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The Implementation of an Electronic Medication Management System in a Nursing Home.

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The Implementation of an Electronic Medication Management System in a Nursing Home.

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Abstract

Nurse leaders are responsible for medication management and medication safety in any health care setting. Medication errors can occur at any stage in the therapeutic use of medication from drug prescribing to administration to the resident. The change agent advocates the implementation of an electronic medication management system to reduce medication errors and to improve patient safety. The change agent therefore chose the implementation of an electronic medication management system to reduce medication errors for this change project with the aim of improving the safety of residents and improving the quality of care in the organisation. The HSE change model was used to provide a systematic and disciplined approach to implementing the change. The change agent collected data by various approaches including observation, audits, surveys and interviews. The change resulted in a reduction in medication errors and near misses in the organisation. The change agent required strong and committed leadership to initiate this significant change and lead the process to a successful outcome.
Acknowledgments

This dissertation would not have been possible to complete without the support and help of various people, especially Mary Woods and Breda Hayes. I wish to express my gratitude to all of those who contributed generously of their time, knowledge and experience in the implementation of this change project especially the Pharmacy team. In addition, I recognize the input of the staff as they engaged positively and enthusiastically in this project in the belief that it would deliver holistic, patient centered and safe care. My deepest thanks go to my husband and children, for their love, understanding and support. Lastly, I would like to recognize the encouragement and assistance provided at the RCSI, specifically from the facilitator and the members of the Action Learning Set who have supported and validated me in the action learning approach.
Chapter 1
Introduction

1.1 Introduction
Leaders and managers working in healthcare today face considerable multifaceted challenges as the environment is complex and faces constant change. The Health Act (2007) and National Quality Standards of Residential Care Settings for Older People in Ireland (HIQA, 2009) has championed the importance of extensive modifications and improved processes in the care of older people. The regulations combined with other external competitive forces pose significant challenges and dangers to organizational viability and flourishing if they do not reach the standards set. Resident safety is paramount in any quality improvement initiative. This is supported by the World Health Organization (2007) which published nine Patient Safety Solutions with the aim of safety of patients and its key areas include medication management. As medication management improvement achieves significant gains in safety and quality, the change agent argues that it must be transformed to improve processes and reduce the risks involved. This change management project focuses on implementing a safe medication management system in a nursing home containing 117 beds.

Nurse leaders have a responsibility to ensure a safe medication management system in any health care settings, but this is particularly so in nursing homes (HIQA, 2009). Nursing homes are nurse led, in most instances, without an onsite multidisciplinary support team. Medication management is a complex process including prescribing, transcribing, ordering, dispensing, supplying, administering and storing, and medication error can occur in all stages of the process (Diles et al., 2011). Tumheim (2003) concluded that adverse drug events are common in nursing homes, and nursing home residents are vulnerable to such events due to a high incidence of polypharmacy and change pharmacokinetics and
pharmacodynamics. The change agent advocates the introduction of an electronic medication management to reduce medication errors and to improve patient safety (Ryan, 2007). These systems will replace paper medication charts and allow electronic prescribing, administration and pharmacy review. Chapter 1 outlines the aim and objectives of this change project and the rationale for carrying the change.

1.2 Aim and Objectives

The aim of this project is to implement an electronic medication management system as an integral component of the processes in the nursing home so as to improve safety of residents by reducing medication errors and lack of compliance with policy and regulations. This will help to improve the quality of service by streamlining care, by assisting decision making and providing feedback on performance. The process will integrate the pharmacy service, the general practitioner (GP) and the organization through an electronic process.

The main objectives of this project are that:

• By 30th March 2014, medication errors will be reduced by 25%, comparing to medication error audit results from before the change.
• By 30th March 2014, 50% of near misses will be reduced by comparing to near misses audit results from before the change.
• By 30th February 2014, there will be 100% compliance with HIQA standards on medication management including 3 monthly medication reviews, recording of stock, dispensing, reordering and returning medicines to the pharmacy.
• By 30th March 2014, nurses will be able to complete medication administration rounds within 45 minutes. This outcome will equate with more than a 25% reduction in time.
• By the 30th March 2014, the use of generic medicines will increase by 75% to support the Irish government goal of achieving savings on the cost of medication.
• By 30th March 2014, the organization will have fully implemented software medication management system.

The change agent will achieve these objectives by providing training, resolving all barriers to implementation and evaluating the implementation of the change against the stated aim and objectives. The organization has a vision of implementing information technology for all nursing documentation and this change is the first step of that process.

1.3 The Rationale for Carrying out this Change

1.3.1 The organization and the change agent: The context of this change is that the change agent is working as a Clinical Nurse Facilitator in the nursing home for more than 6 years. The primary work objective of the change agent is to ensure that resident care and staff management is to an excellent standard. One aspect of this responsibility is that she is responsible for ensuring that medication management in line with best practice.

This organization is a nursing home based in Dublin. The organization comprises seven individual clinical units. This division creates specialized functioning units and teams that heighten systemic efficiency and effectiveness of care and it also adds a dimension of person centeredness by having each unit small and self-contained. The total bed capacity is 117 and the residents range in age from 35 years to 100 years. In this organization, the medication orders were previously handwritten and the medications dispensed by the pharmacy having received handwritten orders from nurses by fax. The medication administration record was documented by the administering nurse signing for each medication. The change agent has assessed that near misses and errors have happened for a variety of reasons. These include lack of access to information, inadequate decision support, poor communication, incomplete medical histories for residents, illegible orders,
confusion about the name of the drug, improper process of administration and interruptions of the nurse during the administration process.

1.3.2 Previous experience of failure: Failure of a previous project also inspired the change agent to implement this current change. The team, including the change agent, started a project to support a pharmacy to develop a software system for medication management over one year ago. That project failed due to very poor time management on the part of the pharmacy team, lack of team work, failure to develop all requirements in the system as expected by the organization and lack of leadership from the pharmacy team. Having reflected on this situation, the change agent opened discussion with her employer to implement this current change in the organization. From the failure of the previous project, the team learned about the requirements of a fully developed system and the barriers to achieving a successful change. The change agent was very mindful that such a change requires the allocation of significant resources both financial and human, the integration of the pharmacy, G.P. and the organization for the safety of residents and the success of the project (figure 1).

Figure 1: Integrated approach
1.3.3 Criteria necessary for an electronic medication management system: A new electronic medication management system must encompass all the requirements needed for residents to receive a person centered care in accordance with the HIQA standards (2009). The new system must make it more manageable for the staff to carry out their daily tasks and routines both to achieve their support and to justify the financial and human resource investment in the project.

The organization had been successfully accredited and reregistered by HIQA, as required, to carry out its business. The registration requires the organization to follow the National Quality Standards for Residential Care Settings for Older People in Ireland (HIQA, 2011). A component of the requirement for registration is that the organization operates a safe and reliable medication management system. The organization must also facilitate registered nurse to follow the guideline provided by An Bord Altranais (ABA, 2007) ‘Guidance to nurses and midwives on medication management’. This is required to assist them understand their roles and responsibilities in all aspects of medication management. Any electronic system must be consistent with the requirements of both these organizations as well as other legislation governing administration of medication in Ireland. This includes the Pharmacy Act 2007, the Misuse of Drugs Acts 1977-2006, Medicinal Products Regulations 2003-2009, Health Act 2007 and specific HIQA standards 14 and 15 (National Quality Standards for Residential Care Settings for Older People in Ireland, 2009)

1.3.4 The vision of the organization: The change agent must adhere to the mission and vision of the organization (Ventris, 2004) in any change project planned. The specific objectives of this change must be consistent with the existing mission and planned future of the organisation. The mission is to provide a special place where people can live, laugh, and socialize and to provide an environment that enables all those in our care to
experience a quality of life that is characterized by dignity, independence and compassion. The vision of the organization includes that time must be spent to achieve the mission and to eliminate time that is inefficient in achieving it. Therefore, it is planned that the full nursing documentation system will change to an electronic system to maximize available time. The management has planned strategies for fulfilling that vision through an incremental approach. The first step on the strategic pathway is to implement electronic medication management.

This project will progress in a step by step process by using a PDSA cycle in the following progressions of the planned change:

1. Implementation of software system in all units.
2. Implementation of a medication pouch system for medication supply
3. Piloting electronic Mar (medication administration record) sheet and bar coding of the pouch system
4. Implementation of electronic Mar sheet and bar coding medication administration in all units.

The change agent's employer advised the change agent to take the first two steps for this project for her MSc dissertation. It was considered sufficient to take the first two steps due to restrictions of time and financial implications. The completion of the complete project will be divided over two years. This will allow the organization to spread the cost of equipments over several budget cycles and support careful evaluation and problem solving. The final step of the project requires more investment in time and has high financial implications. This fourth step will not be included in this written project as its adaptation is not within the timeframe of the project.
Therefore, the rationale for carrying out this project was as follows:

1. The planned change is in line with the strategic plan and goals of the organization (Cervone, 2011);

2. The change leader is responsible for ensuring medication management is in line with best practice (HIQA, 2007; ABA, 2007);

3. Medication management is very important component of the care process. This is particularly so for the older population as older people are extremely vulnerable to adverse effects of medication errors (Kosh et al., 2010).

1.4 Summary

Medication management is a complex process, and older people are at higher risk of medication misadventure than other groups due to a variety of reasons. The implementation of the medication process requires the cooperation of various healthcare professionals including the G.P, the pharmacy service and nurses. The period of time spent by nurses on each shift dealing with the various aspects of medication management equates with 40% of their working time (Armitage & Knapman, 2003). This change project was carried out to reduce medication errors, to ensure national standards of medication management, to improve efficiency and to positively impact on the safety and quality of care received by residents in the organization.
Chapter 2
The Literature Review

2.1 Introduction
Against a background of rapid technological development, a growing knowledge based workforce and the shifting of accepted work practices, change is becoming an ever-present feature of organizational life (Burnes, 2004). Change must be effectively managed as up to 70% of change programmes do not achieve their intended outcomes (Balogun & Hope Hailey, 2004). In response to the increasing importance of organizational change, an increasing amount of literature has been published to comment on the processes of successful change management and to advice on methodological approaches to assure success. In the light of the high failure rate of change projects, change must be well managed, well researched and capable of flexibility to adapt to changing circumstances as the project progresses.

A search of the relevant literature was conducted through Pub med, CINAHL, Emerald, MEDLINE, Google Scholar and INMO resources. Search terms used were medication errors, contributing/etiologic/risk factors, medication safety, medication management, nursing homes, healthcare technology, bar coding and electronic medication administration. The aim of this literature review is to demonstrate how it connects with the practicality of this project, to gain knowledge of the reasons for failures and to strengthen the reasons why this change project is valuable and should be implemented.

Most of the literature appropriate for the study is available online from nursing, healthcare and management journals, for examples, *Journal of Nursing Management*, Journal of Nursing Administration, International Journal of Medical Informatics, Health Science
Journal, and Journal of Organizational Change Management. Pub Med and Google Scholar proved to be useful sources for additional information on informatics terminologies.

2.2 Residential care facilities in Ireland

Aging of the population is a global phenomenon. Reflecting a worldwide phenomenon, Ireland has an aging population (appendix 1). Worldwide, the number of people aged 60 years or over is predicted to treble to 2 billion by the year 2050, with the proportion of the world's population aged over 60 years old increasing to one in five (United Nations, 2010). Within the population of Irish older people, ninety four percent live in the community with the remaining six percent residing in some form of communal care (CSO, 2012). Since July 2009, the Health Information and Quality Authority (HIQA), an independent body established under the Health Act 2007, has responsibility for the registration and inspection of all residential care services for older people in Ireland (HIQA, 2009). Leaders, especially nurse leaders now face increasing expectations to deliver the necessary changes in the culture of long-term residential care. This is more than appropriate as the population in such care is the frailest and most vulnerable of older people.

Residential care facilities are known by a range of terms such as care homes, nursing homes, residential aged care facilities and long-term care for older people. The need for residential care for older people arises for many reasons (Spilsbury et al., 2011). It may be a result of an acute episode where the older person requires ongoing care for a period to allow full recovery, or the need for end of life care, or due to chronic illness where there is a reduction of functional and cognitive ability to the extent that independent living is no longer possible. Other factors such as age, home support, and geographical supply and demand can influence admissions to residential care (Wren et al., 2012). The change
agent’s work facility encompasses all of the above categories including specialist dementia care services as well as a unit for adults with physical disabilities who are under 65 years.

