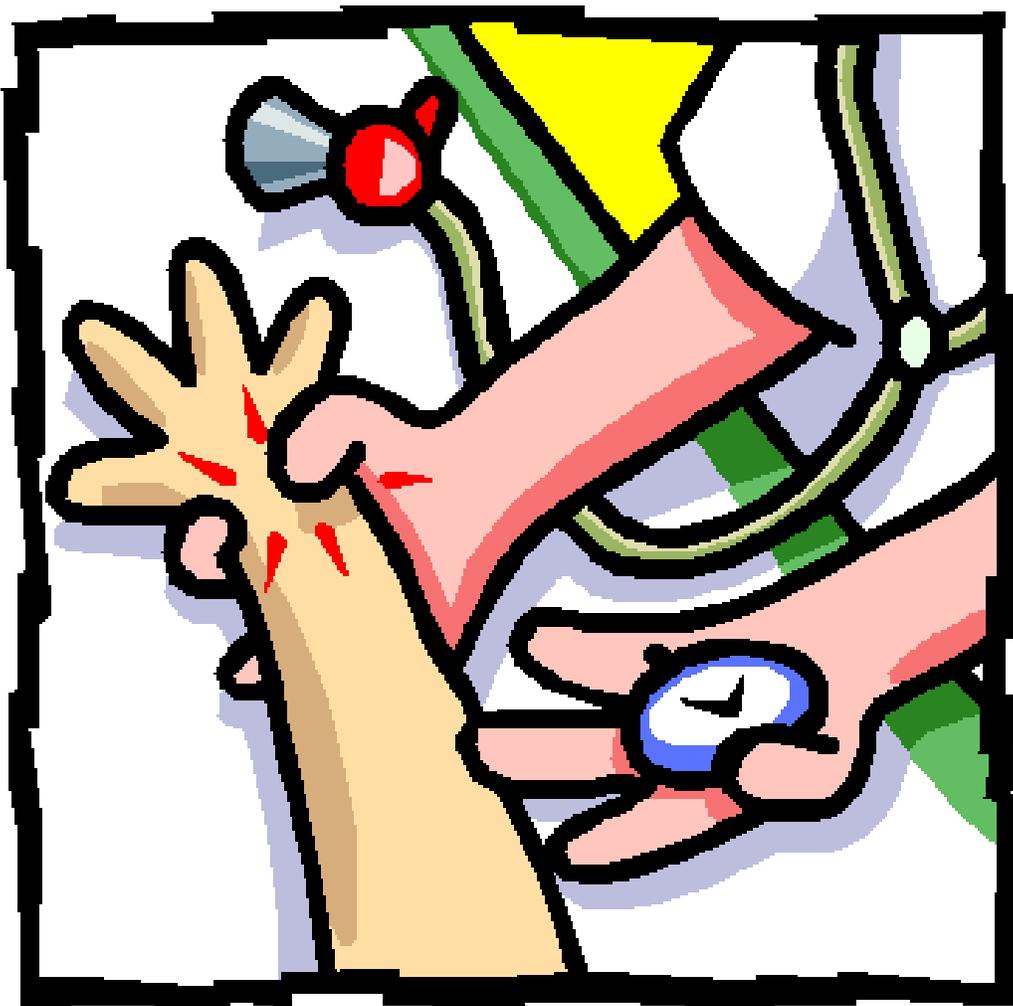


# **ORIENTATION: SELF-STUDY GUIDE**



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**PREFACE**

The format of the Orientation Self-Study Guide has been organized to reflect the hospital’s commitment to adult learning in educational programs. Each employee is required to read the study guides to update himself/herself with information and successfully complete the tests.

The following table describes which Self-Study Guide each staff member must complete:

	<b>Roles and Delegation</b>	<b>Patient Safety: Patient Identification</b>	<b>Comprehensive: Age Appropriate</b>	<b>Use of Restraints</b>	<b>IV Therapy Part I</b>	<b>Patient Teaching (Adults)</b>	<b>Patient Teaching (Children)</b>	<b>Medication Safety</b>	<b>Medication Calculation</b>
Registered Nurses	X	X	X	X	X	X	Applicable to only those nurses working with children (Peds, Neonatal)	X	X
Nurse Practitioners	X	X	X	X	X	X		X	X
Licensed Vocational Nurses	X	X	X	X	X	X		X	X
Student Worker, Nursing	X	X	X	X					
Nursing Attendants, Technicians	X	X	X	X					
Clerks	X	X	X	X					

If your position is not listed in the table or you are not sure in which category you belong, consult the Nursing Orientation Coordinator.

**INSTRUCTIONS FOR COMPLETING**

Welcome to the Harbor-UCLA Medical Center Department of Nursing. Please read each Self-Study Guide thoroughly. Study questions are provided at the back of each self-study guide for your practice.

Check your answers against the answer key provided at the end of study questions. Please bring this manual and the completed test on the first day of nursing orientation.

**PLEASE DO NOT WRITE IN THE MANUAL.**

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Harbor-UCLA Medical Center  
Department of Nursing

# **Roles and Delegation**

**ROLES AND DELEGATION****Objectives:**

Upon completion of this section, the nurse will be able to:

1. Differentiate specific functions within the scope of practice for Registered Nurses (RNs), Licensed Vocational Nurses (LVNs) and Unlicensed Assistive Personnel (UAPs; e.g., Nursing Attendants, Senior Student Nurse Workers, Surgical Technicians).
2. State the five rights of delegation.
3. Identify four essential components of communication to use when delegating tasks in the clinical setting.

## ROLES AND DELEGATION

### I. INTRODUCTION

The current nursing shortage is impacting healthcare delivery and nursing practice across America, and especially in California. Providing safe and therapeutic care to patients is a challenge to nurses and hospitals everywhere. Finding effective ways to meet today's challenges requires careful consideration and evaluation of the scope of practice for registered nurses (RNs), licensed vocational nurses (LVNs), and unlicensed assistive personnel (e.g., nursing attendants, senior student nurse workers, surgical technicians, etc).

It is important to understand the roles and responsibilities of all members of the nursing team. This knowledge allows members of the team to maximize their own abilities and special skills in delivering optimum care. It is the responsibility of the individual care provider to develop a working knowledge of the laws and regulations defining his or her role. The following section will explore the roles and responsibilities of the various members of the nursing team and strategies for successful delivery of nursing care.

### II. THE ROLE OF THE REGISTERED NURSE

A. The Nursing Practice Act is a designated section of the Business and Professions Code of California addressing nursing practice. The Nursing Practice Act addresses many administrative and educational issues as well as those related to licensure and practice. Section 2725 of the Business and Professions Code of California provides "clear legal authority" for the practice of nursing by registered nurses. It identifies the following functions within the scope of nursing practice.

#### 1. Overview of the Scope of Nursing Practice<sup>1</sup>

- a. The practice of nursing includes those functions of basic healthcare, that help people cope with challenges in performing Activities of Daily Living (ADLs) related to treatment and/or illness or that require a substantial amount of scientific knowledge and/or technical skill to:
- Provide for patient safety
  - Prevent disease
  - Promote restoration of health and function
  - Provide comfort
  - Encourage and facilitate hygiene
  - Administer medication
  - Administer skin tests, venipuncture, and immunization
  - Observe for signs of illness, reactions to treatment, general condition and behaviors
  - Determine whether observed signs, symptoms or behaviors exhibit abnormal characteristics
  - Implement care and initiate referral based on observed abnormalities

### III. THE ROLE OF THE LICENSED VOCATIONAL NURSE

A. The Bureau of Vocational Nursing and Psychiatric Technicians (BVNPT) defines the LVN as 1) An entry-level healthcare provider who is responsible for rendering basic nursing care; 2) An LVN performs/practices under the direction of a physician or registered professional nurse; and 3) The LVN is not an independent practitioner. The LVN must work under the clinical direction and supervision of the RN or MD.

