Medication Errors

Burden on the Healthcare System Incidence

Each year, medication errors result in approximately 7000 deaths in the US. Medication errors in the hospital setting also account for prolonged patient hospitalization, consumption of staff time and increased resource utilization. In 2006, the annual healthcare costs associated with medication errors in the US were approximately $US3.5 billion. Given this fact, reducing the incidence of medication errors would significantly improve the current status of healthcare in the US. Achieving significant reductions in medication error incidence rates is an important initiative that will require involvement from multiple sectors of the healthcare system. (Schein, Hicks, Nelson, Sikirica, & Doyle, 2009).

Medication Process and Errors

The medication process is complex and includes a number of phases: Prescribing, transcribing, dispensing, administering, and monitoring. Errors can occur at all points of this process. The highest rates of error occur in the ordering phase, followed by the administration phase. Many potential errors are identified and intercepted by nurses during the transcription and administration phases of the medication process. (Harding & Petrick, 2007).

Causal Factors

Medical errors result from the interplay of multiple factors that include, among others: Regulatory environment, organizational leadership and commitment, management policies and procedures, complexity of tasks involved, work culture, and physical environment. (Chaudhury, Mahmood, & Valente, 2009). Causes of medication errors and efficiency can be conceptualized at two levels, “active failures” and “latent conditions.” An ‘active failure’ is one that is caused by the person on the frontline, example, nurse administering medication on a patient. Active failures can be attributed to human cognition and limitations of memory and thought process. The adverse effect of an active failure will be an active error, such as use of a wrong medication or incorrect dose. ‘Latent conditions’ refer to failures resulting from decisions made by the management. Examples of latent conditions include time pressure, stress, fatigue, and physical factors such as noise, and temperature. (Chaudhury, Mahmood, & Valente, 2009). The National Coordinating Council for Medication Error Reporting and Prevention Taxonomy of Medication Errors describes five main causes of medication errors: Communication, name confusion, labeling, human factors and packaging/design. Identifying the causes or contributing factors of medication errors, as well as, the error-prone situations, is important to recommending improvements and correcting the causes.

Organizational Management Contributing Factors

Management decisions and organization processes, such as staff hierarchy, pattern and quality of staff communication, staff workload, and work culture, can effect nursing and
medication errors either directly (example, miscommunication of medication information) or indirectly by creating error-producing conditions (example, staff fatigue leading to error). (Chaudhury, Mahmood, & Valente, 2009).

Recommendation for Improvement: There is a need to create cultures of safety within all healthcare organizations. Organizational culture, or climate, represents the “shared beliefs, values, norms, expectations, and assumptions that are manifested in behavior and that bind people to the organization. The climate of safety depends on the effective interplay of environment structure and process, the attitudes and perceptions of workers, and behaviors related to safety. Nurses need to work in supportive atmospheres and have the opportunity to try new ideas. All employees need to be empowered and vigilant to patients’ needs for safety. Key aspects of this empowerment are communication, nonhierarchical decision making, constrained improvisation, training, and rewards and incentives for involvement in safety improvements. Employees should be encouraged to identify unsafe situations and potential for errors before they actually occur. (Dennison, 2007).

Medication Process Contributing Factors
A majority of medication errors occur at the ‘ordering stage’, with incorrect dosing as the most common ordering error, followed by inappropriate medication choice, prescription of a medication to which the patient is allergic, ordering at the wrong frequency of administration, and failure to anticipate a drug interaction. ‘Execution of treatment’ is another step in the process of providing medication where human error may occur. Serious medical errors are associated with both the medication ordering process and execution of treatment, including wrong dosage and duplicate medication orders. Once a medication is ordered, errors in the ‘hospital pharmacy’s medication ordering and dispensing’ process may contribute to medication errors. Such errors include a failure to identify provider ordering errors, example, incorrect dosing of prescription of a medication which a patient is allergic. Most hospital prescriptions are filled in a two-step process, in which pharmacy technicians fill drug order, and pharmacist verify the orders. This protocol is effective for catching many prescription errors before the product leaves the pharmacy. However, errors may still occur despite this two-step process and can have significant and even fatal consequences. Some orders are filled improperly by pharmacy technicians, and some of those orders are approved to leave the pharmacy with undetected errors. Finally, human-related PCA medication errors may result from errors that occur during pump programming or pump activation during IV drug use.