2.3 Medication Errors

The definition of medication error, for the purpose of this project, is adapted from the American National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP). The definition is that “Medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer. Such events may be related to professional practice, healthcare products, procedures, and systems, including prescribing, order communication, product labeling, packaging, nomenclature, compounding, dispensing, distribution, administration, education, monitoring and use” (NCC MERP, 2005).

Medication errors, defined as any error in the prescribing, dispensing or administration of a drug whether there are adverse consequences or not, are the single most preventable cause of patient injury (Weingart et al., 2000). These errors can occur at any stage in the drug use process from prescribing to administration to the patient. In 2000, the Institute of Medicine (IOM) released a report focusing on patient safety estimating that 44,000 to 98,000 people die in U.S. hospitals annually as a result of medical errors. Many of these errors involve medications. Morbidity from medication errors results in high financial costs for health care institutions and adversely affects the patient's quality of life (Choo et al., 2010). In a subsequent report, the IOM identified information technology (IT) as one of the four critical forces that could significantly improve health care quality and safety (IOM, 2001).
2.4 Types and causes of medication error

Medication errors are only one element of errors that can occur in health care. Many other medical errors can occur and various classifications are presented, the most used is that published by the Institute of Medicine in an extensive report “To err is human: building a safer health system” (table 1) (Kohn, 1999). Medication errors are a significant component of health care misadventures, and they can be broadly classified as prescribing, dispensing or drug administration errors. In a report by the World Health Organization (WHO, 2009) entitled “Improving Medication Safety”, it is reported that when medication errors happen, healthcare professionals should look for all the contributing factors”, making clear by this phrase that medication errors are a multifaceted problem.

When the task requirements exceed the individual's capacity, errors may result (Monroe & Graham, 2007). Important issues to consider include good physical status (reduction of stress or fatigue). This is also mentioned in a cross-sectional survey by Mahmood et al. (2011) as a factor that may lead to medication error. Benner et al. (2002) examined 21 fatal cases of nursing errors and their taxonomy revealed eight categories including the category of medication error. It is frighteningly worrying that eight out of 21 cases died as a direct result of a medication error. Various reasons for the occurrence of medication errors were cited including failing to follow a step of the medication procedure, misunderstanding of the verbal order by telephone and pharmacy errors. Studies by Kim et al. (2011) and Tang et al. (2007) mentioned the variable ‘personal neglect’ in the top five contributing factors of medication errors.
<table>
<thead>
<tr>
<th>Types of errors following IOM (Institute of Medicine) approach.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diagnostic</strong></td>
</tr>
<tr>
<td>: Error or delay in diagnosis</td>
</tr>
<tr>
<td>: Failure to employ indicated tests</td>
</tr>
<tr>
<td>: Use of outmoded tests or therapy</td>
</tr>
<tr>
<td>: Failure to act on results of monitoring or testing</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
</tr>
<tr>
<td>: Error in performance of an operation, procedure, or test</td>
</tr>
<tr>
<td>: Error in administering treatment</td>
</tr>
<tr>
<td>: Error in the dose or method of using a drug</td>
</tr>
<tr>
<td>: Avoidable delay in treatment or in responding to an abnormal test</td>
</tr>
<tr>
<td>: Inappropriate care</td>
</tr>
<tr>
<td><strong>Preventive</strong></td>
</tr>
<tr>
<td>: Failure to provide prophylactic treatment</td>
</tr>
<tr>
<td>: Inadequate monitoring or follow-up of treatment</td>
</tr>
<tr>
<td><strong>Others</strong></td>
</tr>
<tr>
<td>: Failure of communication</td>
</tr>
<tr>
<td>: Equipment failure</td>
</tr>
<tr>
<td>: Other system failure</td>
</tr>
</tbody>
</table>

Table 1: Types of medical errors

The clinical environment is very busy and complex. Interruptions and distractions in workflow are constant. These occur when a nurse is performing an intervention and, before finishing with it, another task arises (Karavasiliadou & Athanasakis, 2014). Petrova (2010) and Ozkan et al. (2011) attributed medication errors primarily to the factor of distractions. Knowledge of why medication errors occur is important so that remedies can be found. This knowledge can be gained by data gathering information about medication errors. Knowledge gained through analysis can assist in bringing about solutions to the problem of medication errors. Data gathering strategies include retrospective chart review, performance monitoring, anonymous incident reporting, event audit and analysis of complaints and litigation (Rubin, 2003). The building of a no blame culture of non-punitive management of medication errors may encourage voluntary reporting in order to fully understand why errors occur. Zane et al. (2008) argue that health care workers may not report due to fear of repercussions.
2.5 Medication supply systems

Monitored Dosage System (MDS) are in widespread use in nursing homes. These systems comprise of a system where the medications for an individual resident is packed for one month. Some reports show that it is easier for staff to administer medications safely and systematically. However others have expressed more negative opinions about the MDS approach (Appendix 2) by raising concerns about its safety. In the MDS, tablets could not be identified easily, there was no replacement tablets if medication was dropped, there was a risk of secondary dispensing errors, potential hygiene existed because of problems of reuse of packaging and the system encouraged staff not to look at the label of the medication (NHS, 2011).

In contrast, Bar-code based medication administration systems have the potential of reducing medication errors by confirming that the correct medication is being given to the correct patient at the right time. The research study of Szczepura et al. (2010) showed that the bar coding was very effective in reducing medication errors in a large number of care homes. During a medication round, the user first scans each resident's bar code identifier using a hand-held device to ensure the correct drug file is recalled and to visually confirm identification of the resident. The user then scans each dispensed item prior to administration. The system carries out a number of checks based on both bar codes to ensure the following are correct (1) resident, (2) medication, (3) time, (4) dose, (5) quantity and (6) in date. If administration is outside any parameter, the system alerts the member of staff immediately to the potential error. If administration of medicine within the correct time window lapses the system enters this as a 'missing record'. The system records all deviations between the medications as prescribed and that finally administered.

Bar-code systems linked to electronic medication administration records (eMAR) have
been shown to completely eliminate transcription errors (Poon et al., 2010). The system incorporates several technologies into the nursing work flow to ensure that the correct medication is administered in the correct dose at the correct time to the correct patient. With the bar-code eMAR, medication orders appear on the patient’s electronic record once the pharmacist has approved them.

The Bar-code system and eMAR sheets linked to a pouch supply system is one of the latest innovations for packaging medications. These pouches are produced by an automated packaging machine (appendix 3) and they are secure, tamper-evident and fully identified for both patient and medication information. They have extensive labeling on each package and are bar coded. The pouches are provided in a Pouch Porter (appendix 4) which is a secure, organized, easy to use storage system that saves nursing time when administering medications. The manufacturers maintain that nurses feel safe, accountable and efficient with a system that is easy to use.

2.6 Best practice in medication management

Medication errors can be prevented by alterations in the system for ordering, dispensing and/or administration of drugs.

Other methods of minimizing prescribing errors include:

• Ensuring knowledge of a drug before prescribing
• Ensuring an accurate drug history is taken
• Printing the drug name and patient details clearly on the prescription
• Including all details of drug therapy i.e. name of drug, dose, directions, duration of therapy
• Not leaving a decimal point “naked”. A zero should always precede expression of values <1 e.g., 0.1. Ten-fold errors in dose have occurred due to the use of a trailing zero.
• Avoiding the use of abbreviations e.g. AZT, ISMN, FeSO4, U
• Being aware of sound-a-like products (Cohen, 1999).

Information published by the Pharmaceutical Society of Ireland for pharmacists on how to deal with dispensing errors (PSI, 2008) includes:

• Ensuring a safe dispensing procedure
• Using different brands or separating products that look-a-like
• Focusing on the task in hand, keeping interruptions to a minimum and maintaining their workload at a safe and manageable level
• Being aware of high risk drugs e.g. Potassium chloride, cytotoxic agents
• Introducing good housekeeping practices.

Medication administration errors occur frequently and are more likely to result in serious harm and death than other types of medication errors (National Patient Safety Agency, 2009). Drug administration errors may be minimized by the following:

• Checking the patient’s identity
• Having dosage calculations checked independently by another healthcare professional before the drug is administered
• Having the prescription, the drug and the patient in the same place so they can be checked against one another
• Ensuring that medication is given at the correct time
• Minimizing interruptions during drug rounds (Copping, 2005).

Policies on medication safety are necessary to facilitate consistent medication administration practices and support staff in providing safe, high quality care (Choo et al., 2010).
2.7 Use of Generic medicines

The generic name is the name of the active ingredient in the medicine that is decided by an expert committee and is understood internationally. The brand name is the name given to a medicine by the pharmaceutical company that makes it. Generic medicines are safe copies of well-known medicines. The Irish Medicines Board (IMB) reviews the safety of all medicines and decides if medicines are interchangeable (IMB, 2014). A new pricing system has been introduced by the HSE called the reference price. This means that the HSE will pay one price for a group of interchangeable medicines (HSE, 2013). Reference Pricing is being introduced one medicine at a time, so not all people, or all medicines, will be affected at once. The Irish Medicines Board started to publish an Interchangeable List of products from August 2013 with atorvastatin (Appendix 5). Recent research published by the Economic and Social Research Institute (ESRI) shows that already more people are choosing generic medicines in Ireland (Brick, 2013). This will hopefully reduce the cost of medication to both the government and the consumer without any reduction in quality.

2.8 Health Technology and Information

Health technology and information systems are defined by Szydlowski and Smith (2009) as the technology used within a healthcare organization to facilitate communication, integrate information, document healthcare interventions, perform record keeping and support the functions of the organization. Leaders in 2020 will require the ability to integrate technology with mobility and portability of relationships, interactions and operational processes (Huston, 2008) and to create an organizational culture that recognizes quality healthcare and patient and staff safety as paramount. The healthcare industry is under increasing pressure to utilize information technology (IT) in an effort to reduce process inefficiencies; control spiraling healthcare costs, and improve the quality of patient care (Edwards et al., 2008).
Information technology (IT) has the potential to improve the quality, safety, and efficiency of health care. With the arrival of IT, computerized medication management systems have the potential to become the foundation of medication error prevention. The paper based system of physician orders and medication administration carries a particular risk of human errors (Hersh, 2002). Traditionally, nurses have been responsible for the coordination of patient management. Therefore, software development teams must collaborate with nurses during the design, development and testing of an electronic medication system. This knowledge forms the foundation for clinical judgment and accurate and efficient administration of medication (Kirk et al., 2005). Nurses can locate important system weaknesses and, therefore, allow the development of tailored interventions (McBride-Henry & Foureur, 2007).

Having integrated electronic management, tracking, and physician order entry tools can make it easy to communicate warnings and other information to providers. In healthcare, the goal is to utilize IT so that providers can make sure patients receive the highest quality of care and best outcomes while improving operational efficiencies and costs in the healthcare system (DePhillips, 2007). Healthcare experts believe that the use of IT offers the industry tremendous potential for resolving some of its most important problems, namely the rising number of medical errors, poor health service quality, care fragmentation, and limited access and integration to patient information (DePhillips, 2007).

2.9 Bar code assisted Medication administration system (BCMA) and Electronic Mar sheet (eMAR)

The use of BCMA to improve the accuracy of medication administration at the point of care seems particularly promising to achieve the previously discussed outcomes. However, the implementation of BCMA has proved challenging, with fewer than half of nonfederal US
hospitals having adopted this technology (Pedersen et al., 2013). Published research substantiating the efficacy of BCMA in decreasing the frequency of medication errors is limited (Hassink et al., 2013).

Evaluation studies of computerized physician order entry (CPOE) implementation in hospitals in the 1970s and 1980s by Aarts at al. (2007) reveal economic savings and better patient outcomes in terms of reduction in length of patient stay. The evaluation also demonstrated an improvement in the quality of medication orders in terms of legibility, completeness, and decreased of transcription errors. Additionally, studies by Collin et al. (2008) that focused on medication errors and poor drug incidents conclude that CPOE significantly decreased medication error rates and increased medication safety and care quality.

