimination of redundancy in the health care system, reducing overcrowding, reducing workload within a health care facility, as well as assisting in the prevention of medication errors. However, despite the introduction and implementation of the systems the rate of medication errors is still high that has greatly been attributed to lack of appropriate policies and guidelines to help healthcare practitioners in effectively utilizing HIT systems in the prevention of medication errors and adverse drug events. Thus, an interdisciplinary team was involved in developing policies and guidelines to supports the utilization of HIT systems in addressing medication errors.

Section 5: Manuscripts of publication

Abstract

Being a major concern in the nursing homes and healthcare facilities, medication errors resulting from the poor utilization of the health information technological systems, the chapter develops a manuscript of publication with the guidelines and policies aiding in the utilization of the HIT systems. This is an important step in enhancing quality care and safeguarding the safety of the patients in improving healthcare.

Introduction

The purpose of the project was to develop the best practices and provide pertinent policies and guidelines for nursing homes and health care facilities in regards to policies and guidelines for Electronic Health systems utilization that the manuscript of publication identifies. Thus, the stipulated policies and guidelines to aid in the utilization of HIT systems in an effort of reducing medication errors and enhance health care delivery and patient's safety are discussed below.

Medical errors are a major problem as they present a great danger to the patient safety in the healthcare system. According to National Patient Safety Foundation, over 1.5 million Americans are affected by errors in medication, which translate to at least one patient per day in each hospital (Van Den Bemt, Idzinga, Robertz, Kormelink, & Pels, 2009). Out of these cases, around 20 percent of these errors happen in nursing homes and 400,000 cases are preventable with appropriate utilization of the health information systems (Vest, 2010). These errors have been attributed to various factors that entail miscommunication in the care setting, dispensation errors, dosages errors, confusion in

patient's names, poor packaging, and other dosing unit errors. The rise of medication errors and adverse drug events has been of great concern over the past keeping in mind that health care facilities, including nursing homes, adopting HIT systems, medication errors has also been on the rise. According to a CDC report in 2010, the results indicated that 700,000 emergency department visits and 120,000 hospitalizations were as a result of adverse drug reactions that occurred annually. A reason for the high incidences of medication errors within this facilities is attributed to poor utilization of HIT, which is meant to leverage human error and provide accurate and efficient health care service (Agrawal, 2009). If nursing homes and health care systems would effectively implement a comprehensive system of electronic health records complete with guiding policies and regulations they will achieve an efficient healthcare delivery system by reducing medical errors through alerts, the internal intelligent capacities, as well as reminders.

Purpose

The purpose of the project was to draw up conclusions on the best practices and provide pertinent policies and guidelines for nursing homes and health care facilities in regards to policies and guidelines for Electronic Health systems utilization. This was achieved through first identification of the advantages and disadvantages of HIT utilization, comparing and contrasting guidelines and policies of HIT systems across the healthcare setting that have successfully managed the reduction of medication errors and development of guidelines and policies to help in addressing effective utilization of HIT systems. In this regards, the stipulated policies and guidelines have outlined below in the manuscript of publication.

Major Outcome of the Project

The objective of the project was to develop guidelines and policies to aid in the

utilization of HIT systems in an effort of reducing medication errors and enhance health

care delivery and patient's safety. The outlined guidelines and policy recommendations

developed by the interdisciplinary team include: (See Appendix H)

1. Targeting resources and corrective actions for improving HIT safety and

    patient's safety- The HIT system should aim to increase knowledge about the

    impacts of HIT on enhancing patient's safety and also engage in the utilization

    of the knowledge in enhancing HIT safety and making health care delivery

    safer. The ministry of health through the Office of the National Coordinator

    for Health Information Technology (ONC) under the Department of Health

    and Human Services (HHS) needs to stipulate certain conditions that health

    care organizations ought to meet for them to continue in participating in

    delivering healthcare to the public. This includes the organizations to have

    quality assurance and performance improvements programs such as the

    adoption of Electronic Health technological systems to enhance quality care

    delivery (MacDougall, Percival, & McGregor, 2009).

2. Utilization of the National Quality Strategy in establishing advanced HIT

    patients priorities- It is important to establish patients priorities of improving

    the safety of the patient's through analyzing the HIT safe trends and risks. The

    priorities need to align with the quality care improvement efforts that are

    outlined in the National Quality Strategy and should focus on areas of

enhancing patient's safety of HIT area with the greatest potential to advance

the patient's safety (Dunn, Stafinski, & Menon, 2014).

3. The incorporation of patient's safety into the certification criteria of HIT

system products- As the HIT system knowledge is on the growth, ministry of

health through ONC needs to update the standards and certification criteria for

HIT system utilization. This is in an effort to ensuring that there are Electronic

Health technology adoption and support according to the stipulated

improvement priorities in enhancing the patient's safety through a meaningful

integration of HIT systems (MacDougall, Percival, & McGregor, 2009). As

well, the developers of certified HIT systems need to integrate the safety

principles into their software design in ensuring a smooth adoption of the

systems. It is also important to identify the quality and usability management

principles, as they are important elements of HIT product safety (Chaudhry et

al., 2006).