B. Scope of Vocational Nursing Practice<sup>6</sup>

1. According to Title 16 § 2518.5: “The LVN performs services requiring technical and manual skills which include the following:
  - a. LVNs may perform basic assessment, which the LVN Scope of Practice defines as data collection. The LVN may not perform assessment that requires analysis or synthesis of data. The LVN also participates in planning, and executing interventions according to the care or treatment plan. Data collected by the LVN can be used by the RN to assist in the assessment process. LVNs should inform the direct care RN of any abnormal values recognized during the course of performing data collection.
  - b. LVNs provide direct patient care by which the licensee:
    - i. Performs basic nursing services
    - ii. Administers medications
    - iii. Applies communication skills for the purpose of patient/client care and education
    - iv. Contributes to the development and implementation of a teaching plan related to self-care for the patient/client
  - c. LVNs are not independent practitioners, but may implement components of patient care assigned to them by the RN responsible for the patient. Basic nursing services within the LVN Scope of Practice<sup>7</sup> include:
 

<ul style="list-style-type: none"> <li>•Ambulation techniques</li> <li>•Catheter care</li> <li>•Point of care tests</li> <li>•Administration of cleansing enema</li> <li>•Feeding patient</li> <li>•Intake and Output</li> <li>•Skin care</li> </ul>	<ul style="list-style-type: none"> <li>•Bed-making</li> <li>•Specimen collection</li> <li>•Hot and cold applications</li> <li>•Range of motion</li> <li>•Personal hygiene and comfort measures</li> <li>•Positioning and transfer</li> <li>•Vital signs</li> </ul>
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2. Special certifications relating to IV therapy for LVNs are also defined in the LVN Scope of Practice. An LVN who is IV certified by meeting the state requirements for IV certification may start peripheral IVs and superimpose intravenous solutions of electrolytes, nutrients, vitamins, blood and blood products. The law prohibits LVNs from administering IV medications or any intravenous agent via a central line, in any practice setting.<sup>8,9</sup>
3. Harbor-UCLA Medical Center nursing policies and procedures reflect the legal standards of IV therapy for IV certified LVNs.<sup>10,11,12</sup>

#### IV. THE ROLE OF UNLICENSED ASSISTIVE PERSONNEL (UAP)<sup>13</sup>

- A. Use of UAPs is commonly seen in various healthcare settings. UAPs assist licensed nursing personnel in care delivery. The Board of Registered Nursing defines UAPs as healthcare workers who may have received special training or certification, but are not licensed.
  1. Examples of UAPs at Harbor-UCLA include nursing attendants, senior student workers, nursing, and surgical technicians.
  2. UAPs do not include members of the client’s immediate family, guardians, or friends. These individuals may perform nursing care without specific authority from a licensed nurse.<sup>13</sup>
- B. Since there is no specific regulatory agency for UAPs, the Board of Registered Nursing provides legal guidance and definition of the role of the UAP.

- C. UAPs can assist patients with:
- Bathing
  - Feeding
  - Assistance with elimination
  - Maintaining a safe environment
  - Assistance with ambulation
  - Vital signs
  - Weight
- D. Nursing Tasks Which Should **Not** Be Assigned to UAPs include:<sup>13</sup>
1. Tasks to be completed when the client/patient is medically fragile. “A medically fragile patient is a patient whose condition can no longer be classified as chronic or stable and for whom performance of the assigned task could not be termed routine. Medically fragile includes those patients who are experiencing an acute phase of illness, or are in an unstable state that would require ongoing assessment by an RN.”<sup>13</sup>
  2. Tasks associated with on-going chronic problems which pose potential harm to the patient experiencing an acute illness.
  3. Tasks which require a substantial amount of scientific knowledge or technical skill including, but not limited to:
    - a. Formulation of the nursing diagnosis
    - b. Formulation of the plan of care
    - c. Evaluation of the effectiveness of the nursing care provided
    - d. Patient education - Educating patients and their families concerning healthcare problems and/or discharge teaching
    - e. Care of invasive lines - Invasive procedures including inserting nasogastric tubes, inserting catheters, or tracheal suctioning
    - f. Procedures involving sterile techniques

## V. THE FOUNDATION OF NURSING PRACTICE<sup>14</sup>

- A. The nursing process is recognized as the foundation of nursing practice. The nursing process consists of assessment, diagnosis, planning, implementation, and evaluation. A definition of the components follows:
1. Assessment: Collects and interprets data about health status, risk factors, health problems, psychosocial needs and support systems as well as spiritual needs and support systems
  2. Diagnosis: Analyzes assessment data and identifies appropriate nursing diagnosis/diagnoses
  3. Planning:
    - Prioritizes diagnoses and problems
    - Defines desired/expected outcomes and goals
    - Selects appropriate interventions
  4. Implementation: Performs and documents interventions and activities identified in the plan of care
  5. Evaluation: Assesses the patients for their response to individual interventions and measure progress according to stated outcomes and interventions. Modifies interventions and outcomes as appropriate
- B. Assessment is the collection and interpretation of health data. Data collection focuses on discovering evidence of health problems and contributing factors.<sup>15</sup> RNs are expected to

utilize their knowledge in the various sciences when performing patient assessment. While LVNs and UAPs can participate in data collection, only the RN can interpret the assessment data. Synthesis of assessment data into a nursing diagnosis is clearly designated as an RN responsibility.

1. The RN is required to perform and document a complete assessment for each assigned patient during the shift and upon admission and/or transfer of a patient.<sup>2,16,17</sup> A complete assessment includes physical, psychosocial, and spiritual components as well as any elements impacting the patient's health status.
  2. In addition to patient assessment, the RN is also required to assess the competence and skill levels of LVNs and UAPs in order to appropriately delegate patient care activities.<sup>1</sup>
- C. Synthesis of assessment findings results in a diagnosis.<sup>15</sup>
1. The American Nurses Association (ANA) includes “diagnosis as an essential element of nursing practice, and describes diagnosis as the nurse analyzing data to determine a diagnosis.”<sup>4</sup> Formulation of nursing diagnoses “requires a substantial amount of scientific knowledge or technical skill”, thus, only an RN can formulate a nursing diagnosis.<sup>16</sup>
  2. Accurate application of the nursing process at the diagnosis stage is critical for effective and safe care planning.<sup>14</sup>
- D. Planning includes prioritization, outcome identification and selection of appropriate interventions.<sup>17</sup>
1. The planning phase of the nursing process involves three major components.
    - a. Determination of priority nursing diagnosis/diagnoses
    - b. Establishment of expected outcomes and goal development
    - c. Selection of interventions that will work toward desired outcomes and goal achievement
  2. Professional and legal regulations require care planning for each patient. They mandate that the plan of care be developed collaboratively with the patient, family members, or other representatives and interdisciplinary team members involved. Regulation also requires that the care plan remain in the patient's permanent medical record.<sup>3,5</sup>
- E. Implementation is putting “the plan into action”.<sup>15</sup> Essential components of implementation include patient and family teaching as well as delegation of tasks and supervision of nursing team members.<sup>3</sup>
- F. Nursing interventions are performed to: Monitor health status; reduce risks; resolve, prevent, or manage a problem; facilitate independence or assist with activities of daily living (ADLs); promote optimum sense of physical, psychological, and spiritual well being.
- G. Evaluation determines the effectiveness of the patient in meeting the outcomes in the plan of care.<sup>18</sup> Ongoing assessments and evaluation keeps the nursing process dynamic, and maintains continuity of care.<sup>14</sup>
1. Careful evaluation of the plan of care will result in one of three general actions:<sup>17</sup>

- a. Continuation of the plan - desired outcomes remain unmet, yet feasible for the patient; current strategies and interventions are working to move the patient toward desired outcome achievement.
  - b. Modification of the plan - desired outcomes are deemed unachievable and/or current strategies and interventions are not moving the patient towards outcome achievement; new problems/diagnoses arise and new outcomes and interventions are identified.
  - c. Resolution of the plan - desired outcomes are met, no new problems/diagnoses are identified.
2. Advocacy is a fundamental component of the evaluation process. Title 16 requires that the RN act as the patient’s advocate by initiating action to improve healthcare or to change decisions or activities which are against the interests or the wishes of the patient. The patient must have the opportunity to make informed decisions about healthcare before it is provided.<sup>2</sup>

The nurse acting as an advocate shall: Protect privacy; ensure confidentiality; assure the competence of nursing care providers; take corrective action when questionable practice is noted; and guard a patient’s right to self-determination when they are considering or participating in research.