BCMA-eMAR systems require that mobile medication trolleys with thin client computers and tethered scanners are provided for each staff member who administers medications. All pouches of medications for each resident will have machine-readable bar codes. Electronic scanning is the process of using an electronic device to read the medication bar code and interpret data using software to validate the accuracy of medication against medication identification and strength (Heather et al., 2014). BCMA-eMAR systems electronically capture events and provide reports that can be used to develop improvement plans. Such a system still contains an inherent possibility of error and, for example, the BCMA-eMAR does not prevent a medication that should be administered intravenously from being administered orally. However, Poon et al. (2010) assessed the rate of errors before and after implementation of bar-code and eMAR, findings showed use of bar-code eMAR reduced errors significantly. The change agent's organization is willing to invest time and revenue to achieve such a goal.
2.10 Resistance to Change

All humans go through five stages of ‘grief’ (denial, anger, bargaining, depression and acceptance) when faced with a loss or change even when the change has been viewed as relevant and required for positive organizational change. Wiggins (2009) emphasizes the importance of good communication and support during the period of change, which she suggests should be tailored to the stage of change that the employees have reached. After the news of the change is delivered, employees need to be given information to tackle the denial that they may feel of the need for change. Once the information has sunk in, and they experience anger, bargaining and depression they require various kinds of support. A clear future vision may help employees come to an acceptance of the situation so that they can commit to an improved future.

Oreg (2006) found personality and the context of change influence the resistance to it and the change process. Employees resist changes because they judge them to have an unwanted outcome. A top-down change management approach would not work effectively because it may lead too much resistance amongst the employees.

Benham-Hutchins (2009) believes that the incorporation of change management strategies, such as participation by stakeholders during the implementation process, is a critical component of an effective IT system implementation. Open communication is a key change management strategy that helps stakeholders in the process of change and decreases the resistance and anxiety that often accompanies change. Although technology based solutions have been shown to reduce medication administration errors, they will only be embraced by staff if they are reliable, easy to use and do not add significantly to staff workload for a particular task.
2.11 Summary

In this chapter, the change agent has defined medication errors and discussed issues surrounding nursing homes, health technology, bar coding, eMAR sheet and resistance to change. All residents are potentially vulnerable to the effects of errors. Each healthcare professional shares a responsibility for identifying contributing factors to medication errors and for using that knowledge to reduce their occurrence. IT systems are key components of a multifaceted management strategy to prevent medication errors and improve patient safety (Agrawal, 2009). Leaders and managers must effectively respond to the requirements of all standards and legislation. Any system must also comply with these requirements. The developed system must also enable the building of competence in employees as well as meeting the expectations of the employer to achieve safety, efficiency and productivity.
Chapter 3
Methodology and Methods

3.1 Introduction
Marquis and Huston (2009) suggest that most healthcare organizations find themselves undergoing continual change directed at organizational restructuring, quality improvement and employee retention. Today's healthcare leaders occupy an extremely challenging position to maintain a competitive edge while leading the organization through constant change. The Health Act (Department of Health, 2007) and National Quality Standards for residential care settings for older people in Ireland by (HIQA, 2011) requires all residential care facilities for older persons to change to ensure achievement of the required standard.

This chapter of the project will commence with a discussion on the change process. The change agent will then provide an overview of different change models and the rationale for choosing the change model for this project. The change agent will also discuss the change implemented using plan-do-study-act cycle and the HSE model of change management.

3.2 The Change Process
The process of change implementation is a critical task for all firms that seek to develop and maintain a competitive position in their industries (Burke, 2002). The majority of specialized literature on organizational changes argues that to succeed in the process of implementing organizational changes, certain individual, group, and organizational capabilities are needed that are critical at that moment. Some of those capabilities are related to leadership, teamwork, conflict management, change resistance management, negotiation, and communications management (Burke, 2002; Denis et al., 2001). This
change project is part of a wider process of improvement required by HIQA (2011) to strategically develop appropriate and sustainable resources and to provide continuity and stability in the lives of those in their care. Management of all change requires commitment and adaptation by employees. The change agent is mindful of this and plans her actions to achieve it.

Change management is a process aimed at empowering employees to accept and embrace changes in their current business environment (Hiatt & Creasey, 2010). The change process is a procedure of planning, assessing and implementing the changes to the system (Blokdijk, 2008). The HSE change process helps the change agent to handle all the change requirements in this project, and it can easily monitor the quantity of the change. It is important to go through a systematic change process because it will give a template for management of the project and validated approach to each step involved.

The change agent secured management support and was given the authority to implement the required changes in the medication management system. The change agent viewed involvement of top level management as essential because their support was crucial to the success of the project. They retained the authority for the final decision and also to decide on financial outlay. She shared her thoughts with the Director of Nursing and The Employer who reinforced her findings from her preliminary observations and the previous experience of a failed change process. Accordingly, the initial demonstration of the software system was conducted by IT developers to assure management and the change agent that the system was sufficiently developed for easy adaptation by our organization. The management was impressed with the system and added value by making some suggestions for further improvement. Following our previous experience we did not make too many suggestions for further improvement but we needed to be satisfied with the
quality and applicability of the system. The system developer was able to respond to the suggestions, and this facilitated a sense of ownership within the management team without major work for the developers and we had an assurance that our suggestions were within their scope for achievement. The suggestions offered by the members of the management team proved an advantage to the change agent as it helped her to identify the key people who had a good interest level and who were willing to commit to implementing the changes.

3.3 The Change Models
Models create reality around bundles of related assumptions that help us make sense of the world and act (Kernick, 2004). Iles and Sutherland (2001) carried out an extensive review of change literature and summarized that approaches to change can plan or emergent; continuous or episodic, and developmental, transitional or transformational.

3.3.1 Kotter’s Change model (1996) describes eight steps of the transformational process, insisting that no step can skip without disastrous results (appendix 6). In his model, Kotter organizes each step into three phases: creating a climate for change, engaging and enabling the whole organization, and implementing and sustaining the change. The eight steps are:

• Developing a vision and strategy
• Establishing a sense of urgency
• Creating a guiding coalition
• Empowering broad-based action
• Communicating the change vision
• Anchoring new approaches in the culture
• Generating short-term wins
• Consolidating gains and producing more change (Kotter, 2007).

The model has some limitations as it designed for more corporate setting than that of the change agent’s. In Kotter’s model, although it contains elements for handling the psychological effects created by change, it is not solely devoted to managing the transitions that occur during a change management. Argyris (2000) criticized this model as a command-and-control model. Some questioned the usefulness of the broad-natured action sequences, and their application to unique organizational contexts. Others have suggested a more ‘situational’ or ‘contingency’ approach, arguing that the performance of an organization depends heavily on situational variables. This model employs a strategic approach to achieving a change in the organization other than an intrinsic transition. Another major criticism is the difficulty of evaluating wins (Appelbaum et al., 2012).

3.3.2 Lewin’s model: One of the most influential perspectives within what are known as ‘planned approaches’ to change is that of Lewin (1952) in Elrod II and Tippett (2002). Lewin argued that the change involves a three stage process: firstly, unfreezing current behaviour; secondly, moving to the new behaviour; and, finally, refreezing the new behaviour (appendix 7). The three-step model was adopted for many years as the dominant framework for understanding the process of organizational change (Todnem, 2005). Since its formulation, the theory has been reviewed and modified, with stages being divided to make more specific steps. Despite its popularity, Lewin’s original theory has been criticized for being based on small scale samples (Todnem R, 2005). More importantly the model is based on the assumption that organizations act under constant conditions that can be taken into consideration and planned. It treats planned change from the perspective of top management and indicates that the change is linear. Burnes (2004) criticizes the apparent lack of focus on acquiring buy in from stakeholders given the reality
of conflict and organizational politics. Cummings and Worley (2009) argue that, in reality, equilibrium is never achieved, as a change never ends.

Change is both situational and psychological. Any change is going to impact the individuals involved in change process (Campbell, 2008). No single model will fit all situations that need change so the choice must involve the model that is best suited to the situation. Furthermore, people’s perceptions of change are greatly influenced by their own life experience and world views; thus, consideration of the human and emotional elements of change is fundamental (Shanley, 2007). The change agent argues that a more integrated model, HSE Change Model, takes a non-linear approach to change, makes use of positive and negative feedback loops and recognizes that unexpected behavior patterns can emerge at any stage of the change process.

3.4 Rationale for the change Model selected

The HSE model is both an organizational development model and a step model in that each phase sets out a number of steps for achievement. However, the model has importance for the change agent because of its similarity with her own principles and values, particularly in its upfront emphasis on the people and cultural aspects of change. Recognizing both her personal strengths and her areas for development (Belbin, 1993), she would also acknowledge that the simplicity of the HSE change phases was useful for her in this change proposal.

The change agent selected the HSE Change Model (figure 2) for planning and managing change in her organization. The HSE change model splits into four key stages: Initiation, Planning, Implementation and Mainstreaming. Each stage has a number of different sections within it (HSE, 2008). The HSE model is a traditional model and is influenced by
Kotter’s model. A very good aspect of this model is that it is very flexible, feasible, comprehensive and fits to the organization very closely (Burke, 1994).

![HSE Change Model Diagram]

Figure 2: HSE change model

The HSE change model lays emphasis on the importance of engaging people in the process of change (HSE, 2008). In this model, employees participate in decisions; create feelings of empowerment and providing opportunities for a voice in the planned change. Effective communication with employees increases acceptance, openness and commitment to change (Bordia et al., 2004). This model helps the change agent to follow her own personal approach while working with people assessing the situation, diagnosing the problem and prescribing a solution for the issue in question. This model focuses on the connections, relationships and dependencies between different parts of the system. It promotes learning through regular feedback and evaluation at all stages the change.

In all of the phases of this project, the HSE Change Model was a useful frame of reference. The fact that this model derives from organizational development approach underlines its potential to capture the complexity of change and the fact that this is not a linear process but rather a ‘whole-system’ approach. In the change agent's opinion, this approach is particularly relevant to a process oriented project such as the electronic medication management approach.
3.5 Preparation for the change

With any planned change, some preparatory work needs to be undertaken to predict the relative success of that change. Early identification of triggers will allow a change agent to manage the change pro-actively. In this change project, the PEST analysis (appendix 8) is used to identify the external triggers (Jones & Jenkins, 2007). The external triggers can be political, environmental, economic, technical, legal and social-cultural influences (Dawson, 1994). The Leavitt’s diamond (Voudouris, 2008) explains the internal triggers as technology, people, task and administrative structure.

In this change project, the external triggers are the cost of health care and reduction in source of funding, competitive pressures, current legislation such as HIQA, and change in economic environment. The internal triggers arguably are more of a driving force for this change. They include redesign the daily work pattern, the need for highly functioning care delivery systems, wage rates, incentives, the need to maximize the use of evidence-based best care delivery (Gray, 2001), internet based communications and documentation and creation of transparency and person-centered care. There are more internal triggers including the providers need to raise issues of safety and over-workload, reduction of effectiveness of the current management structure, staff turnover, multidisciplinary approach, effect of other departments, and training to improve performance. Employee’s attitudes towards change and key beliefs (Armenakis et al., 2007) are very important for implementing the change. The change project was executed under the four key headings of the HSE Change Model (2008) as outlined in Figure 2.

3.6: The HSE Change Model

Change is a complex process that can have negative as well as positive outcomes and as such it is worth looking at the available evidence so that the process is conducted as
efficiently and effectively as possible. The HSE change model is a model designed by the National Organization Development and Design Directorate in Ireland to be implemented in healthcare organizations (HSE, 2006). The model is a continuous cycle that ensures proper evaluation of the change and limits the rigid linearity of Kotter’s and Lewin’s models.

3.6.1 Initiation Stage: Preparing to lead the change.

Initiation is an early preparation and scoping step that is meant to create readiness, to establish a sense of shared responsibility, and to make sure of a solid foundation for successful change. As an individual with overall responsibility for coordinating and leading this change project in this organization, the change agent set up a project group in September 2013, representing all staff affected by the change, overseeing implementation and evaluation in each unit. At this step, two meetings were carried out followed by a demonstration of the software system attended by the pharmacy team, management team, G.P, IT developers and one registered nurse from each unit. The following steps were undertaken to lead and drive the change in line with the HSE Change Model:

3.6.1.1 Drivers of Change and Urgency: Identification of what is driving the need for change and the degree of urgency to introduce the software system to reduce medication errors was presented to the project team. The drivers involved the rationale regarding the importance of reducing medication errors thus improving the practice and safety of residents, the other objectives of this project and the vision of the organization. All these topics directed the attention of participants to agree on the project as a priority as soon as possible.