4. Aligning the health care patient's safety standards with the initiatives to the

HIT safety- In an effort of enhancing HIT systems adoption, it is important to

align the health care safety initiatives and standards with the HIT safety

priorities. This is important in leveraging support efforts of enhancing

adoption rate as well as increasing the reporting of HIT adverse events and

hazards with an aim of improving knowledge of HIT safety. Once the health

care patient's safety has been aligned with the HIT safety initiatives,

organizations, nursing homes and health care facilities will be forced to adapt

to the new system in an effort of enhancing the patient's safety (Lintonen,
Konu, & Seedhouse, 2008).

5. Identify more opportunities to make health care delivery safer using HIT
   systems- It is important for ONC to work hard in hard with other stakeholders
   such as the National Quality Strategy and other private sectors in determining
   opportunities for making health care delivery safer for HIT use. Electronic
   health technology has an enormous potential for enhancing safe health care
   delivery and realizing this potential is the ultimate product (Agrawal, 2009).
   This can be enhanced by enhancing more hospital partnerships and
   collaboration at a national, regional and state level with an aim of identifying
   and sharing perspectives on interventions, practices as well as quality
   measures in enhancing the patient's safety (Dunn, Stafinski, & Menon, 2014).

6. Supporting research and the development of user tools, testing tools and best
   HIT practices enhancing HIT safety- It is important to support the stipulated
   policies with research to enhance the utilization of the HIT systems. It is,
   therefore, important to understand and address other risk potentials of harm
   that are related to HIT use in every stage of the design, development and
   utilization. Further support is also essential to improving knowledge on HIT
   safety and provide areas of correction to enhance health care safety.

7. Incorporation of HIT safety in training and education among the health care
   practitioners- In an effort of enhancing hit safety utilization, it is essential to
   educate the practitioner on ways of utilizing the systems, as well as their

advantages. The ONC should aim at strengthening and integrating HIT safety knowledge when educating and training the health care practitioners (Agrawal, 2009). In ensuring that the process becomes a success, grants should be given to universities and colleges to help them in developing HIT based curriculum and expand their HIT education programs.

8. Investigating and taking corrective measures in addressing hazards and adverse events resulting from HIT utilization- It is important to investigate reports on adverse events resulting from HIT systems utilization in order to determine corrective measures for remedying the problems. Thus, the ministry of health should work with the public sector organizations that have an ability of investigating resulting hazards to take corrective initiatives in an effort of making the health care delivery safe to the population and enhance their safety. This can be achieved by building up of commissions of investigating the resulting adverse effects (Braun, Catalani, Wimbush, & Israelski, 2013).

9. Encouraging the private sector to take shared responsibility and leadership in HIT adoption- The responsibility of HIT adoption should be a shared responsibility across all stakeholders and developers of the system. The actors should all collaborate and be involved in the system to enhance the development of an adaptive socio-technical framework where HIT hardware, services and software's are all integrated to ensure the attainment of the stipulated objective. For the health care system to benefit maximally and attain full potential, it is crucial for the entire group stakeholders to work

together in developing a culture of shared responsibility, safety and
continuous improvement (Gil-García, 2004).

10. Establishment of a HIT patient's safety oversight program- The establishment
    of an oversight program is crucial to ensuring that stakeholders involved in
    health care delivery comply with the stipulated policies and guidelines. The
    government should play a critical role in the oversight as it is involved in
    licensing health care professionals and facilities (Lintonen, Konu, &
    Seedhouse, 2008). This will be a crucial step to ensure that nursing homes and
    other organizations delivering health care provide quality and safe care to
    their clients. The health care ministry should work hand in hand with state
    administrators focusing on the utilization of electronic health information
    exchange in an effort of enhancing reporting (James, 2013).

11. Integration of eHealth consumers such as family caregivers as an essential
    part of the HIT safety program- Patient-centered care engaging the families,
    and the patients should be focused as an integral part of the initiative.
    Incorporating the patients and family feedback is essential in enhancing the
    completeness and accuracy of information in the HIT systems such as their
    medication history making care safer. This way the program will be able to
    win the trust and confidence of the consumers (Kimaro & Twaakyondo,
    2005). HIT systems should have an ability to provide the patients and families
    in taking part of their care and become knowledgeable about their conditions
    as well as in facilitating shared decision-making.