VI. APPLICATION OF ROLES AND RESPONSIBILITIES WITHIN THE NURSING TEAM

A. Nursing care is most effective when all team members are maximizing their role and fulfilling their responsibilities. Table 1 shows examples of specific applications of nursing team roles and responsibilities.

**Table 1. Specific Examples of Application of Roles and Responsibilities within the Nursing Team**

ROLE	RN	LVN	NA
Assessment •Pain  •Nutrition	•Completes pain assessment •Integrates data from other healthcare providers •Documents findings  •Completes nutritional screening •Integrates data from members of the nursing team •Assesses oral mucosa •Obtains and interprets appropriate lab values as needed (e.g., albumin) •Documents findings	•Collects information about patient’s pain including using appropriate pain scale •Communicates findings to RN and documents in medical record  •Monitors and documents height, weight, intake and output •Obtains appropriate labs as ordered •Reports patient identified	•Screens patients for presence of pain - may use appropriate pain scale •Communicates findings to RN  •Measures and documents height, weight, intake and output •Reports patient identified
•Diagnosis	•Synthesizes assessment findings into appropriate nursing diagnoses	•None	•None
•Planning	•Selects appropriate outcomes and interventions for each nursing diagnosis •Appropriately prioritizes nursing diagnoses	•Contributes information to care plan development	•Contributes information to care plan development

ROLE	RN	LVN	NA
Interventions •Pain  •Nutrition	•Administers appropriate pain medications (IV, PO, IM, transdermal, SQ, PR) •Recommends pain consult to MD •Facilitates pain management education  •Initiates nutrition consults •Places and maintains enteral feeding devices (e.g., NG tube) •Administers TPN & PPN •Monitors fluid balance, electrolyte, and weight •Documents care provided	•Administers appropriate pain medications (PO, IM, transdermal, SQ, PR) •Provides education about pain medication, and non-pharmacological interventions  •Monitors fluid balance, electrolyte and weight •Places and maintains enteral feeding device (e.g., NG tube) •Provides oral care •Documents care provided	•Provides comfort measures  •Assists with feeding as needed •Provides oral care
Evaluation •Pain  •Nutrition	•Reassesses effectiveness of pain interventions •Evaluates progress towards Identified outcomes •Integrates data from other healthcare providers when making decisions regarding modification of the care plan and documents findings •Analyzes data for changes in nutritional status •Reassesses effectiveness of interventions •Evaluates progress towards identified outcomes •Integrates data from other healthcare providers when making decisions regarding modification of the care plan •Documents findings	•Asks patient to re-rate pain on previously identified pain scale •Reports data to RN •Documents findings •Reports patient identified problem to RN  •Reports and documents intake and output •Monitors changes in weight •Reports patient identified problem to RN	•Reports data to RN as requested by RN (e.g., presence of pain, HR) •Reports patient identified problem to RN  •Reports and documents intake, output, and weight •Reports patient identified problem to RN

- B. Successful application of roles and responsibilities of each team member will result in quality patient safe care.

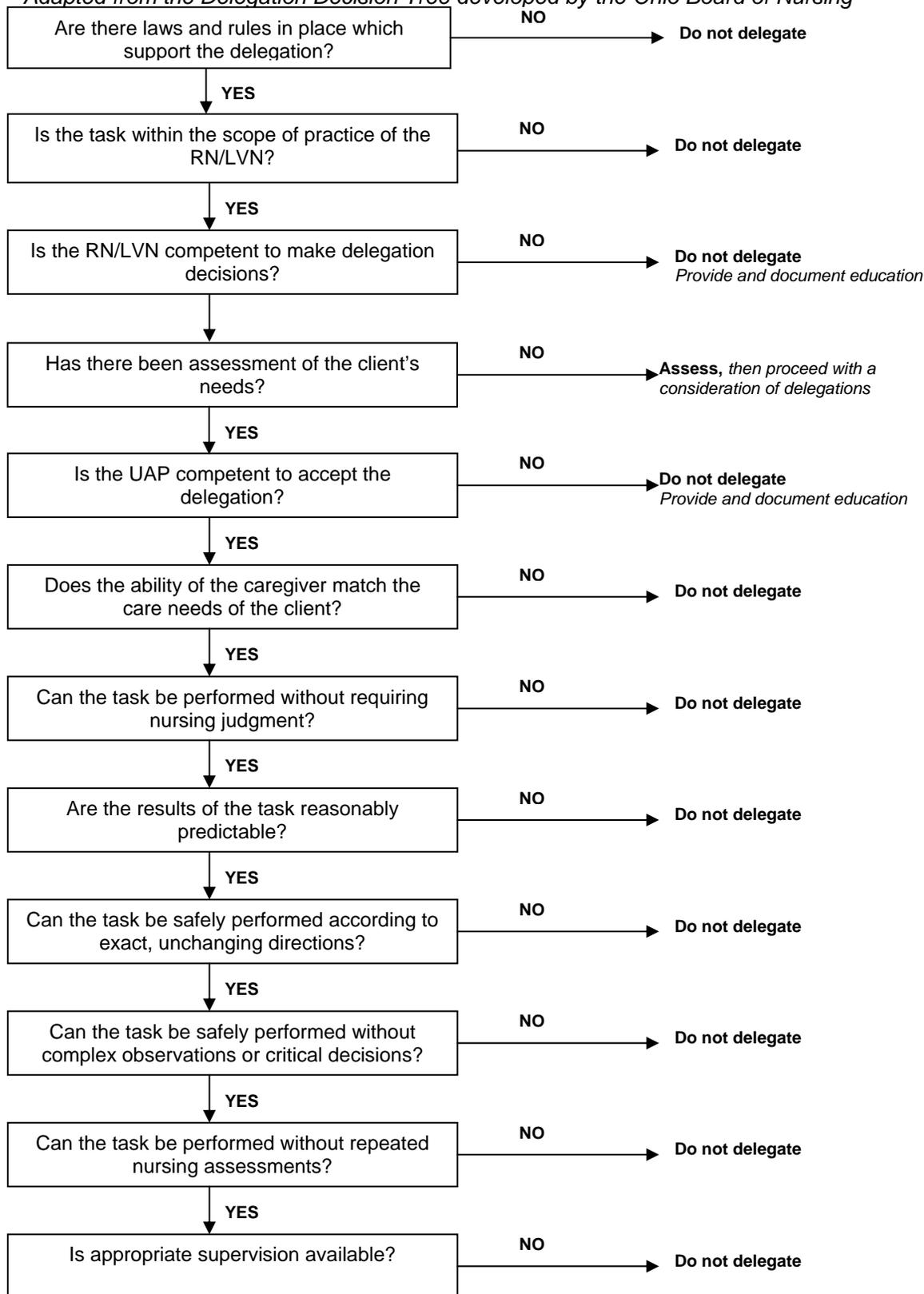
## VII. DELEGATION

- A. Understanding each team member's role facilitates the work of patient care. Delegation is used in an effort to have the right person involved in the appropriate work. The ability of the RN to delegate is an essential component of nursing practice in order to provide quality care. Both professional and legal regulations specifically identify delegation and supervision as important aspects of the RN role. This section will discuss some practical guidelines to use when making delegatory decisions and strategies for successful delegation and supervision of nursing tasks.
- B. The Five Rights of Delegation identified in *Delegation: Concepts and Decision-making Process* assists nurses in the decision-making process, and clarifies important elements of delegation.<sup>20</sup> Delegation of nursing activities must be "based upon the fundamental principal of protection of health, safety and welfare of the public
1. Right Task - one that is appropriate to delegate for a specific patient