Recommendation for Improvement: Automation can substantially streamline the system of medication prescription, storage, dispensation, preparation, and administration. There are several areas where automation could reduce errors. Areas where automation are recommended and worth considering are: Computerized physician order entry allowing access to evidence-based practice at point of ordering, order verification, medication storage (Pysix machine, refrigerator, other), dispensation, preparation, administration (bar coding), documentation of medication effects, ordering of materials/supplies, and movement of materials/supplies. (Chaudhury, Mahmood, & Valente, 2009). Safeguard systems such as these, that are built into healthcare to protect the patient from human error, need to be designed that can tolerate the occurrence of errors by containing the effects to limit the consequences. Because human error is inevitable, adequate safety net
systems are needed to prevent errors from reaching the patient. (Dennison, 2007). For example, with regards to administering medications via intravenous fluids, the availability of intravenous infusion pumps provides a safety net for nurses administering intravenous drugs. These “smart pumps” have customizable software to create libraries that are specific to the hospital and patient care area. The medications, standard concentrations, dosing units, and dosing limits are configured to the hospital’s specifications. If the nurse programs the pump to an infusion rate that would deliver a dose outside of the configured limits, also referred to as guardrails, an alert will occur warning the nurse that the dose is too low or too high. Alerts may be soft or hard. A soft does limit alert allows the nurse to override the prompt that warns when a dose is too low or too high. It is analogous to the computer prompt of “are you sure?” A hard dose limit alert will not allow an override and the rate/dose display reappears for a more appropriate parameter within the dosing limits. This mode will not allow the pump to be programmed to deliver a drug at a dose significantly outside of safe limits. (Dennison, 2007).

**Medication Delivery Contributing Factor**

The handling of medication passes through various hands from the time it leaves the pharmacy until the medication reaches the patient; thus, there is potential for error at several points. One example is, when medication arrives in the nursing unit through a runner, who works out of the pharmacy. The runner loads medications onto a ‘cart’ from the pharmacy and then drops off the medications in the back room where the Pyxis machine is located. In this example, if oral medications and IV medications are grouped together, this can become a problem, when nurses do not look for the oral medications among the IV medications. Another example is when the medications arrive to the nursing unit through a ‘tube’ system that is situated at the nursing station. This is problematic because the nurses’ station tends to be chaotic and any person, not necessarily a nurse, may retrieve the medication and misplace it. One more example of a delivery problem is that the medication which should be placed in the ‘pyxis’ machine, is not placed into the pyxis. As a result, the medication is not found, and only at that time the replacement order is made. (Chaudhury, Mahmood, & Valente, 2009).

**Environmental Contributing Factors**

As with the management and organizational aspects, the physical environmental aspects could potentially affect the occurrence of errors in direct ways. For example, lack of adequate lighting causing misreading a medication label, or in indirect ways by creating error-producing conditions, such as, noise in and around nurses’ stations can cause staff stress, which in turn raises the potential for nursing error. Also, these two dimensions of the care environment can act independently or interact with each other in influencing error-producing condition like staff stress and fatigue. Thus, the environment plays an indirect role on mediating factors like staff stress and fatigue, the latent conditions in the staff themselves. Staff stress and fatigue, even lack of job satisfaction, are conditions arising out of the more fundamental latent dimensions of the organization or management, and physical environmental systems. Thus, staff stress and fatigue, are the second-level latent conditions in the causal pathway that leads to nursing and medication errors. (Chaudhury, Mahmood, & Valente, 2009). Environmental variables that can contribute to errors in acute care settings are: lighting, noise levels,
ergonomics/furniture/equipment, and design/layout. (Chaudhury, Mahmood, & Valente, 2009).