3.6.1.2 Force Field analysis:

A realistic approach must be adopted when facing change and the change agent must
take into account the many and varied forces at play (Bamford & Forrester, 2003). Force Field Analysis is a positioning tool that assists the management of change by examining and evaluating the forces for and against the change (Paton & McCalman, 2008). While driving forces direct behaviour away from the status quo, restraining forces direct behavior to maintain the status quo. For the equilibrium state to change, driving forces must increase, while restraining forces must reduce. The change agent used Force Field analysis (Lewin, 1951) for weighing up the forces working for and against change, and assessing the balance of power between these forces (appendix 9). She used it as a starting point for more in-depth discussions such as cost, resources, resident and family management, regulatory factors like HIQA, timescale, current practice, complexity of the unit, and to reduce the restraining forces. For a change to succeed, the driving forces must be strengthened, and the restraining forces weakened (Bozak, 2003).

3.6.1.3 Key people involved in the change: Identification of key people and stakeholders at different units and departments was undertaken. An authorized team at management level was assigned with a clear mandate for involvement throughout the whole project. The main function of this team was to design, manage and lead the change process. The leadership role of the change agent was communicated to the wider organization. Reed et al. (2009) highlighted the importance of understanding who is affected by the decisions and actions and who has the power to influence the outcome. Stakeholder analysis is a useful tool that enables a change agent to identify the range of stakeholders for a particular project and the degree of their importance and influence for the movement from the current state to the new one. The results of the stakeholder analysis undertaken as a component of this project are set out in appendix 10. This analysis gave direction to the change agent to communicate with each stakeholder and to plan the type, nature and approach to the communications undertaken.
3.6.1.4 The change agent

The change agent is responsible for managing the change effort and must have power to bring about the required change (Daly et al., 2004). The change agent should be a realistic, effective communicator and active listener (Wolf et al., 2011). Furthermore, because of the many different ways in which individuals and groups can react to change, correct assessments are frequently not instinctively clear and require careful thought (Goldsmith, 2003). Change management requires effective strategies and programmes, such as communication, collaboration, empowerment and leadership, to overcome barriers when initiating technological changes.

3.6.1.5 Communication is the cornerstone of success when implementing technological change (Lorenzi & Riley, 2004). The change agent needs to provide adequate information about the change to reduce the stress and insecurity of the staff. She needs to clearly communicate the organization’s vision to the staff and explain how this change will help the staff and the organization. Training is a key communication tool in the implementation process as stakeholder’s share opinions, ask questions, and obtain additional information about the new information systems project (Wagstaff, 2006). More information about the project should be made available, and more opportunities to participate in planning and implementation should be created, to encourage in stakeholders a sense of ownership and familiarity (Wagstaff, 2006).

3.6.1.6 Collaboration ensures a more effective use of individual talents (Kotter, 2007). Collaboration enables the implementation team to understand the importance of dealing with healthcare professionals in system implementation and the strategies needed to create a temporary team of people who are interested in and who support the information system (Goldsmith, 2003). Besides, collaboration is one way of transferring new
knowledge and information (Lorenzi & Riley, 2004).

3.6.1.7 Empowerment: Key individuals responsible for implementing the change must be directly involved and empowered in the project (Benham-Hutchins, 2009). Gill (2011) defines empowerment is giving people the knowledge, skills, self-confidence, opportunity, freedom, authority and resources to manage themselves and accountable for their performance. System buy-in and ownership can be effectively created by empowering the team members with new knowledge. The team members are the stakeholder groups who are most knowledgeable, possess various skill sets, and have existing trust relationships with other staff and providers (Wagstaff, 2006).

3.6.1.8 Leadership:

Great vision without great people is irrelevant (Collins, 2001). That argument demonstrates the importance of leadership in the process of actions to produce effective organizational change. Outstanding leaders are focused on an articulating vision by keeping the focus on change and gaining support of others by inspiring them to be positive in a change situation (NHS, 2006). Transformational leaders create shared organizational positive affective responses to change when they convey an organizational vision in such a way as to inspire hope and optimism (Connelly et al., 2002). The change agent must lead proactively, recognize her responsibility, give stimulus to get a response and not use blame when conditions are less than favourable.

The change agent passed her enthusiasm on to others and so took crucial responsibilities in the change programme. She took responsibility for managing the change effort and had the power to bring about the required change (Daly et al., 2004). She knows the organization and understands the culture that helped her to identify with the needs and
aspirations of the people in the organization.

3.6.1.9 **Readiness of the organization**: Readiness to embrace change is closely aligned to organizational culture and the nature of relationships between people, teams and services. The change agent assessed the readiness and capacity for receiving and accepting the change from the current state to the expected one through the HSE assessment template (appendix 11) and team meetings. It revealed the need for assistance and support at the level of the units including available equipment, training and education, effective communication with external and internal stakeholders, financial and IT support. The HSE assessment template for readiness shows the importance of changes required in organizational culture. This assessment was important to assist the planning process when leading and delivering the change.

3.6.1.10 **Organization politics**: Political and power dynamics can have a positive or negative impact on the success of change in the organization. Frequent healthy communications were noted as necessary in the organization regarding the need and benefits of this change. As the change agent is a member of the organization for a number of years, she knew the culture very well and the relationship between the people that assisted her to plan the change and to manage the concerns and resistance of this change. Additionally, she created a supportive culture of partnership with the pharmacy team through regular meetings and the building of positive relationships.

3.6.1.11 **The power/interest matrix**: The change agent used the Power/Interest Grid (appendix 12) for Stakeholder Prioritization (MindTools, 2006-2011) for analyzing the stakeholders affected by this change. She made a conscious effort to understand the politics in the organization and the interpersonal relationships amongst the team members
such as Director of Nursing (DoN) and General Manager (GM), both of them were in a position to influence other members. The Clinical Nurse Facilitator (CNF)/change agent was seen as the overall lead in the team and was directly responsible for supervising the team. The positional power of the change agent within the organization contributed to the ease of access to these two influential team members and likely added a dimension of mutual benefit to these interactions.

3.6.1.12 **Opportunities to enable the change:** This step helped to scan the environment continuously to identify where change in one part will produce a knock-on effect somewhere else in the organization. It assisted to build up relationships that assisted the change agent to identify the areas that need more training and the leaders who have high knowledge and interest in this change. The completion of SWOT analysis (appendix 13) helped to pre-empt challenges and opportunities within the organization. Due to the strong alliances and relationships of the team members and the change agent, there were small, but important, innovations related to daily medication management undertaken in the organization before starting this major change. It included erecting post boxes for scripts in each unit, storing an emergency stock of medications including end of life care medications, new medication error/ near miss report form (appendix 14), updated policy and emergency phone number for access to the pharmacy after working hours.

3.6.1.13 **Impact of change:** In order to gain insight into the possible consequences of the project, a generalized assessment on the impact of change was completed by the team. It noted that considerable training was required before this change. Audit of medication error reports (appendix 15) and near miss reports (appendix 16) was undertaken for the whole organization. The audit was completed by categorizing each medication error in the medication error report forms. The change agent divided the errors and near misses into
three groups such as Pharmacy, G.P and the nursing staff for evaluating the project outcome so that comparisons could be made between the before and after scenarios. Audit is considered the best method to ensure a high standard, and regular audits have been reported to reduce errors and improve practice (Griffith, 2004).

**3.6.1.14 Intended objectives and outcomes:** The information gained from the impact assessment assisted in clarifying and outlining the change aim and objectives, presented in chapter 1.

**3.6.1.15 Resources:** A preliminary resource assessment was completed identifying sources of appropriate support, guidance and expertise from IT to ensure the success. Training was paramount to achieving objectives, and this resource could be provided in the organization by the software developers. Additionally, a review of the medication management policy was vital for this change. The change leader and the project team reviewed the software system with suggested changes in consultation with the IT developers as they could advise as to what was possible and achievable. It was a pivotal step towards success as the previous failed electronic medication management system stumbled because the developers were unable to deliver the requested improvements suggested by the management team despite promising that they could.

**3.6.1.16 Business case for change:** This stage helped the change agent to determine what she will pay attention to and plan for so that she will not miss any key points of change. The change agent had been spending more time thinking, communication and engagement with stakeholders at this stage. She completed the preparation for leading the change by convincing management of the urgency of the need for the change and that continuing with the old way of doing medication management was no longer an option.
Her argument was that reducing medication errors and using time efficiently could not be achieved by staying with the original process. As a leader, the change agent is aware of her role and she sought to develop the team including opinion leaders to help her to make the change happen. The software system allows the integration between the pharmacy, G.P and the nursing home thereby helping to improve medication management. As our pharmacy was an early innovator in developing this system, it assured us that it had followed the regulatory and legislative framework and HIQA standards. This gave us added confidence in the appropriateness of the change.

Meetings were held with the employer (provider), DoN, the first line management team and the Clinical Nurse Managers (CNM’s). As to be expected, there was a mixed reaction. Some were open to and welcomed the proposed change while others were more reserved and a little hesitant. Questions were encouraged and answered fully. The change agent listened to the concerns highlighted. A presentation of the software system (appendix 17) was made to all CNM’s and encouraged questions and suggestions. Most of them showed interest in the new change, at the same time, showed their stress at another change being suggested. In order to achieve success, each change project must have a certain level of ‘buy-in’ from all those involved i.e. stakeholders (Kotter, 1996).

3.7 Planning: Planning is undertaken to determine the specific details of the change and to create a broader support for the planned change. It focuses on building commitment, energy and capacity to change. The change agent strove to demonstrate more visible action by increasing participation and engagement in the change process. The change agent needed to communicate the vision for change with stakeholders start to assign roles to individuals and identify key performance and quality measures (HSE, July 2008). Planning includes three steps.
3.7.1 Building commitment: This step of the planning stage is an essential step that deals with resistance to change and transforms the resistance into commitment. Opportunities were provided to contribute ideas, views and solutions to problems emerging from the whole system approach. SWOT analysis of the change project was helped to review of the organization’s major internal strengths, weaknesses, together with an assessment of those opportunities and threats in the external environment which could make an impact on the introduction of the software system. Internally the organization had many strengths but primarily the strength was from a highly motivated staff.

3.7.2 Determining the detail of the change: The change agent communicated the vision of the organization with the team and all staff involved with this change. Emails were effectively used by the team to inform staff of planned meetings and other information. The change agent assessed the gap between the current situation and the vision through observation and interviews. She found that the team needed to find out more information about suitable equipment such as script printers, electronic tablet devices and evidence of acceptance of electronic signatures. She allocated a team to visit an organisation where the system was already active. The change agent visited and observed the system and management in another nursing home and discussed the system with the DoN outlining the thoughts and experiences of the staff using the system.

3.7.3 Developing the implementation plan: At this stage, the implementation details are specified, such as the sequence of the actions required for the next stage, the people responsible for each action and the time frame for completion. A detailed implementation plan was outlined (appendix 18) with details of sequenced actions and the time frame for completion. Initial objectives were revisited to ensure validity to continue the
implementation. The implementation plan impact was assessed by completing the HSE impact assessment template (appendix 19). Based on the information from the assessment, it should be possible to assess the impact on the existing organization, services, teams, staff and service users.

The project team and the change agent allocated the staff in each unit to upload the resident profiles and Kardex (appendix 20) into the system before the implementation date. The pharmacy team was fully dedicated to supporting the staff by demonstrating the process of uploading the details. Kardex and mar sheets (appendix 21) for all residents in the unit were printed out with all HIQA standards and kept ready on the day before the planned start date of the new medication system.

3.8 Implementation: This step focuses on implementing and monitoring the plan to ensure that it is meeting its purpose. The change agent must actively attend to what is happening in the organization as it is undergoes change. She should monitor the external and internal triggers in order to adapt appropriately and she needs to show leadership qualities such as flexibility, adaptability and responsibility to keep the change process on track (HSE, September 2006).

Following initiation and planning, the organization was equipped to implement the software system, attending to factors supportive of the longer term sustainability of the change. In this stage, the change agent implemented changes by using PDSA cycle. Stewart’s Plan-do-study-act (PDSA) cycle is useful to guide effort and steps in the change process. He recommended that these four processes be rotated constantly with quality as the top criterion (Graham, 1995). The PDSA cycle (see figure 3) is used for rapid cycle improvement, aimed at making positive changes in steps of the project. The rapid-cycle
aspect of PDSA begins with piloting the software in one unit and following this by examining results and responding to what was learned through problem-solving and making adjustments, after which the next PDSA cycle will initiate in another unit.