2. Right Circumstances - appropriate patient setting, available resources, and other relevant factors considered
  3. Right Person - right person is delegating the right task to the correct person to be performed on the appropriate person
  4. Right Direction/Communication - clear, concise description of the task, including its objectives, limits and expectations
  5. Right Supervision - appropriate monitoring, evaluation, intervention (as needed) and feedback
- C. Terms commonly utilized in the delegation process<sup>20,22</sup>
1. Accountability: being responsible and answerable for actions or inactions of self or others in the context of delegation
  2. Assignment: designating nursing activities to be performed by an individual consistent with his/her licensed scope of practice or role
  3. Delegation: the transfer to a competent individual the authority to perform a selected task in a selected situation. The delegation of an activity passes on the responsibility for task performance but not accountability for the process or the outcome of the task
  4. Delegator: the person making the decision
  5. Delegatee: the person receiving the delegation
  6. Supervision: the provision of guidance or direction, evaluation and follow-up by the licensed nurse for accomplishment of a nursing task delegated to unlicensed assistive personnel.
- D. The following *Delegation Decision-making Tree* illustrates decision-making in the delegation of nursing tasks

# Delegation Decision-making Tree

*Adapted from the Delegation Decision Tree developed by the Ohio Board of Nursing*



*Note: Authority to delegate varies, so licensed nurses must check the jurisdiction's statutes and regulations. RNs may need to delegate to the LVN the authority to delegate to the UAP.*

- E. Communication is one of the most essential components in effective delegation because the outcomes can vary depending on how the delegation is communicated. The nursing team includes people from significantly different educational and cultural backgrounds, age, work experience, and language, which affects the communication of delegation.<sup>22</sup>

The 4 “Cs” of communication assist the delegator in providing clear and well-defined instructions to the delegatee. The delegator must ensure that the communication is:<sup>22</sup>

1. Clear, Concise, Correct, and Complete
  - a. Clear - Am I saying what I want to say and is the delegatee hearing it?
  - b. Concise - Am I confusing him/her with too much information?
  - c. Correct - Is this a task I can comfortably delegate to a competent individual and is the task within his/her role?
  - d. Complete - Am I stating the outcome we want to achieve? (Explaining why this is being done); Have I given parameters for reporting? And does delegatee have enough information to do the job accurately?
2. The delegator should never assume that a delegatee will perform a delegated task as directed when the delegated task has not been communicated with clear, well-defined expectations, and concrete instructions.<sup>20</sup>
3. The instructions should include: Who, What, When, Where, How, Why.<sup>22</sup>
  - a. Who - Refers to who the delegatee is and who the patient is.
  - b. What - Identifies the task to be done within the scope of the delegatee.
  - c. When - Defines the time frame for task completion and specifies deadline for reporting back to delegator.
  - d. Where - Refers to anatomical and/or geographical location for task completion.
  - e. How - Method for task completion.
  - f. Why - It is important that delegatee understands the significance of the delegated task to patient care outcomes.

Example of complete/combined approach to communicate delegation:

Martha (*who-delegatee*), Do you have 10-15 minutes to ambulate?(*what*), Mr. Parker (*who*), before lunch please (*when*)? He is slightly weak on his right side; so please walk on his left side (*how*) to give support on his unaffected side (*why*). See if you can get him to walk the length of the hall (*where*).

4. The following situation is communicated in two different ways. Which situation would be the most effective way to communicate when delegating a task?<sup>23</sup>
  - a. Situation 1: An RN asks an NA to do a blood pressure check on Mrs. Hodges. The blood pressure is taken within an hour and the NA charts the findings. Mrs. Hodges' blood pressure is 190/118. The nurse fails to notice or check with the NA until over two hours later.<sup>23</sup>

- b. Situation 2: An RN informs the NA, “Mrs. Hodges had headaches last night and her blood pressure was a little high. Would you please check Mrs. Hodges’ blood pressure by 9:00 am and report her blood pressure to me as soon as possible. Thank you.”
- c. In situation 1, there is a problem in instruction and delegation because the instruction was not clear and well-defined. However, in situation 2, the RN provided more clear and well-defined instructions including, who, what, when, where (implied), how, and why information which resulted in effective communication of the delegated task.

F. Commonly asked questions regarding supervision and delegation<sup>23</sup>

**Q:** *Is an LVN an independent practitioner?*

**A:** No. According to the LVN scope of practice, the LVN may provide nursing care under the supervision of the RN.

**Q:** *If an RN is responsible for supervision of UAPs what does that entail for the RN?*

**A:** Supervision is the action of the RN in directing, guiding, and influencing the UAP in performing an activity or task.

**Q:** *What guidelines should be used when determining the appropriate level of supervision?*

**A:** The RN, as the person ultimately responsible for patient outcomes, should incorporate measures or controls for determining if an activity has been completed in a suitable manner that meets expectations. Second, controls should be instituted to assure that the RN delegating an activity can stop an inappropriate act, review the measures taken, or otherwise regain control and complete the activity or task.

**Q:** *Does the act of delegation of tasks carry accountability with it?*

**A:** While the state laws may vary in interpretations, it is a reasonable assumption that the RN remains legally responsible for the activities that are delegated to UAP.

**Q:** *If the UAP does not perform an activity correctly, why is the RN accountable?*

**A:** The RN is responsible for assessing the competence and skill level of a UAP prior to delegating nursing tasks. The RN should also provide appropriate supervision of task completion.

G. Tips for Delegators<sup>22</sup>

- Delegate to the most appropriate person
- Define task and expectations
- Specify time frames
- Include need to know information
- Guide priorities
- Listen to suggestions
- Ask for help instead of telling
- Make your availability known to the support person
- Retain control while giving the support person the necessary freedom to think and act

## VIII. CONCLUSION

A basic understanding of regulatory standards and Harbor-UCLA policies and procedures builds a foundation for effective nursing practice and enhances each team member’s ability to provide quality patient care. Applying knowledge of the regulatory standards, effective communication, and delegation strategies are the key to successful coordination of patient care. Recognizing that everyone plays a vital role in care delivery will improve outcomes and create a positive work environment.

## ROLES AND DELEGATION

### Study Questions

1. Which of the following nursing staff is allowed to delegate tasks to others?
  - a. Registered Nurse
  - b. Licensed Vocational Nurse
  - c. Nursing attendants
  - d. Clerks
  
2. When using the four C's of communication for delegation, concise refers to?
  - a. Providing clear information
  - b. Giving too much or too little information
  - c. Identifying the right task to be delegated
  - d. Explaining why the task needs to be done
  
3. Which of the following statements reflects appropriate communication of delegation to unlicensed assistive personnel?
  - a. Patient in room 18B needs vital signs.
  - b. Patient in room 18B needs vital signs now.
  - c. Patient in room 18B needs vital signs in 20 minutes and please let me know what his blood pressure is.
  - d. Patient in room 18B needs vital signs in 20 minutes because I just increased his PCA dosage. Would you please report back to me what his vital signs are when you are done?
  
4. Which of the following tasks cannot be delegated to UAPs?
  - a. Vital signs
  - b. Assisting with ambulation
  - c. Administering cleansing enema
  - d. Monitoring patients in restraints
  
5. Which of the following tasks would be appropriate to delegate to an LVN and not an UAP?
  - a. Insert Foley catheter
  - b. Assist in hygiene care
  - c. Formulate nursing diagnosis
  - d. Assist in collecting data for Nursing Admission/History and Assessment
  
6. Which of the following functions are not within the Scope of Nursing Practice as defined in the Nursing Practice Act?
  - a. Prevent disease
  - b. Observe for signs of illness
  - c. Cure disease
  - d. Provide comfort
  
7. The following are examples of an unlicensed assistive personnel **EXCEPT**:
  - a. Surgical technician
  - b. Nursing attendant
  - c. Patient's neighbor
  - d. Escort Services staff

8. An LVN can administer the following:
- Insulin SQ
  - Coumadin PO
  - Blood and blood products
  - All of the above
9. An LVN may participate in the assessment process in all of the following ways **EXCEPT**:
- Calculate I & O
  - Monitor vital signs
  - Measure pain on a pain scale
  - Evaluate patient need for fall prevention measures (FPM)
10. Which of the following is the correct sequence of the nursing process?
- Assessment, implementation, evaluation
  - Assessment, planning, diagnosis, evaluation
  - Assessment, implementation, evaluation, planning
  - Assessment, diagnosis, planning, implementation, evaluation

### **CHECK YOUR ANSWERS TO THE STUDY QUESTIONS**

#### **Answers to Study Questions**

1. a      2. b      3. d      4. c      5. a      6. c      7. c  
8. d      9. d      10. d

If you answered 9 out of the 11 questions correctly, go on to the next section. If you missed 3 or more, read the content again and repeat the study guide questions.