Significance for Future Practice, Research, and Social Change

With limited research studies on the topic, the project will aid in adding to the number of projects on the study topic in enhancing care delivery. Moreover, the development of guidelines and policies alone cannot ensure that the Health Information Technological implementation will be a safe process or that it will be utilized effectively in making health care delivery safe (Levin & Perconti, 2013). As stipulated in the guidelines discussed above, it is crucial to support the stipulated policies with research to enhance the utilization of the HIT systems. Further research in understanding and addressing other risk potentials of harm that are related to HIT use in every stage of the design, development and utilization is necessary. The projects advocate for further research studies to enhance adoption of HIT systems. Despite the advancements and in the clinical practice the health care systems have remained plagued by poor care quality. Patients are still experiencing problems in the quality of care in the health care system that results from a lack of coordination in the delivery system. This results in increased cases of medication errors, misdiagnosis, treatment and testing duplication as well as negative care experiences. The adoption of the health informational, technological systems offers a good chance of improving the quality and safety of health care, it is the high time that full adoption and implementation is taken into consideration to change the health sector. The project has stipulated guidelines and policies that will help in enhancing the adoption of the system.

The implementation of the highlighted points in this project will add value to the health care system. Future practice of the mentioned plans will help eradicate the medical

errors that surround the healthcare sector. Proper healthcare systems will translate to the

improvement of livelihood and social lives of the public. It will also contribute to

efficient and safe administration of health care, particularly in the nursing homes. Proper

practice of the identified procedures will also boost the use of the HIT systems in nursing

homes. Consequently, the existing medical errors will be eliminated or minimized. The

achievements made in the use of HIT systems will lay a firm foundation for future goals

in the health care sector. Investing in research and positive change in the society will add

value to the health care status (Walt et al., 2008). The health care sector can create the

needed change through adopting HIT systems. Significant change can be realized in the

creation of a transparent health delivery system. The patients will feel secure during the

treatment process thereby creating a positive relationship between the medical

practitioner and the society. Additionally, the society will develop positive attitude

towards the available medical care.

Literature and Evidence Informing the Project

Adequate and significant literature was used in supporting the project. Over the

years, medication errors have been a major concern in the healthcare setting. The safety

and quality of care delivered have also been subjects of debate in the health care delivery

system (Agrawal, 2009). The importance of implementation of HIT systems, into the

health care system, is to minimize and prevent the occurrence of medication errors. The

health information technological systems are also important in a number of ways such as

in elimination of redundancy in the health care system, reducing overcrowding in the

hospitals, reducing workload, as well as assisting health care teams in the prevention of

medication errors (Levin & Perconti, 2013). According to statistics, over 1.5 million Americans are affected by errors in medication, which translate to at least one patient per day in each hospital (Van Den Bemt, Idzinga, Robertz, Kormelink, & Pels, 2009). Out of these cases, around 20 percent of these errors happen in nursing homes, and nearly half a million cases are preventable with appropriate utilization of the health information systems. Despite the introduction of HIT systems, the rate of adoption is still low (Vest, 2010). The project, therefore, recommends for a change in practice in the health care systems by enhancing the adoption of Health Information Technological systems in an effort to improving the quality of care and the safety of the patients. In doing so, it has stipulated policies and guidelines to enhance the adoption and utilization of the systems.

Major Approach/steps used to Complete Project

After Institutional Review Board approval, the quality improvement project commenced. The project approach for carrying out the project sought to develop Policies and guidelines that will support and aid the utilization of HIT systems in addressing medication errors and adverse drug events at the identified nursing home in Cincinnati, Ohio and other health care facilities. The electronic health systems have an enormous potential of enhancing the safety of the patients in the care setting and when integrated into the system well they are essential in identifying the patient's safety risks that are helpful in developing interventions in advancing national health as well as facilitating the safety aims of the patients. The overall product was the development of guidelines and policies to aid in the utilization of health information technological systems.

Implementation and evaluation of the products of the project occurred in the institution after project completion.

The elements of the overall project undertaken during the project were:

1.   Assemble an interdisciplinary team of institutional stakeholders

2.   Guide the project team through a review of relevant literature and evidence

3.   Develop policies and practice guidelines

4.   Validate policy and guidelines using external expertise

5.   Develop an implementation and education plan

6.   Develop an evaluation plan

Interdisciplinary Project Teams Involved with the Project

Assembling the interdisciplinary team of institutional stakeholders required thoughtful and purposeful planning. The project involved an interdisciplinary team who were very competent on the subject matter of the research project. The team members were from different interdisciplinary backgrounds to ensure quality and diversity of ideas for the project success. The team consisted of members that were familiar with the policies of the implementation process, from various departments in the healthcare delivery system regarding the utilization of the health information systems (Blindler, Richardson, Daratha, &, Wordell, 2012). Each member of the team brought different skills to the team to help in identifying the main project issue, and brainstorm for solutions, evaluation of the process, and success of the project was required of each member. Membership in the project is voluntary, and the main aim was to enhance the

reduction of medication errors in the health care setting. Achieving the project objectives was a shared responsibility among the team as no one individual could fully realize the full potentials of attaining the project's goals. Members of the team include clinicians among them three nurses and a physician, an administration representative, two IT department representatives, Director of Nursing (DON), a supervisor and a representative from accrediting bodies to help in the adoption of HIT policies and guidelines in the nursing homes and health care settings.