![PDSA cycle](image)

Figure 3: PDSA cycle

On September 30th 2013, the software system of medication management with supported documentation was started in two units where all staff received training in all elements of the change. The change agent and two other team members closely monitored the impact of the change on staff. Support was offered by being on site in the units to reinforce the new way of medication management and to monitor and coach as required while being mindful to empower staff to undertake the processes involved themselves when they demonstrated confidence in their abilities. The feedback was excellent, and the team work was fantastic. The change agent and the team continued the implementation of the system in other units on a weekly basis and the implementation was completed within one month. In the next two months, the change agent and team monitored, supported and evaluated the change initiating minute changes as required in a number of processes.

In January 2014, training to all staff for the Pouch delivery system started. The feedback of training was very good as the staff had overcome the shock and denial stage of change
completely after the first step of change (Nortier, 1995). They fully acknowledged and adopted the change as the vision of the organization and the increased efficiency and ease of use was evident to all. In January 27th, the second of change, implementation of the pouch system started in two units with the full support of pharmacy team. The change agent and the team continued the implementation of the pouch system (appendix 22) in other units on a weekly basis again with the full support of the pharmacy team. The PDSA cycle was again used and the implementation was completed successfully within one month.

The change agent focused on assisting staff with their reactions to change, both positive and negative during the implementation so as to yield long-term benefits, build allegiances and identify resources for future changes. Communication with staff continued during the implementation stage until the new practices became part of the culture. Shirey (2011) identifies teamwork, regular reviews and feedback mechanisms as elements for achieving successful implementation.

3.8.1 Culture: The change agent acknowledged openly the personal challenges of change and supported a cultural norm of tolerance and continuous learning. McAuliffe et al. (2006) have described the concept of organizational culture as, when people typically say ‘this is the way we do things around here’. A longer-term change in an organizational system will not be effective unless there is a change in the culture or unless the culture is consistent with the identified changes required. The staff found it easy to adjust to this change as the organization has a strong background of success in other previous projects albeit a significant failure had occurred with the earlier planned electronic medication management system. The change agent used the Competing Value Framework (Quinn et al., 1991) to assess the culture. The organization has all four cultures, but Internal process and
Rational goal are more dominant. The change agent suggests that the organization needs to aim to improve the Human relations and Open system to increase staff morale.

**3.8.2 Training:** In September 2013 and January 2014, training was delivered to all nurses in approximately 2 hours related to the software system and the pouching system. Due to challenges for some staff in using technology, a further one to one training was provided to ensure the best possible outcome and to empower the less technologically able staff to feel confident and comfortable in administering and managing the medication processes. The change agent evaluated the training given to the staff as discussed in chapter 4.

**3.9 Mainstreaming:** This refers to integrating and sustaining new ways of working and supporting the use of new skills and practices in our everyday activities (HSE, 2008). When considering how to implement change it is important to plan for how change will sustain for the long term (National Institute for Health and Clinical Excellence, 2007). It focuses on the success of the change effort, sustains new ways of working, evaluation and continuous improvement. It includes two steps.

**3.9.1 Making it ‘the way we do our business’:** The healthcare environment is always changing; staff move on, services may change, and organizational priorities may shift. The change agent focused on strengthening relationships and connections with staff, management, G.P, and pharmacy team in order to enable change to be sustained over the longer-term and to continue to build commitment. The project team ensured that the new changes in medication management were incorporated with protocols, policies and guidelines to support transition to mainstreaming.

**3.9.2 Evaluating and learning:** This step in the change process focused on the methods
to evaluate and learn from the change undertaken and to identify possible improvements in the process. Communication and engagement processes were kept at the same pace throughout the process so that effectiveness could be successfully evaluated. The change agent explained about evaluation and feedback in Chapter 4.

### 3.10 Summary

This change project involved implementation of a software and pouch system to support medication management in a nursing home. This chapter reviewed different models of change. It outlined the HSE change model chosen, and the actions undertaken following the steps of the change model chosen. The change project was successfully implemented and evaluated. Strong and committed leadership is important in making significant quality improvement, to ensure effective use of financial resources, to provide administrative support and to emphasize safety as an organizational priority. The transformational leader will be able to develop effective quality improvement by setting direction through the mission, vision and strategy of the organization. This will be achieved by establishing a foundation through a new paradigm, personal readiness and relationships, generating ideas, and executing change (Ransom et al., 2008). It is necessary to conduct a detailed evaluation to determine if the change made an improvement in the organizational processes and if it achieved the stated objectives. The next chapter will discuss the evaluation of the change project.
Chapter 4
Evaluation

4.1 Introduction
Evaluation of change is fundamental to the change process to assess whether or not the change is working in practice. Lazenbatt (2002) defined evaluation as a method of measuring the extent to which an intervention achieves its stated objectives. Evaluation helps to determine the effectiveness of the interventions and its contributions for the improvement in programmes (Green and South, 2006). It helps to determine whether quality and safety have increased, whether training is effective, and whether the change is acceptable to the stakeholders. The evaluation in this project needs to be multifaceted. This chapter outlines the evaluation approach undertaken with this change project and outlines its findings.

4.2 Evaluation methods and tools
Evaluation is perceived as useful if it aids in decision-making for further and future development activity. In broad terms, evaluation is sometimes categorized into three types: process, outcome and impact. Khandker et al. (2010) agree that there are two types of evaluation methods, namely, qualitative and quantitative. Qualitative methods emphasize the perception, feelings, and reactions of individuals and quantitative methods focus on numbers, relationships and experiments.

Khandler et al. (2010) stated that a mixture of both a qualitative and quantitative approach is useful in gaining a comprehensive view of the projects effectiveness. Evaluation methods for this project were based on the project objectives. Due to the nature of this project several evaluation methods, using both qualitative and quantitative approaches,
were used which included questionnaires, pre and post implementation audits, observation and interviews.

4.3 Quantitative methods

4.3.1 Observation: Observation is the most powerful method to accurately detect medication administration error. After the observation, the observer then cross-referenced with the medication management policy of the organization. The change agent integrated the process of evaluation and measurements (Glenaffric, 2007), a system thinking and methodological tradition (Checkland & Scholes, 1999) in the observation evaluation. This approach helped her to focus on what she might specifically want to know (table 2). She used the Medication Management Competency Assessment during Drug Rounds (appendix 23) and audit of medication stock (appendix 24) for this evaluation. The results identified some issues and also gave an excellent opportunity to educate the staff on a one to one basis. These assessments, now routine in the organization, will be conducted on six monthly basis and has emerged as the single most useful tool for quality maintenance and improvement in medication management. It demonstrates the synergistic effect change can have and how the use of the PDSA cycle involving staff members can benefit the organization by integrating a one off evaluation into a planned ongoing quality improvement tool.

<table>
<thead>
<tr>
<th>Evaluation Type</th>
<th>Suggested questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Evaluation</td>
<td>Does it work? (efficacy)</td>
</tr>
<tr>
<td></td>
<td>Is resource use minimized? (Efficiency)</td>
</tr>
<tr>
<td></td>
<td>Does it attain longer term goals?</td>
</tr>
<tr>
<td></td>
<td>Is it pleasing to use? (Elegance)</td>
</tr>
<tr>
<td></td>
<td>Are there any ethical/legal/safety issues for those who are involved?</td>
</tr>
<tr>
<td></td>
<td>To what extent are the desired changes to occur? For whom?</td>
</tr>
<tr>
<td></td>
<td>What are the potential barriers/facilitators?</td>
</tr>
<tr>
<td></td>
<td>What is most appropriate development activity? (Effectiveness)</td>
</tr>
</tbody>
</table>

Table 2: Evaluation questions
4.3.2 Audits of medication error reports and Near misses: Pre and post implementation audits of medication errors were completed to determine the effectiveness of the new change in medication management. The project team reviewed the medication error report form by referencing ABA (2007) guidelines on medication management and organization policy. The data for this report was gathered by means of an audit of medication errors (figure 4) and also an audit of near misses of medication management (figure 5).

![Audit of medication errors](image)

Figure 4: Audit of medication errors
An audit of the Kardex and mar sheet was less expensive and has proved to be useful in detecting prescribing errors and near misses in recording of medication administration. In this data collection, the change agent checked the near misses and medication errors due to incomplete resident profile, wrong time and frequency, failure of record the route of administration in the kardex, and mar sheets with unsigned administration columns. To determine the impact of the change, the change agent analyzed pre implementation data, data during the implementation and post implementation data. The barriers in data collection include incomplete information, fear of disclosure, resistance from staff, and uncertainty about whether the data would be useful.

The analysis of data collected shows that the medication errors and near misses were high during implementation, and it was challenging for a change agent and team members. She reassessed the situation very closely, and found that the deteriorating situation happened due to lack of knowledge in technology, poor communication, wrong administration and interruptions of the nurse during the process of administration and Kardex preparation. The change agent held an urgent meeting with the clinical team, management, IT developers and the pharmacy team. Training was provided again to each staff nurse with support given to staff by the IT developers as required. The change agent increased the

Figure 5: Audit of Near misses
communication level between staff and team members, G.P and pharmacy and CNM’s provided special attention to the staff who had difficulties with technology. All staff was very vigilant to preserve the safety of residents and to support the pharmacy to cope up with increased demands due to the change.

The post implementation data was collected from the months of February to March 2014. The data shows that one medication error and three near misses occurred within two months. The medication errors reduced from 8 to 1, and near misses reduced from eight to three after the change. It shows that incidents of medication errors improved by 87.5% and near misses improved by 62.5% after the change. The one medication error happened when the nurse gave medication to the wrong resident. The change agent emphasizes that implementing bar coding with eMar will reduce the errors and near misses further when that change is fully implemented and gives her confidence to gain co-operation for that eventual change.

4.3.3 Medication administration time

One of the objectives of this change project was to improve the time required for medication administration because the software system and pouch delivery system would build efficiency into the drug round. The change agent assessed the drug round of one staff from each unit before the change, and she assessed the drug round of the same staff after the change (table 3).
Audit of medication administration time

<table>
<thead>
<tr>
<th>Unit 1</th>
<th>Unit 2</th>
<th>Unit 3</th>
<th>Unit 4</th>
<th>Unit 5</th>
<th>Unit 6</th>
<th>Unit 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication administration time (before change)</td>
<td>55 sec</td>
<td>75 sec</td>
<td>90 sec</td>
<td>50 sec</td>
<td>65 sec</td>
<td>70 sec</td>
</tr>
<tr>
<td>Medication administration time (After change)</td>
<td>50 sec</td>
<td>60 sec</td>
<td>75 sec</td>
<td>55 sec</td>
<td>70 sec</td>
<td>62 sec</td>
</tr>
<tr>
<td>Time saved</td>
<td>5 sec</td>
<td>15 sec</td>
<td>15 sec</td>
<td>-5 sec</td>
<td>-5 sec</td>
<td>8 sec</td>
</tr>
</tbody>
</table>

Table 3: Report of medication administration time

The analysis of collected data shows that one unit improved the time for drug rounds by completing the medication administration within 45 minutes. At the same time, three units took more time than usual for completing the round after the change. The change agent observed that five units took one hour and more for completing the drug round. This evaluation shows that the technology or new supply system did not assist the staff to improve time management. There are many other factors impacting on time management such as staff efficiency for medication management, resident's capacity, dependency and availability of required documents and medication availability and supply. By using this evaluation method, the change agent identified the increased number of disturbances for staff during medication round such as phone calls, reports to the physiotherapist, occupational therapist and management, call bells and assistance required by care staff, residents and household staff. She communicated about this situation to the DoN and further changes are planned for resolution after this change project. It also may be true that the evaluation of the post change time involved was too early as nurses may still be in a learning phase and will become more efficient as time passes. The change agent will repeat the process of evaluation in three months before other improvements in the process take place. It demonstrates a further commitment to the PDSA cycle by acting on additional information received in evaluating the process.
4.3.4 Use of Generic medicines:

The pharmacy team and the organization are almost 100% compliant in using generic medicines for all long term residents as an approach to cost efficiencies to assist the partner pharmacy and as an action to help national cost containment (appendix 25). The change agent faced difficulty with one resident when generic medicine use commenced in the nursing home. That particular resident accused staff such of giving wrong medications as the appearance of the medications was different to what she was use to in the past. The change agent and pharmacist explained about the generic medicines but failed to convince the resident. This is the only resident who insists on use of original brand products equating with 0.85% of the resident population. The overall ensured success rate is therefore 99.15%.

The change agent assessed the financial benefit to the government of using generic medicines, and it shows a small difference only as pharmaceutical manufacturers agreed to lower the price of off-patent pharmaceuticals by 35%. The change agent analyses the Irish Government and Irish medical Board needs to review the situation to develop standardized rules for using generic medicines. However, it is apparent that a national approach towards using generic medications brought pressure on the previous patent protected manufacturers to lower prices.