## References

1. Board of Registered Nursing. The Nursing Practice Act, Business and Professions Code of California, § 2700-2838.4. Web site. <http://www.rn.ca.gov/regulations/bpc.shtml#2725>. Accessed November 1, 2012.
2. Department of Consumer Affairs. Standards of Competent Performance, 16CCR § 1443.5. Web site. <http://www.rn.ca.gov/pdfs/regulations/npr-i-20.pdf>. Accessed December 10, 2009 November 1, 2012.
3. Waterman-Taylor J. *Implementation of Nursing Practice Standards & Guidelines*. Washington DC: American Nurses Publishing; 1995,15.
4. Joint Commission Accreditation for Healthcare Organizations. In: *Comprehensive Accreditation Manual for Hospitals: The Official Handbook*. 2000.
5. Board of Vocational nursing and Psychiatric Technicians. Scope of Vocational Nursing Practice, 16CCR § 2518.5. Web site. [http://www.bvnpt.ca.gov/pdf/mandatory\\_reporting\\_language.pdf](http://www.bvnpt.ca.gov/pdf/mandatory_reporting_language.pdf). Accessed November 6, 2012.
6. Department of Consumer Affairs. Eligibility for Licensure, 16CCR § 2516. Web site. <http://www.rn.ca.gov/pdfs/applicants/end-app.pdf>. Accessed December 5, 2012.
7. Board of Registered Nursing. The Nursing Practice Act, Business and Professions Code of California § 2860.5. Web site. <http://www.rn.ca.gov/pdfs/applicants/end-app.pdf>. Accessed November 6, 2012.
8. Professional and Vocational Regulations, 16CCR § 2542 (1997).
9. Los Angeles County Harbor-UCLA Medical Center Department of Nursing. Intravenous Therapy (Peripheral). In: *Policy Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center Department of Nursing; 2012: 215.0-215.18.
10. Los Angeles County Harbor-UCLA Medical Center Department of Nursing. Blood and Blood Products Transfusion, Administration and Monitoring. In: *Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center Department of Nursing; 2011: 50.0-50.11.
11. Board of Registered Nursing. Unlicensed Assistive Personnel. Web site. <http://www.rn.ca.gov/pdfs/regulations/npr-b-16.pdf>. Accessed November 6, 2012.
12. Alfaro-LeFevre R. *Applying the Nursing Process: Promoting Collaborative Care*. Philadelphia: Lippincott; 2002.
13. Alfaro-LeFevre R. *Applying the Nursing Process: Promoting Collaborative Care*. Philadelphia: Lippincott; 2002:5.
14. Board of Registered Nursing.. The Nursing Practice Act, Business and Professions Code of California § 2725. Web site. <http://www.rn.ca.gov/pdfs/regulations/npr-b-53.pdf>. Accessed November 6, 2012.
15. Alfaro-LeFevre R. *Applying the Nursing Process: Promoting Collaborative Care*. Philadelphia: Lippincott; 2002; 142.
16. Nettina SM. *The Lippincott Manual of Nursing Practice*. 8<sup>th</sup> ed. Philadelphia: Lippincott; 2006.
17. Habel M. Delegating Nursing Care to Unlicensed Assistive Personnel. In: *Continuing Education for California Nurses 2000*. Sacramento: Continuing Education Resource; 2000:1-20.

18. National Council of State Boards of Nursing, Inc. Delegation Concepts and Decision-Making Process, National Council Position Paper, 1995. Web site.  
[http://www.ncsbn.org/public/regulations/delegation\\_documents-delegati.htm](http://www.ncsbn.org/public/regulations/delegation_documents-delegati.htm)  
<http://www.state.ia.us/nursing/images/pdf/delegation1.pdf> Accessed December 5, 2012.
19. National Council of State Boards of Nursing, Inc. The Five Rights of Delegation. 1997. State of California Department of Consumer Affairs, Board of Registered Nursing. Unlicensed Assistive Personnel. Web site. <http://www.rn.ca.gov/pdfs/regulations/npr-b-53.pdf> . November 16, 2012.
20. Hansten RI. & Washburn MJ. Interventions to making it all happen. In: *Toolbook for Healthcare Redesign*. Gaithersburg, MD: Aspen Publishers; 1997; 119-218.
21. Walton, JC, Waszkiewicz, M. Managing Unlicensed Assistive Personnel; Tips for Improving Quality Outcomes. *MedSurg Nursing*. 1997;6:24-28.

Harbor-UCLA Medical Center  
Department of Nursing

# **PATIENT SAFETY: PATIENT IDENTIFICATION SELF-STUDY GUIDE**

## **Patient Safety: Patient Identification**

### **Objectives:**

After completion of this section, the participant will be able to:

1. Differentiate between patient identifier and source of patient identification.
2. Give examples of patient identifiers and examples of non-patient identifiers.
3. Identify the number of patient identifiers to use before obtaining lab specimens, or administering medications or blood products, registering a patient or sending a patient for a test.
4. Identify procedures that require use of two patient identifiers based on Harbor-UCLA policy.

## I. DEFINITION: PATIENT IDENTIFIERS

## A. What is meant by two “patient identifiers”?

An identifier is a piece of information specific to the person, for example the patient’s name, identification number, telephone number, date of birth, social security number. An identifier **is not** the medium on which the information is kept (e.g., driver’s license, identification card) (Table 1). In other words, two patient identifiers could mean name and identification number, name and social security number, **but not** identification card and bed card.

**Table 1. Patient Identifiers, Sources of ID, Non-patient Identifiers**

Patient Identifiers Examples	Sources of Identification Examples	NOT Patient Identifiers
<ul style="list-style-type: none"> <li>Name</li> <li>Patient identification number</li> <li>Date of birth</li> <li>Social security number</li> <li>Address</li> <li>Telephone number</li> <li>Tag number (newborns and mothers)</li> </ul>	<ul style="list-style-type: none"> <li>Driver’s license</li> <li>Patient ID card</li> <li>Picture ID card</li> <li>Passport</li> <li>Alien registration card</li> </ul>	<ul style="list-style-type: none"> <li>Room number</li> <li>Bed number</li> <li>Diagnosis (the “gun shot wound” in bed 3)</li> <li>Organ of disease (the “liver” in bed 5)</li> </ul>

## B. Intent of using two patient identifiers

The intent of the recommendation to use two identifiers is to reliably identify the individual as the person for whom the service or treatment is intended; and to match the service or treatment to that individual (Table 2). The two patient-specific identifiers must be directly associated with the individual and the same two identifiers must be directly associated with the medication, blood product or specimen tube (such as an attached label).

**Table 2. Intent of Using Two Identifiers**

Intent	Action (Example)
Identify the individual as the person for whom the service or treatment is intended.	Check the order and compare the patient’s name and MRUN on the physician order sheet with the patient’s name and MRUN on the patient’s identification bracelet.
Match the service or treatment (e.g., medication administration) to that individual.	Check the medication administration record (MAR) and compare the patient’s name and MRUN on the MAR with the patient’s name and MRUN on the patient’s identification bracelet.

## C. Unidentifiable patients

Some patients who come to the emergency department may not be able to provide their identifying information because they are unconscious or unable to communicate. These patients can be assigned a temporary “name”, e.g., John Doe, Trauma Patient and an E.D. or medical record number. These identifiers could then be used to identify the patient and match against specimen labels, medications ordered for the patient, or blood product labels.