Major Product, Implementation and Evaluation plan

The major product described in the project is the adoption of HIT systems in an effort of enhancing safety and quality in the health care system. HIT systems are crucial in enhancing the safety of the patients through the prevention of medical errors, errors in assessment and surveillance as well as reduction in the risk of harm associated with medication errors (Nebeker, Hoffman, Weir, Bennett, & Hurdle, 2005). Among the medical errors that take place every day in the healthcare setting, include errors during drug prescription, errors during treatment with wrong drugs prescribed, and procedural errors, diagnostic and administrative errors that can all be compacted under proper utilization of HIT technological systems. Among the systems that are utilized in the prevention of medical errors in the HIT include the EHR, CPOE, CDSS, the BCMA and RFID (Agrawal, 2009). The integration of these methods provides good efficiency and effectiveness in the reduction of medical errors. If nursing homes could effectively implement a comprehensive system of electronic health records complete with guiding policies and regulations, they will achieve an efficient healthcare delivery system. Thus,

the project has stipulated guidelines and polices that will help in enhancing the adoption

of HIT systems to improve health care safety (Levin & Perconti, 2013). The policies

highlights measures and conditions in enhancing full implementation of the system as

well as measure of ensuring compliance such as the establishment of conditions to ensure

compliance and an oversight program to oversee the implementation of the program. This

is crucial in ensuring that the health care system is of quality and is safe for the

consumers of health care.

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Appendix A: An Illustration of the Proper Steps, Error Rates, and IT Systems in

Medication Management

Stage	Error rate, %	Intercept rate, %	True error rate, %	Relevant IT systems
Prescription	39	48	22	CPOE with decision support
				Electronic medication reconciliation
Transcription	12	33	11	Automated transcription
Dispensing	11	34	10	Robots, automated dispensing cabinets
Administration	38	2	51	Bar-coding, electronic medication administration

Appendix B: Functions of the Program

Coordination and evaluating the implementation of the plan	Analyzing comprehensively data on safety of HIT from different sources	Eliminating any inefficiencies across the project plan
Collaborating with all the actors to incorporate HIT systems in their organizations	Identification of trends in patients safety and health informational technology	Through identification of any unnecessary overlap occurring during the implementation process to enhances efficiency
Assisting all the actors in undertaking their responsibilities under 5 the plan	Providing information on policies and other efforts of improving HIT patient's safety	Evaluating the outcomes of the plan and their efficiency during implementation
	Providing feedback to providers and developers of HIT systems	Determining the actions to be undertaken from the outcomes and whether they are beneficial, insufficient, or unnecessary

Appendix C: The Project Team

1. Clinicians to include three nurses and a physician

2. Administration representative

3. Two IT department representatives

4. Director of Nursing (DON)

5. A supervisor

6. A representative from accrediting bodies to help in the adoption of HIT in the nursing homes and health care settings such as health insurances, educational organizations and other professional organizations

Appendix D: HIT policy Decision Matrix Adopted from University of Michigan

Criteria	If Yes	If No
1. Is it implementable across the Hospital?	Continue to #2	Create a **Guideline**
2. Is it compliant with existing policies or laws?	Continue to #3	Conduct further analysis with participation of appropriate stakeholders to determine how to handle
3. Is it applicable across the Hospital?	Continue to #4	Skip to #9
4. Can it stand more than 1 year without review?	Continue to #5	Skip to #9
5. Would there be only a low number of exceptions?	Continue to #6	Skip to #9
6. Is it independent of a specific technology?	Continue to #7	Create a **Standard** ** or ** Create a high-level **Policy** and a Detailed technology-dependent **Standard**
7. Does an umbrella policy not exist?	Continue to #8	Use the umbrella **Policy** ** and ** Create detailed **Standard(s)**, **Guideline(s)**, or **Procedure(s)**
8. Can it be summarized in approximately one page?	Create a **Policy** ** and ** Detailed **Standard(s)**,\ **Guideline(s)**, or **Procedure(s)**, if needed	Create a high level **Policy** ** and ** A combination of **Standard(s)** and/or**Guideline(s)**
9. Is it mandatory?	Create a **Standard**	Create a **Guideline**

Appendix E: Guidelines from IOM on Avoiding Medication Errors

WHAT YOU CAN DO TO AVOID MEDICATION ERRORS
Source: Committee on Identifying and Preventing Medication Errors, Institute of Medicine

PERSONAL/HOME CARE

Maintain a list of prescription drugs, nonprescription drugs and other products, such as vitamins and minerals, you are taking.
Take this list with you whenever you visit a health care provider and have him or her review it.
Be aware of where to find educational material related to your medication(s) in the local community and at reliable web sites.

PHARMACY

Make sure the name of the drug (brand or generic) and the directions for use received at the pharmacy are the same as that written down by the prescriber.
Know that you can review your list of medications with the pharmacist for additional safety.
Know that you have the right to counseling by the pharmacist if you have any questions. You can ask the pharmacist to explain how to properly take the drug, the side effects of the drug, and what to do if you experience side effects (just as you did with your prescriber).
Ask for written information about the medication.