**Lighting:** In general, medication errors tend to be lower when lighting levels are high, whereas, medication errors tend to be higher when lighting levels are low. (Chaudhury, Mahmood, & Valente, 2009). In fact, there is a correlation between the different illumination levels on the dispensing errors of pharmacists. Specific environment conditions, such as type of lighting, artificial versus natural lighting; degree of lighting in nurses’ workspace such as artificial lighting that produce the effect of feeling drained and tired, can lead result in medication error. (Chaudhury, Mahmood, & Valente, 2009). Nurses tend to function more effectively in an environment with minimal artificial lighting and in an environment that facilitates the use of natural daylight.

**Recommendation for Improvement:** To improve lighting, surfaces that reduce glare should be used, and patients should be exposed to natural daylight. Indirect lighting diffuses light and assists in creating a natural effect. In addition, as the average age of nurses is increasing, bright work surface illumination levels may be necessary to reduce errors in dispensation. (Chaudhury, Mahmood, & Valente, 2009).

**Noise:** Source of noise within the hospital includes: Staff, visitors, patients, and hospital devices, such as telephones, alarms on equipment, paging systems, and the beeping of patient monitoring devices. Noise is problematic in a health care setting partially because there are a variety of sources of noise, many of which are loud. Another source of high noise levels is environmental surfaces that reflect rather than absorb noise. For example, room occupancy affects noise levels. So, single-occupancy rooms have also a lower noise level than multiple occupancy rooms. (Chaudhury, Mahmood, & Valente, 2009). Also, noise levels are lower in private rather than multi-occupancy rooms. Similarly, noise levels are lower in smaller hospitals compared to larger hospitals. World Health Organization’s acceptable noise level is 35dB, when measured at the patient’s head. (Chaudhury, Mahmood, & Valente, 2009).

**Recommendation for Improvement:** World Health Organization guidelines for noise levels are as follows: Acceptable noise levels for continuous background noise in patient rooms are 35 dB; nighttime peak noise levels should not exceed 40 dB. (Chaudhury, Mahmood, & Valente, 2009). Sound attenuating surfaces can help reduce the amount of noise produced. Sound-absorbing ceiling tiles, single-bed rather than multi-bed rooms, and the reduction of noise sources may help in noise reduction. Sound-absorbing ceiling tiles could be replaced by non-sounding absorbing tiles. Carpeted hallways can keep noise to a minimum and having music available for patients can help reduce stress. The introduction of a sound environment with specially designed music can produce reduced sound level as well as a less stressful environment. (Chaudhury, Mahmood, & Valente, 2009).

**Design/Layout - of Workstation, Patient Room, Medication Room:** Crowded, acoustically ineffective, and poorly designed nursing stations within the hospital add to staff stress and may increase the risk of medication errors. (Chaudhury, Mahmood, & Valente, 2009). Design recommendations to improve patient care include the use of a universal room, decentralized patient care, enhanced direct contact between patients and staff through room and unit design; the elimination of sensory distracters in areas where nurses perform detailed tasks such as medication administration; the use of automated, computerized medical records; patient social supports; incorporating elements of a
natural environment; the need for personal control for each nurse; the need to provide communal spaces where information can be exchanged; and attention to ergonomic details. The physical environment can be assessed in terms of its architectural and interior design aspects. This enables identification of features of the physical environment that could be modified in an existing facility, versus decisions to plan and design a new facility. (Chaudhury, Mahmood, & Valente, 2009).

Design/Layout of Patient Room: Single-occupancy rooms - Have been associated with fewer medication errors. Standardization of patient care environments and equipment has also been known to reduce staff error. For example, facilities using acuity-adaptable rooms tend to have lower rates of medication errors. Acuity adaptable rooms are also designed to enable a patient to receive all the care required in one room regardless of their acuity level. These acuity adaptable rooms offer patients control of lighting, temperature, and privacy. Acuity adaptable rooms are larger in size than the regular patient room. (Chaudhury, Mahmood, & Valente, 2009).

Design/Layout of Medication Room - The location of the medication room with the nursing unit is the most important criterion for reducing nurses’ fatigue and errors. Decentralized medication rooms can save travel time and reduce potential for errors, as the nurses walk back and forth several times between the medication room and patient rooms. (Chaudhury, Mahmood, & Valente, 2009). Also, medication rooms that are designed to reduce distraction for nurses from coworkers allowing them to focus more on the tasks at hand, result in decreased error rates.