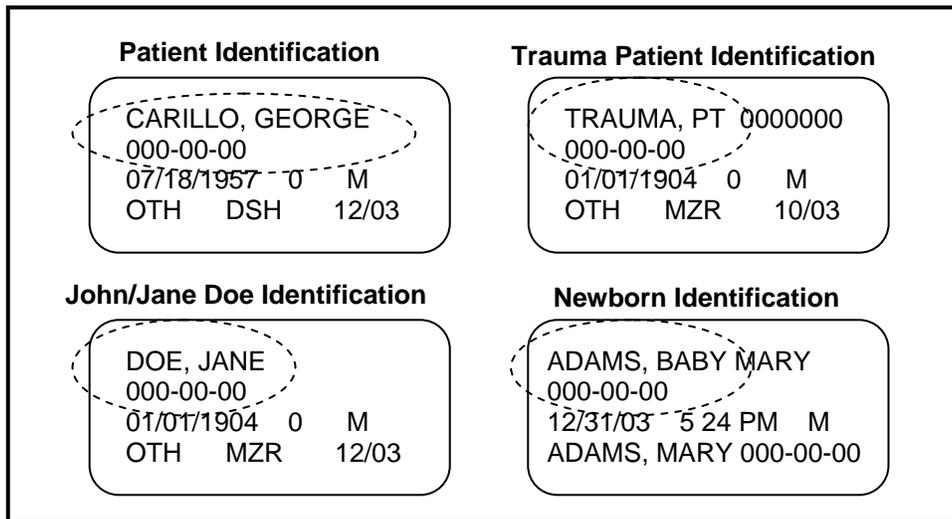
D. Patients without identification bracelets

Patients in the ambulatory care setting may not have armbands. If patients do not have an armband, asking them their name and comparing it to existing paperwork **does not** constitute two patient identifiers. Comparing the patient’s stated name to a name on existing paperwork is **one** identifier. A second identifier might be date of birth, social security number, address, or phone number.

Patient Identification. Harbor-UCLA Medical Center. *Hospital and Medical Administration Policy & Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012. Policy 452.

II. HARBOR-UCLA POLICY: PATIENT IDENTIFICATION

Figure 1. Patient Identifiers for Various Types of Patients (identifiers shown inside circles)



A. At least two of pieces information are required to validate a patient’s identification prior to the administration of any of the following procedures:

1. Administering medications
2. Providing treatments or procedures
3. Obtaining blood or other specimens for laboratory tests
4. Performing diagnostic tests and/or invasive procedures
5. Administering blood/blood products
6. Transporting or discharging patients
7. Distributing diet trays
8. Storing, thawing, or administering breastmilk
9. Dispensing discharge and outpatient prescriptions

B. Verification of patient identity

At least two pieces of information are used to verify the patient’s identity prior to performance of any of the previously identified procedures (see above) except in case of a life-threatening emergency. Whenever possible, patients must be actively included in the identification process. To verify identification, one must include the following minimum criteria:

### 1. **Inpatients and Emergency Department**

Verify name **and** MRUN from the identification band (Figure 1). If the patient is able, also ask him/her to state his/her name. Do not ask, "Are you Mrs. Smith?". Patients who are anxious or who do not speak English may respond "yes" without appropriately hearing or understanding the question.

### 2. **Ambulatory Care Clinics**

Ask the patient to state his/her name and date of birth. Confirm this information against the patient's identification plate. In the event that the plate is not available, ask the patient his/her name and birth date and confirm by comparing with one of the following additional sources of identification:

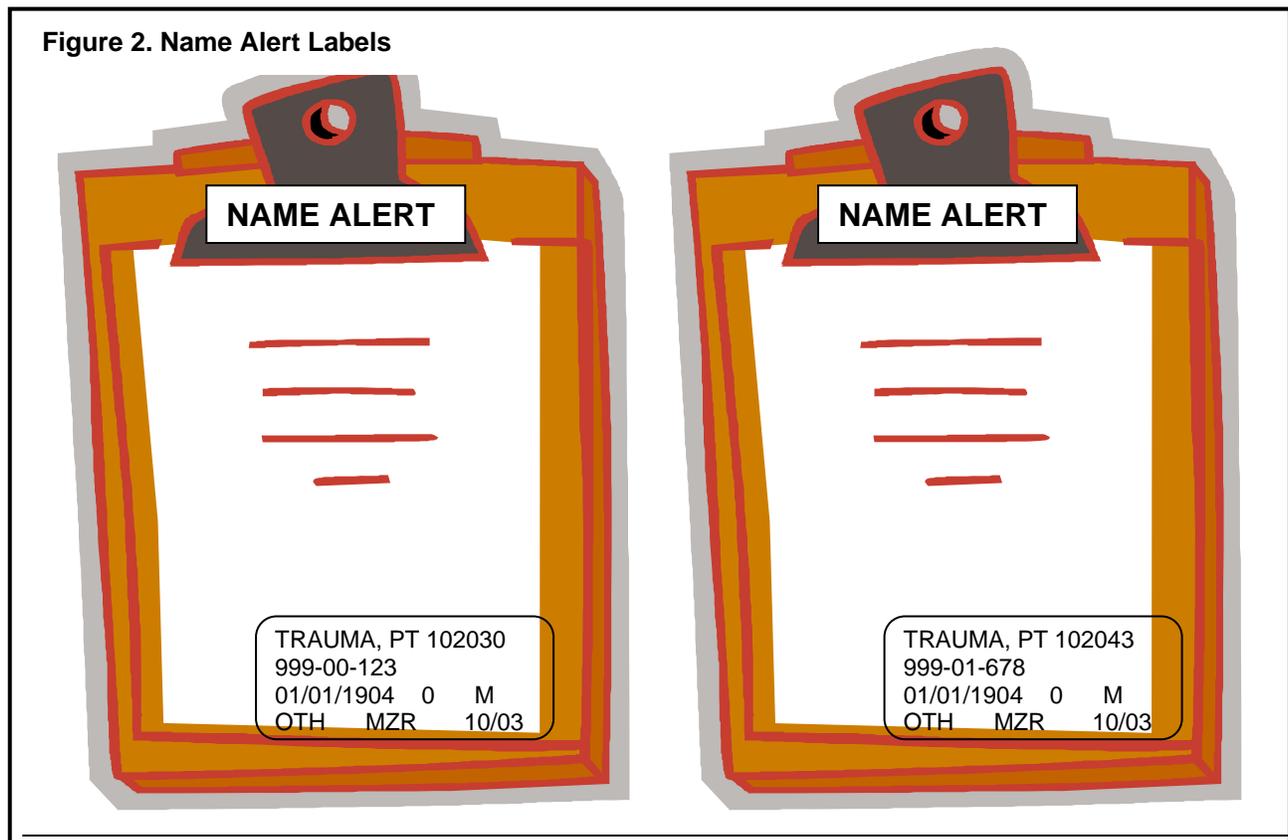
- a. Driver's license
- b. Picture ID
- c. Passport
- d. Alien registration card

### 3. **Newborn Identification System**

This additional banding system consists of 3 bands, each pre-printed with an identical 5 digit number. This 5 digit number is separate and distinct from a patient's MRUN and compared to verify the newborn's identity with the mother. Once the bands are placed, they are compared whenever infants have been separated and reunited with their mothers.

### C. **Name Alert**

Nursing staff will prepare and post a "name alert" label for any patients with similar/same names (Figure 2).



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**Lessons from the Front Lines**

**Mr. Smith Mix-Up.** Joe Smith [not his real name] a 42 year old man was on a medical surgical floor. Raymond Smith [not his real name] was in the same room. Raymond Smith was scheduled to receive a dose of haloperidol (Haldol) IV. The nurse obtained the prefilled syringe from Mr. Smith's medication drawer and went over to Joe Smith to administer the drug. Had a rounding medical student not been present and asked the nurse what she was giving, the nurse would've administered the Haldol to the wrong Mr. Smith.<sup>1</sup>

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**III. PATIENT EDUCATION**

The Agency for Healthcare Research and Quality (AHRQ) has developed informative sheets for patients and parents on how they can help prevent medical errors.<sup>2,3</sup> These patient fact sheets are available on the internet at [www.ahrq.gov](http://www.ahrq.gov).