AMBULATORY CARE/OUTPATIENT CLINIC

Have the prescriber write down the name of the drug (brand and generic, if available), what it is for, its dosage, and how often to take it, or provide other written material with this information.
Have the prescriber explain how to use the drug properly.
Ask about the drug's side effects and what to do if you experience a side effect.

HOSPITAL INPATIENT CARE

Ask the doctor or nurse what drugs you are being given at the hospital.
Do not take a drug without being told the purpose for doing so.
Exercise your right to have a surrogate present whenever you are receiving medication and are unable to monitor the medication-use process yourself.
Prior to surgery, ask whether there are medications, especially prescription antibiotics, that you should take or any that you should stop taking preoperatively.
Prior to discharge, ask for a list of the medications that you should be taking at home, have a provider review them with you, and be sure you understand how these medications should be taken.

Appendix F: Guidelines for Patients on Preventing Medication Errors

Medicines

1. **Make sure that all of your doctors know about every medicine you are taking.**
   This includes prescription and over-the-counter medicines and dietary supplements, such as vitamins and herbs.

2. **Bring all of your medicines and supplements to your doctor visits.**
   "Brown bagging" your medicines can help you and your doctor talk about them and find out if there are any problems. It can also help your doctor keep your records up to date and help you get better quality care.

3. **Make sure your doctor knows about any allergies and adverse reactions you have had to medicines.**
   This can help you to avoid getting a medicine that could harm you.

4. **When your doctor writes a prescription for you, make sure you can read it.**
   If you cannot read your doctor's handwriting, your pharmacist might not be able to either.

5. **Ask for information about your medicines in terms you can understand—both when your medicines are prescribed and when you get them:**
   - What is the medicine for?
   - How am I supposed to take it and for how long?
   - What side effects are likely? What do I do if they occur?
   - Is this medicine safe to take with other medicines or dietary supplements I am taking?
   - What food, drink, or activities should I avoid while taking this medicine?

6. **When you pick up your medicine from the pharmacy, ask: Is this the medicine that my doctor prescribed?**

7. **If you have any questions about the directions on your medicine labels, ask.**
   Medicine labels can be hard to understand. For example, ask if "four times daily" means taking a dose every 6 hours around the clock or just during regular waking hours.

8. **Ask your pharmacist for the best device to measure your liquid medicine.**
   For example, many people use household teaspoons, which often do not hold a true teaspoon of liquid. Special devices, like marked syringes, help people measure the right dose.

9. **Ask for written information about the side effects your medicine could cause.**
   If you know what might happen, you will be better prepared if it does or if something unexpected happens.

Appendix G: Successful Practices for Improving Medication Safety by American

Hospitals Association

<u>**Easily implemented changes (process redesign)**</u>
The following steps can be implemented immediately by hospitals and health systems. They focus on standardization and simplification of medication system processes.
Fully implement unit dose systems

- Maintain and systematically use unit-dose distribution systems (either manufacturer-prepared or repackaged by the pharmacy) for all non-emergency medications throughout the hospital. Unit dose systems should include, in addition to packaging, systems for labeling and order screening.
- Stress the need for dose adjustment in children, older persons, and patients with renal or hepatic impairment.

Limit the variety of devices and equipment

- For example, limit the types of general purpose infusion pumps to one or two.

Develop special procedures and written protocols for high-alert drugs

- Use written guidelines, checklists, dose limits, pre-printed orders, double-checks, special packaging, special labeling, and education.
- Remove concentrated potassium chloride/phosphate from floor stock.
- Limit the number of possible concentrations for a drug, particularly high-alert drugs like morphine and heparin. Such standardization will allow the use of premixed solutions from manufacturers or centralized preparation of IV medications in the pharmacy.
- Review JCAHO Sentinel Events Alert #11, Nov. 19, 1999. Also, review Chapter 5 of Michael Cohen's 1999 book, "Medication Errors," published by the American Pharmaceutical Association.

Ensure the availability of up-to-date drug information

- Make updated information on new drugs, infrequently used drugs, and non-formulary drugs easily accessible to clinicians prior to ordering, dispensing, and administering medications (e.g., have pharmacists do rounds with doctors and nurses; distribute newsletters and drug summary sheets; use computer aids; and provide access to formulary systems and other internal resources).
- Review error potential for all new products, including a literature review, before any drug or procedure is approved for use; reassess six months to one year later.

Educate staff

- Provide physicians, nurses, pharmacists, and all other clinicians involved in the medication administration process with orientation and periodic education on ordering, dispensing, administering, and monitoring medications.
- Distribute information about known drug errors from outside organizations like the Institute for Safe Medication Practices (ISMP) and the U.S. Pharmacopeia (USP).

Educate patients

- Patients should be educated in the hospital, at discharge, and in ambulatory settings about their medications, what they are taking, why they are taking it, and how to use it safely.
- Encourage patients to ask questions about their medications.
- Encourage health care providers to work with pharmacists on patient education when patients receive certain classes of medications or are discharged on more than five medications.