Recommendation for Improvement: Include decentralized medication rooms.

Decentralized medication rooms or individual patient medication cabinets can reduce the length and amount of walking necessary for nurses. Walking to and from patient rooms and medication room or nurses’ station is an important factor contributing to staff fatigue. PODs with 8-12 patient rooms having their own medication room can reduce walking-related fatigue as well as errors taking place in centralized medication room serving 30 or more patients. Medication rooms need ample work surface for medication preparation and other desk tasks by multiple staff members at the same time. (Chaudhury, Mahmood, & Valente, 2009).

Layout of Automated dispensation Machine - With regards to the automated medication dispensation machine Pyxis, staff prefers the machine to be located in a closed versus an open area. In an open area, people stand in line and can block doorways. Other negative aspects of the Pyxis in an open area are the distractions and the noise levels. Also, space is unavailable to draw medications, and working space to look up the patient and drug is nonexistent. Without the adequate workspace, nurses are handling too many things at once creating a potential for error. (Chaudhury, Mahmood, & Valente, 2009).

Ergonomics, Furniture, and Equipment: Reduction of staff stress and error by ergonomic interventions, can positively impact staff health, influence staff efficiency, and contribute toward patient safety. Ergonomics is important to create the optimal working conditions for workers to perform their tasks efficiently and safely. Poor ergonomics may result in increased errors among nurses. (Chaudhury, Mahmood, & Valente, 2009).

Recommendation for Improvement: With regards to equipment and technology, the installation of an automated computer-controlled device installed in nursing units can result in fewer medication errors. Installation of automated computer-controlled device can also lead to improvements in the administration of medication as scheduled. In
addition, with regards to technology, medication errors, including ordering, transcription, and dispensing errors, can decrease with the use of a computerized physician.

Non-Compliance Factors
Many medication administration errors are caused by non-adherence to the rights method. The rights method is a standard process that requires the checking of seven rights: right patient, medication, dosage, time, route, reason, and documentation. To study about medication errors in light of the rights method and in isolation of system factors, can result in individual blame. This continued individual focus does not consider the complexity of the medication process and the system and organizational factors that lead to errors. (Harding & Petrick, 2007).

Recommendation for Improvement: Historically, individual blame and judgment or punishment has been brought to bear following a medication error, rather than the error being viewed as a learning opportunity and a chance to recommend system changes. Due to errors seldom being attributed to one single action by an individual, the systems information emphasizes the importance of building closer relationships with our practice agencies to gather data and collaboratively plan preventive strategies. Instead of focusing on individual carelessness or mishandling of a task per se, it is critical to address the latent conditions of the environment, that is, underlying systems, and their faults to prevent errors.

Inexperience
Within a teaching hospital, medication errors have also been linked to student practice. Specifically, there is a link between decreased clinical placement time in baccalaureate education and the students’ ability to safely perform skills such as medication administration. The primary causes of these errors that link to student practice is inexperience and distractions. Simulation education may contribute to a reduction in medication errors among student or new graduate nurses. (Sears, Goldsworthy, & Goodman, 2009)

Recommendation for Improvement: Much of the nursing education literature specific to the prevention of medication errors focuses on ‘teaching strategies’ for accurately calculating drug dosages. Although there is documentation in the literature of miscalculation contributing to medication errors, the main body of literature does not reflect this as a significant factor. Findings on medication errors and associated system factors have not significantly informed nursing practice. In addition, there is a lack of ‘active partnerships’ between nursing education and hospital quality assurance systems. (Harding & Petrick, 2007). Gaming’ can provide the opportunity for employees to assess the retention of previously learned material or promote the reinforcement of knowledge needed for patient safety. The use of ‘gaming’ provides a comfortable, fun learning strategy for active employee participation that decreases boredom and is viewed as non-threatening. The use of ‘gaming’ to reinforce safety measures in medication administration is one avenue to address the need for reduction of medication errors. (Ward & Koerner, 2008).