The single most important thing that healthcare consumers can do to help prevent medical errors is to be involved in their care. Patients and parents should be encouraged to participate in care decisions that affect them, their significant others, and their children. Teaching points specific to patient identification include the following.<sup>2</sup>

- A. Teach patients to expect healthcare workers to look at their patient identification bracelet before administering any medications, blood or performing any procedures. In ambulatory care settings, teach patients to expect healthcare workers to ask their patients their names and birth dates and confirm them by comparing with one of their additional sources of identification, (i.e., driver's license, picture ID, passport, etc.)
- B. Encourage patients to be familiar with their medications. Patients should feel comfortable asking questions about the medications that are being administered to them. If a nurse plans to administer a medication that is not familiar to the patient, the nurse should question it and he/she should confirm that the medication is ordered for that patient.
- C. Encourage patients to know the interventions and treatments ordered for them. If a healthcare worker approaches the patient to perform an unfamiliar or unexpected treatment or procedure, the patient should question it and expect the healthcare worker to confirm that the procedure is ordered for him/her.

**IV. CONCLUSION**

Services and treatments could be harmful if given to the wrong patient. It is imperative to accurately identify patients using two unique pieces of information about the person, called patient identifiers. Nurses must know the procedures they perform that require verification through the use of two patient identifiers. Whenever possible, patients must be actively included in the identification process.

**PLEASE COMPLETE THE STUDY QUESTIONS ON THE NEXT PAGE**



## **PATIENT SAFETY: PATIENT IDENTIFICATION**

### **References**

1. Archived cases & commentaries: Medicine. The Case: "Mr Smith" Mix-up: patient almost received haloperidol ordered for roommate with same last name. *Web M&M: Morbidity & Mortality Rounds on the Web* [serial online]. <http://webmm.ahrq.gov/cases.aspx?ic=1>. Accessed December 5, 2012
2. *20 Tips to Help Prevent Medical Errors*. Agency for Healthcare Research and Quality Medical Errors & Patient Safety page. AHRQ Pub. No. 02-P038. September 2002. <http://www.ahrq.gov/consumer/20tips.pdf>. Accessed December 5, 2012
3. *20 Tips to Help Prevent Medical Errors in Children*. Agency for Healthcare Research and Quality Medical Errors & Patient Safety page. AHRQ Pub. No. 02-P034. September 2002. <http://www.ahrq.gov/consumer/20tipkid.pdf>. Accessed December 5, 2012

### **Bibliography**

Institute for Healthcare Improvement. Failure modes and effects analysis (FMEA) tool. <http://www.ihl.org/ihl/workspace/tools/fmea/ProcessDetailDataReport.aspx?ToolId=4359&ScenarioId=5198&Type=1>. Accessed December 5, 2012

Patient identification. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012. Policy 452.

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**COMPREHENSIVE AGE APPROPRIATE  
CARE CONSIDERATIONS  
SELF-STUDY GUIDE**

Developed by:

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## Comprehensive Age Appropriate

### Objectives:

After completion of this section, the participant will be able to:

1. Name the major age categories of the human lifespan.
2. Describe the psychological stages of each age group.
3. Identify each age group's most common fears.
4. Discuss how to modify his/her nursing care to incorporate the psychological needs of different age groups.
5. State at least one action to take to promote the physical safety for patients in each age category.
6. Explain the differences in teaching approaches for patients of different age stages.

**INFANCY - PREMATURE INFANT (<37 weeks gestation)****COMPREHENSIVE AGE APPROPRIATE CARE CONSIDERATIONS**

*NOTE: See also, "Infancy"*

**CAPABILITIES/LIMITATIONS OF PREMATURE INFANTS***Physical and Motor*

- Irregular state regulation
- Increased and decreased tone
- Easily exhausted
- Irritable, difficult to soothe
- Poor and altered coordination
- Altered autonomic regulation
- Large body surface area to mass ratio predisposes premature infants to fluid and heat loss.
- Differences in anatomy of head, neck, chest, airways put infants at risk for airway obstruction.
- Immaturity of skin predisposes premature infants to epidermal stripping, chemical and thermal burns, fluid and electrolyte imbalances

*Auditory*

- Active responses to sound observed in preterm infants by 25-28 weeks gestation
- Preterm infants respond to sound by autonomic, attentional, and alerting responses

*Visual*

- Preterm infants demonstrate pupillary light responses and blinking to a bright light by 29-30 weeks, fixate on simple patterns by 30 weeks, demonstrate pattern preference by 31-32 weeks gestation
- Preterm infants take longer to fixate, are less visually responsive, have poorer visual acuity and ability to accommodate than term infants

**STRESS SIGNALS (Signs that a premature infant is overwhelmed with stimuli)***Autonomic System*

- Respiratory pauses, tachypnea, gasping
- Color changes (dusky, pale, mottled, cyanotic)
- Tremors, startles, twitches
- Yawning
- Gagging, spitting up
- Hiccoughing
- Sneezing, coughing
- Sighing

*Motor System*

- Flaccidity (trunk, extremities, face)
- Hypertonicity
- Finger splaying
- Facial grimacing
- Hand on face
- Frantic diffuse activity

*State System*

- Diffuse sleep-wake states
- Fussing or irritability
- Staring or gaze averting
- Panic or worried alertness
- Glassy eyed alertness
- Diffuse arousal

**APPROACHES**

- Pay attention to "stress signals" and minimize sensory input when infant is displaying such signals
- Cluster care to provide periods of rest
- Provide appropriate sensory stimuli
- Single visual stimulus placed within infant's visual range on side of incubator
- Single stuffed animal or toy placed in infant's visual range
- Mobile
- Frequently assess maintainability of airway
- Pay attention to non-verbal cues (e.g., vital signs, body language, crying) for assessment of pain and/or discomfort
- Provide appropriate thermal management
- Use a barrier such as Duoderm Extra Thin between skin and tape
- Avoid frequent baths to maintain acidity of skin pH
- Use minimal amounts of disinfectants on skin, on smallest area possible, and wash off as soon as possible

## INFANCY

### COMPREHENSIVE AGE APPROPRIATE CARE CONSIDERATIONS INFANCY (0-18 months)

#### PSYCHOSOCIAL STAGE: Trust vs. Mistrust

- Major task is to acquire a sense of trust.
- An infant whose physical and emotional needs are met learns to trust self and environment. Needs include:
  - Basic physical needs
  - Nurturing
  - Opportunity to explore environment
- An infant whose needs are not always met or who becomes frustrated with the caregiver grows mistrustful and insecure.

#### *Common fears*

- Separation
- Strangers

#### COGNITIVE STAGE: Sensorimotor (0-2 years)

- Learning occurs by the use of their senses.
- Sensorimotor thought begins with simple reflexes in first few months and ends with primitive symbolic thinking.
- Object permanence is a major cognitive task of this stage. This occurs when infants understand that objects and events continue to exist even when they cannot be seen, heard, or touched.