Ensure the availability of pharmacy expertise

- Have a pharmacist available on-call when pharmacy does not operate 24-hours a day.
- Make the pharmacist more visible in patient care areas - consider having pharmacy personnel make daily rounds on units, or enter orders directly into computer terminals on patient care units.

Standardize prescribing and communication practices

- Avoid certain dangerous abbreviations (see ISMP and USP for examples); identify a list of unacceptable abbreviations that will not be used in your institution.
- Include all elements of the order - dose, strength, units (metric), route, frequency, and rate.
- Use full names (preferably generic).
- Use computerized reminders for look-alike and sound-alike drug names.
- Use metric system only.
- Use preprinted order sheets whenever possible in non-computerized order systems.

Standardize multiple processes, such as:

- Doses
- Times of administration (for example, antibiotics)
- Packaging and labeling
- Storage (for example, placing medications in the same place in each unit)
- Dosing scales (for example, insulin, potassium)
- Protocols for the use and storage of high-alert drugs

Longer-term changes (systems redesign)

The following steps will require substantial changes to existing organizational systems; they will likely require a longer-term implementation plan and a continual focus on improvement. Many of the recommendations rely on computerization in the physician order-entry and pharmacy dispensing processes.

Develop a voluntary, non-punitive system to monitor and report adverse drug events

- Review policies for how your organization encourages reporting and analyzing errors throughout the institution.
- Encourage candid communication and feedback.
- Ensure no reprisals for reporting of errors. Reports will increase if you make it safe to report.

Increase the use of computers in the medication administration system

- Encourage the use of computer-generated or electronic medication administration records.
- Plan for the implementation of computerized prescriber order entry systems.
- Consider the use of machine-readable code (i.e., bar coding) in the medication administration process.
- Use computerized drug profiling in the pharmacy.
- Be a demanding customer of pharmacy system software; encourage vendors to incorporate and assist in implementing an adequate standardized set of checks into computerized hospital pharmacy systems (e.g., screening for duplicate drug therapies, patient allergies, potential drug interactions, drug/lab interactions, dose ranges, etc.).

Institute 24-hour pharmacy service if possible …

... alternatively, use night formularies and careful drug selection and storage procedures. To facilitate medication distribution after hours, develop policies and procedures to ensure access to consultation with a pharmacist if a pharmacist is not available on-site.

Appendix H: Safe Medication Practices using HIT Systems Policy Brief

Safe medication practices using HIT systems policy brief
INTRODUCTION 　　　　With current statistics and reports, medication errors still prove to be a painful thorn in the foot of health care. Despite various efforts being promoted to handle the issue, we are still facing a serious problem considering the fact that they are responsible for a significantly high rate of patient mortality. If this issues is not addressed early, it could significantly hinder the future plans of improving health care delivery. Current research, shows that the rate at which medication errors are being committed has been on the rise over the last decade. However, after a thorough review of current literature and best practices regarding the issue, the current research was able to come up with recommendations and guidelines that will lead to an improved use of health information technology in reducing these errors.
BACKGROUND 　　　　One of the key efforts made was to introduce and implement health information technology best known as HIT systems, into the health care system, was to minimize or prevent occurrence of medication errors. However, current literature suggests that 'medication errors' is still a major problem and danger to patient safety in most of our health care settings. According to National Patient Safety Foundation, over 1.5 million Americans are affected by medication errors, which translate to at least one patient per day in each hospital. Looking at a report by CDC in 2010, it showed that over "700,000 emergency department visits and 120,000 hospitalizations are due to adverse drug events (ADEs) annually". In 2005, the report given by CDC on death and hospital mortality rates indicated medication errors as the sixth leading cause of patient mortality, eight years down the line in 2013, medication errors was identified as the third leading cause of patient mortality (CDC, 2005; MacDonald, 2013). Despite these reports and statistics, the Insititu of Medicine (IOM), American Hospitals Association, and Agency for Healthcare Research and Quality have been activley coming up with guidelines and policies that will help manage the situation. The current project made use of information from these organizations and a number of best practices and guidelines were retrieved during the study and the information was used to come up with the policy recommendations. The goal of this policy is to reduce medication errors and manage treatment of patients following medication errors in nursing homes and promote best practices for Health Information Technology.

APPROACH

The current project addressed a potential gap in nursing practice related to the reduction of medication errors and the management of patients following medication errors in nursing homes and other healthcare centers. The project developed policy recommendations and guidelines to supports and aid the utilization of health information technology (HIT) systems in addressing medication errors and adverse drug events at a local nursing home in Cincinnati, Ohio. The high incidences of medication errors within these facilities have been attributed to poor utilization of health information technological systems, which are meant to leverage human error and provide accurate and efficient service. The interdisciplinary project team identified information on policies and guidelines that were proven successful in other health care settings. The team then drew up conclusions on the best practices and provided pertinent policies and guidelines for nursing homes and other healthcare facilities.