Inadequate Systems Training
Errors that are linked to a system factor are often related to some dimension of the MAR.
This document is a dynamic, complex form representing one aspect of the medication administration system. For example, when a physician orders a medication, it is entered into the pharmacy system by paper or computer, the unit clerk transcribes the order onto the MAR; the pharmacy may generate another computer entry that will override or replace this entry; and the nurse refers to the MAR to administer the appropriate medication and document these actions. It is evident that there are many points in the interaction with the MAR at which errors can occur. With regards to nursing students or nurse novices, there is little attention paid to the fact that these novices are regularly interacting with the system and the various effects this may have on patient safety. The MAR is introduced to students in a laboratory setting (and in the case of a new graduate, an orientation classroom).

Recommendation for Improvement: Teaching strategies, such as problem-based learning, may be a more effective and useful way to incorporate the MAR into students’ or new graduate’s learning. This approach may provide a method that would better emphasize the complex context in which medications are administered. (Harding & Petrick, 2007).

Error-Prone Situations

High-Alert Medications: There are a list of medications that are known to contribute to a significant number of medication errors and are associated with a risk for poor outcome when improperly administered. These drugs, referred to as high-alert medications, require special safeguards to reduce the risk of injury to patients. At least 20 drugs are responsible for 80% of medication error fatalities. Examples of high-alert medications include heparin, insulin, dopamine, propofol, and antineoplastic agents. (Dennison, 2007).

PCA: In the hospital setting, patient-controlled analgesia (PCA) is a known frequent source of errors, especially in post-operative care. While PCA provide better pain control and increased patient satisfaction, PCA use has introduced new sources of medication errors. One possible explanation for these errors is that IV and epidural PCA administration involve processes that require the coordination of several hospital departments, and the programming of PCA pumps requires attention to detail. The use of PCA pumps is relatively complex and often requires significant training for proper setup and monitoring. Complicating the situation, poorly designed interfaces on some PCA pumps have been known as a significant source of PCA pump-related human errors. Because of the complexity of PCA pumps, stringent protocols are required to help reduce the risk of errors. Dangerous errors, including administration of an incorrect drug, may result when these protocols are not followed. (Schein, Hicks, Nelson, Sikirica, & Doyle, 2009). PCA-related errors can be categorized using error groups as follows: use of wrong analgesic or wrong analgesic cartridge, accidental pump malprogramming, false triggering, false triggering by proxy, drug accumulation in IV dead space, runaway fluid column due to siphoning or other means, PCA pump malfunction due to software design error, retrograde flow of PCA analgesic into a second IV set due to catheter blockade, bad medical judgment in formulating a PCA prescription or order, and anaphylaxis. These categories can be further divided into two main areas: human errors and equipment errors. (Schein, Hicks, Nelson, Sikirica, & Doyle, 2009).
PCA & “High-Alert Medications Combined: Furthermore, PCA pumps utilize different types and dosages of opioids, which are described by the Institute for Safe Medication Practices as “high-alert” medications and are associated with a significant number of medication errors. Combining the “high alert” status of opioids with the complex equipment and processes associated with epidural and IV PCA presents an opportunity for numerous medication errors, some potentially fatal, resulting from human- or equipment-related factors. (Schein, Hicks, Nelson, Sikirica, & Doyle, 2009). It is important to classify the various types of errors that may occur as a result of PCA use. By doing so, one can pinpoint areas of system-process or device-related medication errors that can be targeted to reduce future errors.

Reporting Medication Errors

Problems with Reporting
Many medication errors are not detected, and many of those that are detected are not reported. (Dennison, 2007). Medication errors are not detected, in part, due to ineffective analysis of medication errors. One problem with effective analysis of medication errors is that nurses are frequently unsure about what constitutes a medication error. Nurses’ flawed definition of a medication error or their inaccurate determination as to whether or not their action constitute a medication error can be categorized into six ways: (a) if it is not my fault, it is not an error; (b) if everyone knows, it is not an error; © if you can put it right, it is not an error; (d) if a patient has needs that are more urgent than the accurate administration of medication, it is not an error; (e) if it is a clerical error, it is not an error; and (f) if the irregularity prevents something worse, it is not an error. (Dennison, 2007). Due to ineffective analysis, historically, near misses have also not been routinely reported. (Harding & Petrick, 2007). In addition to medication errors that are not detected, many medication errors have not been reported. Such underreporting of medication errors is due to a number of reasons: Inconsistencies in reporting; focus on errors related to medications given rather than not given; perception of unimportance; and emphasis on individual performance and punitive responses. (Harding & Petrick, 2007).