4.4 Quantitative methods:

4.4.1 Questionnaires: Satisfaction survey of staff nurses were carried out after each step of implementation of this change. They allowed analysis of information obtained from questionnaires that probed for crucial information during each step of the change process. Questionnaires were distributed to staff after each step of implementation including a covering letter outlining time needed to complete the questionnaire (Appendix 26). The
Questionnaire focused on safety, efficacy and easy access of the system. The questionnaires were given to 27 registered nurses after a focused meeting in each unit to discuss the methodology of the survey and 24 registered nurses completed the questionnaires. Results of both surveys are represented by bar charts (figure 6 & 7).

![Responses of staff after 1st step of change](image)

Figure 6: Staff response during the change
The first survey demonstrates staff dissatisfaction with the change and lack of confidence in the new technology. Nurses on night duty mainly gave negative responses because they were not confident with the changed processes. The change agent resolved the tension by arranging one to one training to staff on night duty after the first survey. The survey report after the change shows that staffs were more satisfied and confident subsequently. This is another example of the effective use of the PDSA cycle.

4.4.2 Training evaluation: An evaluation of the impact of the training sessions was performed using the Kirkpatrick model (Kirkpatrick & Kirkpatrick, 2006). It explores four aspects, the learners’ satisfaction, the learning arising from the programme, changes in learner behavior arising from the programme and the impact of the programme (appendix 27). The first level evaluates the trainees’ immediate ‘reaction’ to the training. Level two and three evaluates respectively the ‘learning’ from and ‘behaviour’ as a result of the training programme. Level four evaluates the ‘results’ of the learning acquired in the programme from an institutional and organizational perspective. This evaluation of training
completed by staff is contained in appendix 28. The evaluation results show that the staff was satisfied with the training, especially the one to one approach.

4.4.3 Interview: In order to get feedback of the change consequences from different units, the change agent conducted formal and informal interviews. She conducted the interviews by asking two questions; “Do you like this change and why?” “What will help to improve the change?” The feedback was mixture of positive and negative responses that helped the change agent to evaluate the change. Useful suggestions offered for further improvements as follows: “the system is very good, but we need to have a complete system including prescribing and eMAR sheets.” “Pouch system is excellent because I can see all medicines and labels clearly and there is no need to touch any medicines with my hand.” “I am very interested to see the full system.” The staff showed more interest in the change as they felt that their opinions were valued for this change.

4.4 Summary
The results of the questionnaires and audits have provided considerable information on the benefits of the change project. Based on these findings, it can be concluded that the electronic medication management system is beneficial not only to reduce medication errors but also supportive of staff to develop new skills. At the same time, technology by itself could not achieve a safe medication management. The registered nurses are fully responsible for continuing safe medication management with the help of technology and the pouch system. To clarify if the positive effect could sustain over a longer period a determination of organizational impact is necessary. Chapter 5 will identify the strengths and weaknesses of the project, implications of the change on management, and recommendations for future improvement of the organization.
Chapter 5
Discussion and Conclusion

5.1 Introduction
The implemented change management project is based on the main objective of reducing medication errors and leading the organization to implement a fully computerized documentation for medication management as a first step towards full computerized documentation in the organization. This dissertation outlines the processes involved in the implementation of changes in practice to achieve the desired goal. The project was carried out in a nursing home by using the HSE (2008) Change Model which was used to structure this assignment. The majority of nurses were excited about the change but it required constant communication to be successfully implemented.

The change agent achieved the objectives of this change project by reducing the medication errors by utilizing the system for appropriate doses, frequencies and allergies. The near misses are reduced by improving the safety of medication administration by having the resident’s full medication history and legible orders from G.P. There is 100% compliance with HIQA standards by enhancing the chain of communication between the pharmacy service, G.P. and the organization. The organization is 100% compliant in using generic medicines for all long term residents.

5.2 The strengths and limitations of the project
Top management support and commitment plays an especially crucial role in success (Burke, 2002). The pharmacy team, as external stakeholders, provided good support for this successful change. Szydlowski and Smith (2009) believe that it is common to see a
healthcare organization spend large amounts of money on HIT systems, only to see the implementation fail because of poor change leadership. The most common reason for failure of HIT implementation is that the implementation process is treated as a technological problem alone and the human factors and organizational issues are not fully addressed (Carayon et al., 2009). This change was successful for a number of reasons.

As previously stated, an earlier attempt had failed, and this was a source of great disappointment to management and led to disengagement with the supplying pharmacy. The new company was committed to working collaboratively with the organization to assure success both from a financial, as well as a reputational perspective. The owner of the nursing home was also committed to ensure success and was prepared to assign the change agent to take on the responsibility for successful completion of the project. This project was also a change agent’s change project for her Master’s dissertation assignment. These factors significantly increased the driving forces to bring about successful change.

The success was measured along the change pathway with each step of the project being completed within the estimated time frames. Knowledge gained through study and research encouraged the change agent to strive to adopt and use a transformational leadership style in all dealings with stakeholders including staff, members of the management team and the pharmacy personnel. The change agent kept in mind at all times the need to create and maintain an inspiring vision of the future, motivating people to buy into and deliver the vision, manage delivery of the vision and to build ever stronger trust-based relationships with all involved especially those who would implement the change project (mind tools 2014). This utilization of a transformational leadership style and effective support from the team acted as an enabler, ensuring effective implementation. The initial extra work involved for the nursing staff was justified as there was a future vision of efficiency to save them time, enhanced skill development and the pride involved in
being at the cutting edge of a process within the nursing home sector. This approach was successful against a backdrop of this being the first project of its kind to be undertaken in this particular organization which involved some challenges because of the complexity of the change, a previous failure and the fear involved in the use of technology for some staff. Nevertheless, the staff engagement and commitment supported the changes and facilitated the implementation. Ongoing monitoring by the change agent and the management team also helped to keep the vision and the project on track.

However, as in any change process, a degree of resistance was experienced due to insufficient information and fear of increased workload in an already stressed working environment. Barriers include the cost and complexity of IT implementation, which often necessitates significant work process and cultural changes. People can easily be overwhelmed by change, especially within large organizations, where they may perceive they have little or no voice in or control over the changes that they understand are coming down to them (Lorenzi & Riley, 2003). Therefore, because the normal response is fright or escape, not collaboration, supervisors frequently interpret such human resistance to change as stubbornness or “not being on the team” (Lorenzi & Riley, 2003). The change agent reflected on this, and her own commitment to the vision helped her see resistance as an expected human reaction that could be coached, supported and applauded when that resistance helped suggest valuable solutions to problems that emerged.

One of the limitations of the project was the time scales involved. The change agent has evaluated that more time is required for initiating proper changes in the system before the implementation and ensuring organizational readiness. More time was required to assess existing technology skills for each nurse to avoid exposure of lack of skill especially concerning the age profile of staff and to ensure that all required equipment was available.
before commencement. The change agent would have liked to have been able to complete all stages of this project to submit for the Master’s award, but the organization was not financially ready for the next stage. Also, the change agent believes that this part of the project must become embedded in the organization before staffs are ready to embrace further progression. Building a vision for the next phase is also important as the change agent believes that this part will have the most positive effect on making the process of medication management most efficient and enhancing to the work of the nurses. However, as a transformational leader who has sensitivity to the feelings of employees, the change agent senses an element of ‘change fatigue’. The ILM (2003) describes this, in talking about the need to acknowledge employees’ achievements, as a state of being feeling flat and tired after a period of sustained effort and that it can often seem like an anticlimax. The change agent believes that there can be a tendency to accept the success as a given once it is achieved and wants to work to celebrate this achievement, continue to identify areas for improvement using the PDSA cycle before moving on to the next stage. The next stage of the project involves substantial financial outlay, and this is a big consideration when there are competing issues including the computerization of all nursing documentation to be considered which part of the organizations vision is also.

Zandieh et al. (2008) believe that costs are another important barrier to HIT adoption. While HIT undoubtedly delivers the potential to significantly reduce costs for organisations, it is widely viewed as a major expense in and of itself (DePhillips, 2007). DePhillips further explains that costs come in the form of personnel, software, hardware, maintenance, and ongoing upgrades, which occur regularly into the implementation of HIT. This initiative was relatively cost effective utilizing in house training, manpower and technology requirements. The success in this area will give the owners and the management team the confidence to extend the project to the next stage and a willingness to invest financially in the changes
needed.

The barriers and the challenges experienced throughout the project, although overcome, are also a consideration for further progression. The change agent is aware that HIT implementation may create major disruptions in work flows and tremendous turmoil among care staff during initial stages (DePhillips, 2007). Carayon et al. (2009) report that key hospital staff complained of the increased workload and confusion due to the technical problems, and time pressure associated with EMR implementation. . Aarts et al. (2007) report that the growing shortage of healthcare personnel created stress and anxiety for nurses, clinicians, physicians, and specialists due to their overbearing daily responsibilities and workload before their health organizations decided to integrate HIT to existing work processes. Moreover, resource shortages, such as training and IT support during implementation, and failure to assess the basic computer and software skill set necessary for HIT users are elements identified by Szydlowski and Smith (2009) as key barriers to successful HIT integration. This knowledge will be useful for future planned change and help the organization prepare more effectively for what will be a more challenging future technology adoption.

According to Lorenzi and Riley (2003), IT implementation failures are caused by many reasons outlined in four major categories: technical shortcomings, project management shortcomings, organizational issues, and the continuing information explosion. The organization will need to ensure that investment costs are justified by improved readiness for the next phase of the change.

5.3 Implications of the Change for Management

In order for change to be successful, buy in from management is important as this
facilitates the creation of a guiding coalition (Kotter, 2007). Implementation of electronic medication management within the organization is a priority for management, as it clearly aligned with safety of residents and quality of service. The management perceives the change as an improvement that will enhance the practice within HIQA standards, ensure safety of residents, expand the organization’s competitive edge and maintain the organization’s status as an early adopter of cutting edge technology.

The electronic medication management system made it possible for the management to coordinate their activities with the G.P and the pharmacy much better than before and enhance the overall resident care provided by them. Improving formal and informal connectivity with the pharmacy and the G.P has been one of the most appreciated contributions made by this change.

The change has helped management to improve the medication safety in the organisation. Leadership and commitment from the change agent and the project team has helped the management to review the strategies to continue this project within a realistic time frame. The new medication system is an efficient and secure alternative to manual tracking methods and provides real time data for audits.

5.4 Recommendation for future improvements

There were benefits gained through the education of the staff, therefore, a recommendation is made to have regular in-service training sessions of medication management to open up the discussion and encourage the creative thinking process. The change agent was aware that the organization was interested in the implementation electronic medication management and thus considered this an ideal project.
The timeline for this project was short therefore it was not possible to complete it in its entirety. As the change agent and the team were so interested in progressing to the full implementation of this project, they completed piloting of electronic Mar sheet and barcode of the pouch system for five residents. The pilot study was successful. It involved the complete process of computerized prescription printing, e-prescribing, electronic dispensing, and electronic mar sheets with barcode on the Kardex and the pouch for administration. The pilot study encourages the change agent as to the worth and achievability of electronic Mar sheets and barcode. She will recommend the organization to make the financial and personnel investment to implement the system as speedily as possible and practical so that further errors will reduce, nursing time will be saved and therefore, increase the safety of residents and provide extra time for improvement of the quality of service.

The organization did make a financial plan for the financial expenses involved in this change project. The change agent is aware of all costs associated with the project involving training, electronic appliances and stationery. However, this was outweighed by the benefits of training and long term advantages and sustainability of the new service.