CONCLUSION

The purpose of this project is to develop policies and guidelines that support and aid the use of health information technology (HIT) systems in addressing medication errors and adverse drug events. The project achieves this through gathering of information on policies and guidelines that have been proven successful in other health care settings by reknown organizations. These include, guidelines and policies created for acute care and general hospitals by organizations such as Insistitute of Medicine (IOM) and American Hospitals Association, pertaining to use of HIT systems in managing medication prescription and administration. An analysis of the gathered information is then used to develop appropriate guidelines and policies that aid the use of HIT systems that not only benefit identified nursing home, but also useful to other nursing homes.

POLICY OPTIONS

a)	Targeting resources and corrective actions for improving HIT safety and patient's safety	The HIT system needs to increase knowledge about the impact of HIT on enhancing patient's safety and also engage in the utilization of the knowledge in enhancing HIT safety and making health care delivery safer. This entails the incorporation of quality assurance and performance improvements programs
b)	Utilization of the National Quality Strategy in establishing advanced HIT	The priorities need to align with the quality care improvement efforts that are outlined in the National Quality Strategy and should focus on areas of enhancing patient's safety.

	patients priorities	
c)	Incorporation of patient's safety into the certification criteria of HIT system products	There is need to update the standards and certification criteria for HIT system utilization in an effort of ensuring Electronic Health technology adoption and support according to the stipulated improvement priorities.
d)	Supporting research and the development of user tools, testing tools and best HIT practices enhancing HIT safety	supporting the stipulated policies with research to enhance the utilization of the HIT systems as well as understanding and addressing other risk potentials of harm that are related to HIT use in every stage of the design, development and utilization
e)	Aligning the health care patient's safety standards with the initiatives to the HIT safety	This is crucial for leveraging support efforts in enhancing adoption rate as well as for increasing the reporting of HIT adverse events and hazards with an aim of improving knowledge of HIT safety
f)	Identifying more opportunities to make health care delivery safer using HIT systems	Working hand in hand with other stakeholders such as the National Quality Strategy and other private sectors in determining opportunities for making health care delivery safer for HIT use

g)	Incorporation of HIT safety in training and education among the health care practitioners	In an effort of enhancing HIT safety utilization, it is essential to educate the practitioner on ways of utilizing the systems, as well as their advantages. The ONC should aim at strengthening and integrating HIT safety knowledge when educating and training the health care practitioners
h)	Investigating and taking corrective measures in addressing hazards and adverse events resulting from HIT utilization	Investigate reports on adverse events resulting from HIT systems utilization in order to determine corrective measures for remedying the problems
i)	Integration of eHealth consumers such as family caregivers as an essential part of the HIT safety program	Patient-centered care engaging the families, and the patients should be focused as an integral part of the initiative. Incorporating the patients and family feedback is essential in enhancing the completeness and accuracy of information in the HIT systems.
j)	Encouraging the private sector to take shared responsibility and leadership in HIT adoption	The responsibility of HIT adoption should be a shared responsibility across all stakeholders and developers of the system. Thus, the actors should all collaborate and be involved in the system to enhance the development of an adaptive socio-technical framework of adoption
k)	Establishment of a HIT patient's safety oversight program	The establishment of an oversight program is crucial to ensuring that stakeholders involved in health care delivery comply with the stipulated policies and guidelines. The MOH and the government should play a critical role in the oversight as they are involved in licensing health care professionals and facilities

POLICY RECOMMENDATIONS

To address the issue of medication errors, all stakeholders must be ready to work together. There is also need to involve the federal government in an effort to make this a national move and the government can play a great part in funding and speeding up the process. Current regulatory agencies should continue encouraging the adoption of best practices and health care technologies that will help reduce medication errors. Accreditation bodies should also enforce mandatory training of medication-management practices to new and existing health care staff. With the given recommendations and practices guidelines the project team is positive that there will be a significant reduction in the rate of medication errors.

Appendix I: Proposed Guidelines for Preventing Medication Errors Using HIT systems

PERSONAL CARE

Individuals should have a record of the drugs they are required to take either under doctor's prescription or mineral and vitamin supplements.

Visit a medical practitioner to enquire about the drugs and seek further guidance on the use of vitamin supplements. Doctors will use the HIT system to evaluate and offer guidance on drug use depending on the health information collected from the individual.

PHARMACY

Pharmacy operators are required to having the right drugs in stock. The drugs should have the right labels on the packaging materials.

Medical practitioners are also obligated to check and approve the quality of medicine being offered by pharmacists.

Patients should clarify the medicines they purchase with the support of the right documents. Use of HIT systems can assist in guiding the medical practitioners in deciding the right medicine foe the patients.

The pharmacists can also refer to the patient's health information to make preferences on the right medicine.

HOSPITAL CARE

Doctors are the main players in this level and this requires them to have adequate knowledge of various illnesses and health matters. The doctors should have adequate knowledge on the purpose of each drug together with its side effects.