A large percentage of medication errors are not reported because nurses fear punitive repercussions. (Dennison, 2007) This is due to the traditional approaches to the reduction of medication errors which have been primarily person-focused. This approach is based on the belief that errors occur as a result of carelessness, forgetfulness, and negligence. With this approach, the individual who committed the error is typically disciplined and provided with training and remediation. The traditional focus of the training has been on the “5 rights” (right patient, right drug, right dose, right time, and right route). This punitive approach has resulted in the underreporting of medication errors with resultant loss of opportunities to identify and correct system factors that contributed to the human error. (Dennison, 2007)

Reporting Requirements
Regulators, hospitals, accreditation organizations, and legislators in the United States have developed standards, programs, and laws that encourage transparent communication with patients after harmful errors have been made. The National Quality Forum (NQF), an organization that develops standards for health care delivery, has added standards for
disclosure of unanticipated outcomes to its list of safe practices. (Gallagher, Studdert, & Levinson, 2007). Also, in 2001, the Joint Commission on Accreditation of Healthcare Organizations, now called the Joint Commission, issued the first nationwide disclosure standard. This standard requires that patients be informed about all outcomes of care, including unanticipated outcomes. (Gallagher, Studdert, & Levinson, 2007). A few states have mandated the disclosure of certain events to patients, and many states have adopted laws that protect apologies for unanticipated outcomes from being used in litigation as evidence of fault on the part of the provider. (Gallagher, Studdert, & Levinson, 2007).

Recommendation for Improvement
To develop a self-sustaining mechanism that will monitor, report, and act on nursing and medication errors, it is critical that there is an organization culture of safety in place. Most of the facilities have voluntary reporting of errors. This process needs to be emphasized by creating an active agenda for no punitive error reporting and identifying methods to prevent or minimize errors, as well as, built-in mechanisms to track errors, possible errors, stress and fatigue. (Chaudhury, Mahmood, & Valente, 2009).

Conclusion
Error reduction strategies include the following: Education and information, rules and policies, checklists and double-check systems, standardization and protocols, automation and computerization, and forcing functions and constraints. Education related to medication safety is one approach to the prevention of patient harm caused by medication errors. Training with an emphasis on problem solving for possible errors and how to prevent them is another strategy for the prevention of medication errors. In addition, clinical education approach focuses on medication administration technology, high-alert medications, and medication risk-reduction strategies. One strategy for providing this education is the use of technology-enhanced instruction. (Dennison, 2007)
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References


Quiz

1. Each year medication errors result in approximately how many deaths in the US?
   (a) 7000
   (b) 100
   (c) 8
   (d) 500,000

2. In 2006, the annual healthcare costs associated with medication errors in the US were approximately how many dollars?
   (a) 2,400
   (b) 3.5 billion
   (c) 902
   (d) 10,000

3. What are the five (5) main phases of the medication process?
   (a) Ordering/prescribing, transcribing, dispensing, administering, monitoring
   (b) Reviewing, checking, writing, dispensing, asking
   (c) Carting, tubing, picking, monitoring, reviewing
   (d) Determining, dispensing, marring, taking, giving

4. The highest rates of error occur in which phase of the medication process?
   (a) Monitoring
   (b) Transcribing
   (c) Ordering/prescribing
   (d) Dispensing

5. Which is the most common ordering error?
   (a) Transcribing
   (b) Administering
   (c) Dispensing
   (d) Incorrect dosing

6. The second highest rates of error occur in which phase of the medication process?
   (a) Monitoring
   (b) Dispensing
   (c) Transcribing
   (d) Administration
7. The National Coordinating Council for Medication Error Reporting and Prevention Taxonomy of Medication Errors describes five (5) main causes of medication errors: What are they?