Further reflection and discussion have led the organization to increase awareness of the evidence that nurses are not reporting medication administration errors for fear of losing their registration, jobs or confidence to practice. The blame culture of the organization needs changing and management needs to support staff when incidents occur. The organization has committed to change the policy to reflect the new philosophy and has committed to engage in reflective practice as against disciplinary action in an aim to improve practice and to assure more honest reporting.
5.5 Conclusion

According to Szydlowski and Smith (2009), effective change management can lead to more efficient and effective HIT implementation. The change process was carried out using the steps of the Health Service Executive Change Model (2008). It is believed that the project was a success as the objective was achieved. Changing the culture was found to be the biggest challenge during the project. The success of the project was due to the constant communication of the vision and the empowerment of staff through the change team. A strong and clear support from the management was the key to the success of the project. Finally, the change agent concludes this dissertation by supporting ABA (2007) that nurses exercising their professional accountability in the best interests of patients must be sure to apply the five rights of medication administration i.e. right medication, patient/service-user, dosage, form, time (appendix 30). Furthermore, she is convinced that these established principles supported by the use of information technology combined with a commitment and good professional judgment will enhance the lives of both residents and the nurses who care for them.
References


Mind Tools (2014). *Transformational Leadership: Becoming an Inspirational Leader*. 75


administration errors and contributing factors. *Journal of Nursing Care Quality*, 26(2), 136-143.


http://www.biomedcentral.com


audit tool for pharmacists and pharmacy owners, (1st edn).


http://www.ncbi.nlm.nih.gov/books/NBK2652/


Appendices

Appendix 1: Ireland population pyramid for 2050

Ireland Population Pyramid for 2050

Appendix 2: Monitored Dosage Systems
Appendix 3: Pouch machine in the pharmacy

Appendix 4: Pouch porter
Appendix 5: List of Five Generic and interchangeable medicines

<table>
<thead>
<tr>
<th>Interchangeable medicines</th>
<th>Available Doses</th>
<th>List Code</th>
<th>Number of products on list</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin/Clavulanic acid</td>
<td>125/31.25mg</td>
<td>IC0037-071-034</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>875/125mg</td>
<td>IC0037-072-003</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>500/125mg</td>
<td>IC0037-073-014</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>400/57mg</td>
<td>C0037-076-034</td>
<td>7</td>
</tr>
<tr>
<td>Atorvastatin</td>
<td>10mg</td>
<td>IC0001-002-003</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>20mg</td>
<td>IC0001-003-003</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>40mg</td>
<td>IC0001-004-003</td>
<td>23</td>
</tr>
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<td></td>
<td>80mg</td>
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<td>Esomeprazole</td>
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<td>40mg</td>
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<td>Ramipril</td>
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<td></td>
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<tr>
<td></td>
<td>40mg</td>
<td>IC0010-004-016</td>
<td>14</td>
</tr>
</tbody>
</table>
Appendix 6: Kotter's 8 step model

1. Increase urgency
2. Build guiding teams
3. Get the vision right
4. Communication for buy-in
5. Enable action
6. Create short-term wins
7. Don't let-up
8. Make it stick

Appendix 7: Lewin's model

- **Unfreeze**: Ensures that employees are ready for change
- **Change**: Execute the intended change
- **Refreeze**: Ensures that the change becomes permanent
### Appendix 8: PEST analysis

<table>
<thead>
<tr>
<th>Political factors</th>
<th>Economic factors</th>
<th>Social factors</th>
<th>Technological factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Regulations such HIQA, HSE act</td>
<td>• Impact of globalization</td>
<td>• Staff attitudes and opinions</td>
<td>• Introduction of technology</td>
</tr>
<tr>
<td>• pressure of government on nursing homes and cutbacks</td>
<td>• Budget</td>
<td>• Organization image</td>
<td>• Rapid technological changes</td>
</tr>
<tr>
<td></td>
<td>• Cost of resources</td>
<td>• high expectations</td>
<td>• communication methods</td>
</tr>
<tr>
<td></td>
<td>• Intense competition</td>
<td>• redesign the daily work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• reduction in the cost of funding</td>
<td>• incentives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• wage rates</td>
<td>• evidence-based best care</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Training</td>
<td>• over-workload</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• reduction in management structure</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>• staff turnover</td>
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</table>

### Appendix 9: Force-field analysis

<table>
<thead>
<tr>
<th>Forces driving changes:</th>
<th>Forces resisting changes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improvement in nurse's practice</td>
<td>• Unwillingness to change.</td>
</tr>
<tr>
<td>• Improvement in patient safety</td>
<td>• Low staff morale.</td>
</tr>
<tr>
<td>• Advances in technology</td>
<td>• culture</td>
</tr>
<tr>
<td>• A clear and communicated vision</td>
<td>• Inadequate resources</td>
</tr>
<tr>
<td>• Follow HIQA standards</td>
<td>• New technological challenges</td>
</tr>
<tr>
<td>• Team work</td>
<td>• costs</td>
</tr>
<tr>
<td>• External: encouragement from pharmacy</td>
<td>• Increased workload</td>
</tr>
<tr>
<td>• Competitive edge</td>
<td></td>
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</table>
## Appendix 10: Stakeholder Analysis

<table>
<thead>
<tr>
<th>Stakeholder Analysis</th>
<th>High Importance/Low Influence</th>
<th>High Importance/High Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The employer</td>
<td>The director of Nursing</td>
</tr>
<tr>
<td></td>
<td>Residents in the organization.</td>
<td>The senior management team</td>
</tr>
<tr>
<td></td>
<td>Other colleagues not directly</td>
<td>G.P</td>
</tr>
<tr>
<td></td>
<td>involved in the project.</td>
<td>Nurse Managers</td>
</tr>
<tr>
<td></td>
<td>Pharmacy team</td>
<td>Staff Nurses</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IT department</td>
</tr>
<tr>
<td></td>
<td>Low Importance/Low Influence</td>
<td>Low Importance/High Influence</td>
</tr>
<tr>
<td></td>
<td>Staff from other departments</td>
<td>Financial department</td>
</tr>
<tr>
<td></td>
<td>not directly involved in the</td>
<td>Care staff</td>
</tr>
<tr>
<td></td>
<td>project.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 11: **Assess readiness and capacity for change**

<table>
<thead>
<tr>
<th>Activities for Change</th>
<th>Readiness</th>
<th></th>
<th></th>
<th>Capacity</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Overall readiness and capacity of leaders to bring about change</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of responsiveness to urgency of change</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The level of shared understanding for vision of change</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Level of focus on service users, communities and local population</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The effectiveness of communication process both internally and externally</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation toward team working and working across boundaries</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The level of engagement and partnership working based on experiences to date</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture of continuous learning and evaluation</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The level of resources available to support change</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The capacity to balance stability and change</td>
<td></td>
<td></td>
<td></td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Available at:
Appendix 12: Power/Interest matrix

Appendix 13- SWOT analysis

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Dynamic organization</td>
<td>• Limited numbers of staff</td>
</tr>
<tr>
<td>• Vibrant and enthusiastic staff</td>
<td>• Reluctance to change</td>
</tr>
<tr>
<td>• Project supported by Employer, DoN and supportive management team</td>
<td>• Lack of knowledge / skills</td>
</tr>
<tr>
<td>• Fully supportive pharmacy team</td>
<td>• Time constraint due to submission of thesis</td>
</tr>
<tr>
<td>• Knowledge of system from failed project</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Threats</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Accrediting body: HIQA</td>
<td>• Reputation of Organization</td>
</tr>
<tr>
<td>• Lack of training</td>
<td>• New skills</td>
</tr>
<tr>
<td>• Cost implications</td>
<td>• Improved staff experience</td>
</tr>
<tr>
<td>• Reluctance to change</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 14: Medication error/ near misses report form

Medication Error Report Form

Resident Name: ___________________________ DOB: ___________________________

Date of Report: ___________________________ Date of Occurrence (if different): __________ Time of Occurrence: __________

Residential Care Unit: ___________________________ Ward/Unit: ___________________________

Medication/Dose Involved: ___________________________ Route given: ___________________________

Name and Position of person who discovered the error: ___________________________

Stage(s) of the process where incident occurred: ___________________________

Prescribing: ☐ Dispensing: ☐ Administration: ☐ Monitoring: ☐

**Medication incident to related to (tick all that apply):**

<table>
<thead>
<tr>
<th>Incident</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse Drug Reaction</td>
<td>Unauthorised self-administration</td>
</tr>
<tr>
<td>Allergy</td>
<td>Drug-drug interaction</td>
</tr>
<tr>
<td>Wrong resident</td>
<td>Drug-food/enteral nutrition interaction</td>
</tr>
<tr>
<td>Wrong medication</td>
<td>Drug-disease interaction</td>
</tr>
<tr>
<td>Wrong dose (over/under/extra dose)</td>
<td>Incorrect storage/security</td>
</tr>
<tr>
<td>Omission (no. of episodes...........)</td>
<td>Expired drug</td>
</tr>
<tr>
<td>Wrong route</td>
<td>Unclear/incomplete documentation</td>
</tr>
<tr>
<td>Wrong time</td>
<td>Unclear/incomplete prescription</td>
</tr>
<tr>
<td>Wrong dosage form</td>
<td>Unclear/incomplete/incorrect labelling</td>
</tr>
<tr>
<td>Wrong diluent/ method of constitution</td>
<td>Wrong strength/concentration</td>
</tr>
<tr>
<td>Non-compliance with unit policy</td>
<td>Medication on Admission/Discharge/</td>
</tr>
<tr>
<td>Wrong rate</td>
<td>Duplicate therapy</td>
</tr>
<tr>
<td>Wrong frequency</td>
<td>Infusion Pump Incident</td>
</tr>
<tr>
<td>Contra-indication to use of medication</td>
<td>Other:</td>
</tr>
<tr>
<td>Resident’s BMI recorded incorrectly</td>
<td></td>
</tr>
<tr>
<td>Wrong duration</td>
<td></td>
</tr>
</tbody>
</table>

**Description of Incident/Near Miss:**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

**Action required due to the incident (tick all that apply):**

<table>
<thead>
<tr>
<th>Action Required</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No action required</td>
<td>Initial hospitalisation</td>
</tr>
<tr>
<td>Observation</td>
<td>Prolonged hospitalisation</td>
</tr>
<tr>
<td>Vital signs monitored</td>
<td>Intervention necessary to sustain life</td>
</tr>
<tr>
<td>Tests performed (lab/X-ray etc)</td>
<td>Intensive care</td>
</tr>
<tr>
<td>Drug therapy added or changed</td>
<td>Other (specify):</td>
</tr>
</tbody>
</table>

**GP notified?**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Not Applicable</th>
</tr>
</thead>
</table>

**Patient aware/Care representative**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Not Applicable</th>
</tr>
</thead>
</table>

Signature: ___________________________

**Follow up actions by nurse manager/CNF:**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Signature: ___________________________
Appendix 15: Pre implementation audit of medication errors

Pre implementation audit of Medication errors

3 monthly audit results

Appendix 16: Pre implementation audit of Near Misses

Pre-implementation Audit of Near Misses

3 monthly audit results
## Appendix 17: Overview of the software system

### Overview of the software system.

<table>
<thead>
<tr>
<th>section</th>
<th>Purpose</th>
<th>Responsible:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kardex, includes regular medications, PRN and special course medications</td>
<td>It is residents prescription in the nursing home.</td>
<td>G.P and the staff nurses. Pharmacy can view the Kardex, but access to make changes.</td>
</tr>
<tr>
<td>Mar sheets, includes regular medications, PRN and special course medications</td>
<td>Recording administration of medicines</td>
<td>Staff nurses</td>
</tr>
<tr>
<td>Resident profile</td>
<td>A detailed profile of resident to identify easily, reduce errors and increase safety</td>
<td>Staff nurses</td>
</tr>
<tr>
<td>Reordering</td>
<td>Facilitates staff to re-order medicines for future cycle dates</td>
<td>Staff nurses</td>
</tr>
<tr>
<td>G.P Prescription form</td>
<td>Allow G.P to print prescriptions from the system. When G.P will write prescription, it will be added to the Kardex also.</td>
<td>G.P</td>
</tr>
<tr>
<td>Blank Kardex</td>
<td>It will have resident's profile, for critical situations only.</td>
<td>Staff nurses</td>
</tr>
<tr>
<td>3 monthly medication review</td>
<td>To update review of medications as per HIQA standards</td>
<td>Staff Nurse, Pharmacist, G.P</td>
</tr>
<tr>
<td>Administration review</td>
<td>It will provide management to get audit results of any residents medication review, any special medication review or as required.</td>
<td>Management</td>
</tr>
<tr>
<td>Weight Graph</td>
<td>Resident's weight recording will assist for quick monitoring</td>
<td>Staff Nurses</td>
</tr>
</tbody>
</table>
Appendix 18: Implementation plan