Hospitals are required to adopt the HIT systems in order to have credible data handling platforms for the patients.

HIT systems will assist in reducing the common medical errors resulting from administration of wrong treatment methods.

Hospitals should also use the HIT systems to ensure that the right drugs are given based on the health information collected from the patients.

MEDICINES

Patients should understand the use of the medicines they acquire both in hospitals and pharmacies. Doctors should also take the patients through the guidelines given for the drugs.

Patients should understand the right quantities of liquid medicine to take by following the doctor's prescription. One should also know the use and side effects of the medicines they purchase.

USE OF DEVICES AND EQUIPMENT

Patients should have the right information regarding the reason for the use of various deceives and equipment during treatment

Doctors are also required to have a clear understanding on the use of the equipment to avoid causing harm to the patients. Each device or equipment should be labeled to guide the patients on its use during treatment.

Doctors should explain the use and side effects of the equipment to the patients. The patients are also permitted to ask for alternative treatment methods in place of medical equipment.

Appendix J: Policy Implementation Plan

Task	Completion Target Date	Who is responsible for the completion
1. Approve that the policy has been properly formulated by the relevant teams	February 2016	Assistance medical supervisor of nursing homes
2. Creating awareness on any changes on the policy to the team regarding the adopted policy	February 2016	Instruction Supervisor, HIT Director
3. The project leaders make a visit to the Administrator to discuss and lay down a schedule for the project. They also determine the procedures to be used in evaluating the performance of the Health Information Technology systems.	March 2016	HIT Director, Instruction supervisor
4. Health system stakeholders including (nurses, the public, health administrators) discuss on the current health laws and the changes that can be made to make the healthcare more efficient.	March 2016	Director HIT
5. The healthcare management team drafts a procedure to be used in the evaluation of the agreed changes in the use of HIT systems. The procedure follows the respective agendas laid out in the policy under supervision by the project team.	April 2016	HIT Director
6. Health administrator comes up with guiding principles in the entire project. The team also checks on the way the guidelines are developed.	April 2016	Committee heads, HIT director

7. Committee heads present the plans for assessment by the stakeholders. The health practitioners approve the developed plans and present their views to the concerned health bodies. The plans align the committee heads wishes with HIT recommendations.	April 2016	HIT Director, Supervisor of Instruction.

Appendix K: Policy Evaluation Plan

Evaluation Task	When to complete	Who is responsible	As measured by
The team presents the HIT implementation plan to the administrators for approval	October or before administrators' meetings every year	HIT Director	Agreed upon, filed by the supervisor of instruction, and seconded by the HIT director.
The administrators adopt a plan to be followed in the implementation of the policy. The plan adheres to the state laws and the health provision principles.	Annually in September	Supervisor of institution	Filed by supervisor of institution and forwarded to the director of HIT for reporting. HIT supervisor will make frequent

| Health supervisors are granted permission to inspect the performance of the HIT systems in the nursing homes according to the provided measures. They will also create a time plan that matches the project schedule. | Annually in September | Stakeholders, instruction supervisors, HIT Director | visits to the health administrators to assess the implementation of the documented policy. |
| The health administrators at the county level welcome views from guest speakers. | Annually and three months before the formal meeting | Nursing homes administrators | The agreed agendas filed and submitted to the health administrators for approval and reporting. |

Appendix L: Project evaluation measures

Measure	Domain	Data source	Notes	Potential Drawbacks
Medication errors	Patient safety	-Medical records -Chart reviews	To be assessed on both inpatient and outpatient after practice guidelines implementation Assessed on -ordering -Transcribing -Dispensing -Administering -Monitoring	-Chart reviews do not reveal all errors
Preventable adverse drug events (ADEs)	Patient safety	-Medical records -Prescription previews -patient phone interviews -chart reviews	To be assessed on both inpatient and outpatient after practice guidelines implementation At each stage -ordering	-Need to collect large amounts of data -require constant follow-ups

			Transcribing	
			-Dispensing	
			-Administering	
			-Monitoring	
Pharmacist interventions	-Efficiency -Patient safety	-Pharmacy records	-Should focus on interventions related to medication errors	-All pharmacy interventions are not recorded
Inpatient mortality rate from ADEs	-Patient safety	Medical records	-Use records of death rates associated with medication errors	-Will require longer periods to collect relevant data
Percentage records of CPOE use by physicians	Efficiency	-CPOE usage Records	-N/A	N/A
Rate of outpatient electronic prescriptions	-Efficiency	EMR use records	-Expected all outpatient prescriptions to be done electronically	-Will also require chart reviews

Percentage of nurses who have undergone training of new policy and practice guidelines	-Efficiency	-Training logs	-Nurses rate of understanding should also be considered	-Not easy to capture because attendance can differ with rate of understanding
Patient satisfaction	-Patient centeredness	-Survey data	-N/A	-Not easy to capture
Pharmacy callback rate	-Effectiveness	-Pharmacy logs	-Number of orders made should also be considered	-Maybe influenced by patient knowledge levels