(a) Checking, prescribing, transcribing, writing, proofreading
(b) Communication, name confusion, labelling, human factors, and packaging/design
© Labelling, checking, transcribing, checking, design
(d) Name confusion, communication, proofreading, transcribing, checking

8. In the pharmacy, prescriptions are filled using which two-step process?

(a) Pharmacist looks at drug, then technician fills order without pharmacist verifying
(b) Pharmacy technician fills drug order, then pharmacist verifies the order
© Pharmacy technician fills drug order, then pharmacy technician verifies order
(d) Pharmacy student fills drug order then verifies the order

9. Name one (1) human-related medication error:

(a) Incorrect dosing
(b) Automatic reboot of pyxis
© False triggering of machine
(d) Smart pump malfunction

10. Name one (1) device-related medication error:

(a) Giving adverse reaction medication to patient with known allergy to medication
(b) Giving wrong medication
© PCA pump malfunction
(d) Giving medication to wrong patient

11. What is an active failure?

(a) One that is caused by the administrator
(b) One that is caused by the system
© One that is caused by the person on the frontline
(d) One that is caused by the plant

12. What is a latent condition?

(a) One that is caused by a nurses aide
(b) Refer to failures resulting from decisions made by the management.
© One that is caused by the person on the frontline
(d) Refer to failures resulting from the medication nurse.
13. Name four (4) environmental factors that can contribute to medication errors:

(a) Space, hygiene, room, department
(b) cart, room, human, lighting
(c) Lighting, noise, design/layout, equipment and technology
(d) Noise, lighting, human, medication nurse

14. Source of noise in the hospital include:

(a) Train, bus, sidewalk, hospital device
(b) Staff, visitor, patients, hospital devices
(c) IV pump, tunnel, train, visitor
(d) Staff, hospital device, train, sidewalk

15. World Health Organization (WHO) acceptable noise level is:

(a) 35dB
(b) 70dB
(c) 75cc
(d) 35ml

16. Nurses function more effectively with the use of maximum natural daylight:

(a) True
(b) False

17. Medication errors tend to be lower when light levels are high:

(a) False
(b) True

18. Poorly designed nursing station add to staff stress and may increase the risk of medical errors:

(a) True
(b) False

19. The Institute for Safe Medication Practices describes a list of medications associated with a significant number of medication errors, as:

(a) Low-alert medications
(b) No-alert medications
(c) “High-alert” medications
(d) SQ medications
20. Examples of “high-alert” medications include:

(a) Heparin, insulin, dopamine, propofol  
(b) Aspirin, Tylenol, Panadol, Lovenox  
© Hydralazine, Glucotrol, coumadin, iron  
(d) Dextrose, Saline, Vasotec, Lactate Ringer

21. Medication errors have been linked to:

(a) Inexperience  
(b) Distraction  
© Non-compliance  
(d) All of the above

22. One (1) type of automated medication dispensation machine is:

(a) Pyxis  
(b) IV  
© Automatic machine  
(d) PC

23. Examples of a potential problem in medication delivery from the pharmacy, include:

(a) Medication arrives in the nursing unit through a runner, who groups oral and IV medications together without separating them.  
(b) Medication arrives to the nursing unit through a tube system, to a busy and crowded nursing station  
© Medication which should have been in the pyxis, is not found  
(d) All of the above

24. The seven (7) rights method are:

(a) Right sense, right medication, right dosage, right paper, right pen, right patient, right number  
(b) Right number, right check, right pick, right medication, right route, right dosage, right patient  
© Right patient, right medication, right dosage, right time, right route, right reason, right document  
(d) Right patient, right chart, right mood, right pick, right meds, right light, right Sense
25. Reason(s) that medication errors are underreported:

(a) Undetected errors
(b) Ineffective analysis of medication errors
© Emphasis on individual performance and punitive responses
(d) Inconsistencies in reporting
(e) All of the above
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Blank Answer Sheet

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Medication Error

Answers to Quiz

1. A
2. B
3. A
4. C
5. D
6. D
7. B
8. B
9. A
10. C
11. C
12. B
13. C
14. B
15. A
16. A
17. B
18. A
19. C
20. A
21. D
22. A
23. D
24. C
25. E