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2013</td>
<td>Project agreed and approved by management team.</td>
</tr>
<tr>
<td>August 2013</td>
<td>Outline vision/aim and objectives, Drivers for change. Conduct stakeholder analysis, SWOT analysis &amp; Force Field analysis.</td>
</tr>
<tr>
<td>September 2013</td>
<td>Timelines agreed for implementation. Confirm the starting unit. Identify resource requirements, training, support. Plan to implement the first step of change in the first unit by 30th September</td>
</tr>
<tr>
<td>September 2013</td>
<td>Training for all staff Nurses regarding new system. Review of medication management policy, auditing.</td>
</tr>
<tr>
<td>October 2013</td>
<td>Implementation of software system in all units, 2 units in each week.</td>
</tr>
<tr>
<td>Nov-Dec 2013</td>
<td>Evaluation, Training as required for each staff. Improvements as required.</td>
</tr>
<tr>
<td>January 2014</td>
<td>Training for all staff Nurses regarding Pouch system.</td>
</tr>
<tr>
<td>February 2014</td>
<td>Implementation of Pouch system for medication supply, 2 units in each week.</td>
</tr>
<tr>
<td>March 2014</td>
<td>Evaluation, Training as required for each staff. Improvements as required.</td>
</tr>
<tr>
<td>April 2014</td>
<td>Evaluation</td>
</tr>
</tbody>
</table>
# Appendix 19: Impact Assessment

## Impact Assessment Template

<table>
<thead>
<tr>
<th>Description of current situation</th>
<th>Transition from current to future</th>
<th>Description of future vision</th>
</tr>
</thead>
</table>
| - Legislative and regulatory emphasis on quality and safety (HIQA)  
- Currently the medication administration record is in papers.  
- Currently no systems in place to reduce medication errors.  
- Not easy to do audits and monitor the medications of residents such as psychotropic drugs.  
- Resident’s medication supply in monthly blister now. | **Organizational**  
- Necessary to introduce and implement this change to demonstrate ability to provide high quality service.  
- To improve the safety of residents.  
- Will necessitate training/input/support utilizing organizational development approach. | **Local community**  
- Safer, evidenced based care for residents.  
- High standard of organization.  
- Change will further enhance relationship between pharmacy and organization.  
- Focus on holistic patient centered care. | **Individual staff member**  
- Training and support in relation to medication management.  
- Improve communication and teamwork between disciplines.  
- Protocol, procedure, policy will provide framework and support.  
- Future opportunities for training and development. | **By 31st April 2014, implementation of electronic medication management, to reduce the medication error and to improve the safety of residents.** |
### Appendix 20: Copy of Kardex

<table>
<thead>
<tr>
<th>STARTED</th>
<th>NAME OF DRUG (BRAND NAME)</th>
<th>DATE</th>
<th>DOSE</th>
<th>QUANTITY</th>
<th>ROUTE</th>
<th>FREQUENCY</th>
<th>SPECIAL INSTRUCTIONS</th>
<th>DAMAGE CONTROL</th>
<th>PRESCRIBED GP SIGN</th>
<th>PRESCRIBED DATE &amp; GP SIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>19/12/2012</td>
<td>ELTROXIN TABS (LEVOTHYROXINE)</td>
<td>25 MG</td>
<td>PO</td>
<td>DAILY</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>19/12/2012</td>
<td>ELTROXIN TABS (LEVOTHYROXINE)</td>
<td>50 MG</td>
<td>PO</td>
<td>DAILY</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>27/02/2013</td>
<td>LAXOSE SOLUTION (LACTULOSE)</td>
<td>10 ML</td>
<td>PO</td>
<td>TDS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12/02/2013</td>
<td>LOPRAZ CAPS (OMEPRAZOLE)</td>
<td>40 MG</td>
<td>PO</td>
<td>DAILY</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1/05/2013</td>
<td>UCERAX TABS (HYDROXYZINE)</td>
<td>25 MG</td>
<td>PO</td>
<td>NOCTE</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13/06/2013</td>
<td>CALPOL SUSPENSION (PARACETAMOL)</td>
<td>10 ML</td>
<td>PO</td>
<td>EVERY 6 HOURS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>18/07/2013</td>
<td>LEXAPRO TABS (ESCITALOPRAM)</td>
<td>5 MG</td>
<td>PO</td>
<td>OD</td>
<td>5 mg od</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16/01/2014</td>
<td>FUROSEMIDE TABS (FUROSEMIDE)</td>
<td>20 MG</td>
<td>PO</td>
<td>TARDE</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16/01/2014</td>
<td>FUROSEMIDE TABS (FUROSEMIDE)</td>
<td>40 MG</td>
<td>PO</td>
<td>MARIE</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>10/04/2014</td>
<td>KAY-CHEE SYRUP (POTASSIUM CHLORIDE)</td>
<td>5.6 ML</td>
<td>PO</td>
<td>QDS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Medication Name</td>
<td>Dose</td>
<td>Method</td>
<td>Directions</td>
<td>Give at</td>
<td>Date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>------</td>
<td>--------</td>
<td>------------</td>
<td>---------</td>
<td>------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELTROXIN TABS</td>
<td>25 MCg</td>
<td>PO</td>
<td>DAILY</td>
<td>09:00</td>
<td>19/12/2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELTROXIN TABS</td>
<td>50 MCg</td>
<td>PO</td>
<td>DAILY</td>
<td>09:00</td>
<td>19/12/2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAXOSE SOLUTION</td>
<td>10 ML</td>
<td>PO</td>
<td>TDS</td>
<td>09:00, 13:00, 17:00</td>
<td>27/02/2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KOMPRADAX</td>
<td>40 MG</td>
<td>PO</td>
<td>DAILY</td>
<td>09:00</td>
<td>12/03/2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UCERAX TABS</td>
<td>25 MG</td>
<td>PO</td>
<td>NOCTE</td>
<td>09:00</td>
<td>11/03/2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R = Refused, N = Nausea/Vomiting, H = In hospital, L = On Leave, D = Destroyed, S = Sleeping, P = Pulse Abnormal, N/R = Not Required, O = Other
Appendix 22: Medication trolley with pouch system
**Medication Management Competency Assessment: Drug Round**

**Name of the Nurse assessed:**
**Name of Assessor:**
**Date/Time:**

<table>
<thead>
<tr>
<th>Performance Assessments</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The nurse washes hands prior to drug round</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse prepares the drug trolley with the necessary equipments for the drug round</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse checks that the kardex is complete, correct and legible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse checks the name of each prescribed drug</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse checks the each drug has not been discontinued</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse checks if the resident has any known allergies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribed medicines are administered as close as possible to the time written on the prescription</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse checks the prescribed dose of each drug and time of administration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse checks the prescribed route and form of each drug</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse checks the specific instructions regarding administration of certain drugs are adhered to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse selects the appropriate drugs from the drug trolley, reads the name and strength of the drug on the pouch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse checks expiry date of drugs, as required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse uses medicine cups or spoons to avoid making contact with the drug</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where medicines need to be crushed, the nurse establishes that these have been sanctioned by a medical practitioner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse verifies the resident's identity prior to administering medication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse communicates the information sensitively to the resident prior to and during administration of medication.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All medicines are administered personally by the dispensing nurse immediately following preparation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The nurse stays with the resident until the drug has</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If the drug is delayed, refused or omitted, the nurse documents the reason by using appropriate coding in the MAR sheet.

Non-administered and wasted drugs or sharps are disposed of in the appropriate designated sealed container.

The nurse signs on the medication administration record as soon as the medication has been administered.

The nurse cleans their hands between residents.

The nurse does not leave the medicine trolley unattended during the medication round or when unlocked.

The nurse understands the 5 rights of medication management.

<table>
<thead>
<tr>
<th>Areas to be inspected:</th>
<th>yes</th>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply of medicines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerated items</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controlled drugs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labeling and safe administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safe disposal of medications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access of Medication management policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appendix 24: Audit of medication stock

Audit of medication stock and supply
(cover page)

Name of the Unit:
Name of the person conducting audit:
Date/Time:

Sign of staff Nurse:                     Sign of assessor:
Appendix 26: QUESTIONNAIRE FOR COMPUTERIZED MEDICATION MANAGEMENT SYSTAEEM

1. How long have you been working in this organization?
________________ Years / months

2. In which unit/area is your main working experience in this organization?
________________ Unit   ________________ area

Of all the changes that you have done in the last 2 months, in what proportion would you have recommended the following?
An estimate is acceptable.

<table>
<thead>
<tr>
<th>Change</th>
<th>None</th>
<th>1-10%</th>
<th>10-30%</th>
<th>30-50%</th>
<th>50-70%</th>
<th>70-100%</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Commencement of a new software system to make Kardex with resident's full profile is effective and efficient.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Commencement of new Mar sheet with drug name and color coding for each administration time helps to reduce medication error.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Commencement of ordering monthly supply through the system reduces over stock and improves the time management.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The new system is 100% compliance with HIQA standards of medication management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. By using the new system, the time for medication administration is improved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The current system of medication management is acceptable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I found the training provided relevant to the introduction of a new system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Integration of Pharmacy, GP and organization is improved through this system.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What changes do you believe the implementation of computerized system made in your daily work:
------------------------------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------------------------------------
what changes do you believe should be done in the system will improve the medication management:
------------------------------------------------------------------------------------------------------------------------
------------------------------------------------------------------------------------------------------------------------
Date: Name & Sign:
# Appendix 27: Kirkpatrick’s model

## Kirkpatrick’s four levels of training evaluation

<table>
<thead>
<tr>
<th>Evaluation Type</th>
<th>Evaluation Description and Characteristics</th>
<th>Examples of Evaluation Tools and Methods</th>
<th>Relevance and Practicability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reaction</strong></td>
<td>Reaction evaluation is how the delegates felt about the training or learning experience.</td>
<td>‘Happy sheets’, feedback forms. Verbal reaction, post-training surveys or questionnaires.</td>
<td>Quick and very easy to obtain. Not expensive to gather or to analyze.</td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td>Learning evaluation is the measurement of the increase in knowledge- before and after.</td>
<td>Typically assessments or tests before and after the training. Interview or observation can also be used.</td>
<td>Relatively simple to set up; clear-cut for quantifiable skills. Less easy for complex learning.</td>
</tr>
<tr>
<td><strong>Behaviour</strong></td>
<td>Behaviour evaluation is the extent of applied learning back on the job - implementation.</td>
<td>Observation and interview over time are required to assess change, relevance of change, and sustainability of change.</td>
<td>Measurement of behaviour change typically requires cooperation and skill of line-managers.</td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td>Results evaluation is the effect on the business or environment by the trainee.</td>
<td>Measures are already in place via normal management systems and reporting - the challenge is to relate to the trainee.</td>
<td>Individually not difficult; unlike whole organisation. Process must attribute clear accountabilities.</td>
</tr>
</tbody>
</table>

Kirkpatrick’s model (businessballs.com) Available at: (http://www.businessballs.com/kirkpatricklearningevaluationmodel.htm)
## Appendix 28: Training evaluation feedback form

### Training Evaluation & Feedback

<table>
<thead>
<tr>
<th>Question</th>
<th>A lot</th>
<th>some</th>
<th>A little</th>
<th>none</th>
<th>Suggested improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did I enjoy the training?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was the training relevant?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did I learn what needed to learn?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did I like the venue and presentation style?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did I get new informations and ideas?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will I use the informations and ideas in my daily work?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do I think that the ideas and information will improve my effectiveness?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Will I able to teach my knowledge, attitude and skills to others?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“What will success look like to me?” : Please write your suggestions for improvements.

Sign: 
Unit:
Appendix 29: audit result from the system: Residents on Tab. Paracetamol

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Index</th>
<th>Product Name</th>
<th>Dose</th>
<th>Directions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>002</td>
<td>Paracetamol BP SOFT</td>
<td>1 gm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>Paracetamol BP SOFT</td>
<td>1 gm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>117</td>
<td>Paracetamol BP SOFT</td>
<td>1 gm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>119</td>
<td>Paracetamol BP SOFT</td>
<td>1 gm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>116</td>
<td>Paracetamol BP SOFT</td>
<td>1 gm</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>113A</td>
<td>Paracetamol BP SOFT</td>
<td>1 gm</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>001</td>
<td>Paracetamol BP SOFT</td>
<td>1 gm</td>
<td>(CROSSED)</td>
</tr>
<tr>
<td></td>
<td>003</td>
<td>Paracetamol BP SOFT</td>
<td>1 gm</td>
<td></td>
</tr>
</tbody>
</table>

(searching for 'general product name = PARACETAMOL')
Appendix 30: Five rights

The Five “RIGHTS” of Medication Administration

- The right patient
- The right drug
- The right dose
- The right route
- The right time