#### GENERAL CHARACTERISTICS

- Infancy is a period of rapid growth.
- Regains birthweight by 3 weeks, birthweight doubles by 5 months, triples by 12 months
- Large body surface area to mass ratio predisposes infants to fluid and heat loss.
- Differences in anatomy of head, neck, chest, airways put infants at risk for airway obstruction.
- Vital signs:  
BP: 87-105/53-66  
HR: 100-160  
RR: 30-60

PHYSICAL AND MOTOR CHARACTERISTICS	BEHAVIORAL CHARACTERISTICS
<p><i>0-1 month (neonate)</i> Normal birthweight ranges from 5 lb 8 oz to 9 lb 4 oz Primitive reflexes present and include Moro, tonic neck, grasp, stepping Moves both sides of body equally Momentarily lifts head off mattress</p>	<ul style="list-style-type: none"> <li>• Looks intently at people's faces</li> <li>• Responds to bell</li> <li>• Cries when hungry or uncomfortable</li> </ul>
<p><i>1-2 months</i> Lifts head from prone position Turns head side-side Responds to sounds</p>	<ul style="list-style-type: none"> <li>• Completely dependent on adults to meet needs</li> <li>• Exhibits social smile</li> <li>• Has great sucking needs</li> <li>• Quiets when picked up</li> <li>• Recognizes familiar face</li> <li>• Follows moving objects/persons with eyes</li> </ul>
<p><i>3-4 months</i> Rolls over Brings objects to mouth Grasps objects in both hands Primitive reflexes fading</p>	<ul style="list-style-type: none"> <li>• Laughs</li> <li>• Still has great sucking needs</li> <li>• Demands attention by fussing</li> <li>• Recognizes familiar faces, objects</li> <li>• Babbles, coos</li> </ul>

<b>PHYSICAL AND MOTOR CHARACTERISTICS</b>	<b>BEHAVIORAL CHARACTERISTICS</b>
<p><i>5-6 months</i> Sits with support Grasps, holds objects Reaches persistently</p>	<ul style="list-style-type: none"> <li>• Beginning of sense of self</li> <li>• Beginning ability to postpone gratification</li> <li>• Enjoys play with people, objects</li> <li>• Able to discriminate strangers from family</li> <li>• Object permanence beginning</li> <li>• Has likes/dislikes</li> </ul>
<p><i>7-8 months</i> Sits without support Rolls supine to prone Gums or mouths food Self feeding begins Teething</p>	<ul style="list-style-type: none"> <li>• Strong attachment to mother</li> <li>• Orally aggressive in biting and mouthing</li> <li>• Increasing fear of strangers</li> <li>• Imitates simple activities</li> <li>• Plays peek-a-boo</li> <li>• Combines syllables (baba, dada)</li> </ul>
<p><i>9-10 months</i> Pulls to standing Creeps/crawls Uses thumb and forefinger to pick up small objects Drinks from cup</p>	<ul style="list-style-type: none"> <li>• Begins to experience separation anxiety</li> <li>• Beginning of fears of going to bed alone</li> <li>• Plays pat-a-cake</li> <li>• Explores objects by sucking, chewing, biting</li> <li>• Imitates others' speech</li> <li>• Responds to simple verbal requests</li> <li>• Inhibits behavior in response to "no"</li> <li>• Looks for an object if sees it is hidden</li> </ul>
<p><i>11-12 months</i> Cruises around furniture Walks with or without assistance Uses spoon in feeding</p>	<ul style="list-style-type: none"> <li>• Able to show emotions of fear, anger, affection, jealousy, anxiety</li> <li>• Communicates by pointing to objects</li> <li>• Looks for an object even if has not seen it hidden; searches only where object last seen</li> <li>• Jabbers</li> </ul>
<p><i>12-15 months</i> Walks well Creeps up stairs</p>	<ul style="list-style-type: none"> <li>• Beginning to imitate parents</li> <li>• Kisses/hugs parents</li> </ul>
<p><i>15-18 months</i> Begins to run</p>	<ul style="list-style-type: none"> <li>• May develop dependency on transitional objects</li> <li>• May have temper tantrums</li> </ul>

## **APPROACHES**

### ***General***

- Frequently assess maintainability of airway
- Pay attention to non-verbal cues (e.g., vital signs, body language, crying) for assessment of pain and/or discomfort
- Provide appropriate thermal management
- Assess infant while on parent's lap, when possible, to decrease separation anxiety
- Allow parents to stay with infant when possible.
- Provide consistent caretakers
- Provide verbal, auditory, visual, tactile stimulation
- Talk to infant during care
- Avoid insertion of IVs into infant's favored extremity as they may want to suck their fingers, thumb, hand
- TOYS: mobiles, soft toys, musical toys, large balls

***Safety***

- Never leave alone on bed/table without side rails up
- Keep small objects (<1.75 inch in diameter) out of reach (any item smaller than this is a choking hazard for children < 3 years of age)
- Avoid bottle propping
- Do not feed infant small foods (e.g., raisins, grapes, hard candy, nuts)
- Secure infant in high chair or stroller

***Teaching***

- Provide teaching to parents
- Promote injury prevention strategies concerning child proofing, poison control, car seats

## CHILD

### COMPREHENSIVE AGE APPROPRIATE CARE CONSIDERATIONS Toddler (18 months-3 years)

#### PSYCHOSOCIAL STAGE: **Autonomy vs. Shame and Doubt**

- Strives to control body functions, learns to do things unassisted.
- Differentiates self from others.
- Doing things unassisted and exploring the environment helps develop a sense of autonomy.
- If toddler cannot perform self-care independently, exploration is prohibited, or efforts are ridiculed, the toddler develops a sense of shame and doubt.

#### *Common fears*

- Separation
- Loss of control
- Altered rituals
- Pain

#### COGNITIVE STAGE:

##### **Sensorimotor** (0-2 years)

- Learning occurs by the use of their senses.
- Sensorimotor thought begins with simple reflexes in first few months and ends with primitive symbolic thinking.
- Object permanence is a major cognitive task of this stage. This occurs when infants understand that objects and events continue to exist even when they cannot be seen, heard, or touched.

##### **Preoperational** (2-6 years)

- Formation of mental representations of objects and action patterns.
- Thought is egocentric - unable to distinguish between his own perspective and that of someone else.

#### PHYSICAL AND MOTOR CHARACTERISTICS

- Physical growth slows
- Runs by about 2 years of age
- Likes to explore the environment
- Jumps in place
- Potty training
- Vital signs:  
BP: 95-105/53-66  
HR: 80-110  
RR: 24-40

#### BEHAVIORAL CHARACTERISTICS

- Behaviors that represent attempts to control the environment:
  - Negativism* - saying "no" in response to requests
  - Ritualism* - relying on routines
  - Defiance* - refusing to follow commands
  - Dawdling* - responding slowly and offering excuses
- Imitates behaviors
- Plays pretend games
- Still very dependent on parents/caregivers especially in times of stress
- Very possessive of toys
- Begins to develop reasoning capacities
- Thinking is concrete, based on what the toddler sees, hears, experiences.
- Expresses distress by crying and repetitive use of words
- Magical thinking
- Short attention span
- Relates cause and effect, but no concept of danger

**APPROACHES*****General***

- Minimize separation from parents
- Involve parent in care
- Keep security objects close by
- Provide continuity in familiar routines of eating, toileting and sleeping
- Recognize that any intrusive procedure (rectal temp) may provoke an intense reaction (the problem is likely fear of injury and not pain)
- TOYS: Things that turn, ring, push; music

***Safety***

- Keep small objects (<1.75 inch in diameter) out of reach (any item smaller than this is a choking hazard for children < 3 years of age)
- Ingestion of foreign objects and toxic substances is very common at this age. Keep all objects that the toddler may put in his mouth out of reach

***Teaching***

- Use play as a technique
- Let child handle medical equipment (e.g., stethoscope)
- Prepare child a few hours or minutes before procedures (preparation too far in advance may lead to increased levels of anxiety)
- Keep explanations simple, choose wording carefully
- Promote injury prevention strategies (to parents) concerning child proofing, poison control, car seats

**CHILD****COMPREHENSIVE AGE APPROPRIATE CARE CONSIDERATIONS  
SCHOOL AGE (5-12 years)****PSYCHOSOCIAL STAGE: Industry vs. Inferiority**

- Strives to become industrious while overcoming sense of inferiority.
- Child wants to learn how to do and make things with others.
- In learning to accept instruction and to win recognition by producing "things", he opens the way for the capacity of work enjoyment.
- The danger in this period is the development of a sense of inadequacy and inferiority in a child who does not receive recognition for his efforts.
- Child becomes increasingly peer-oriented.

**Major fears**

- Loss of control
- Bodily injury
- Not being able to live up to expectations of important others
- Death

**COGNITIVE STAGE: Preoperational thinking until 7 years****Concrete Operations (7-11 years)**

- Development of logical thinking and ability to perform logical operations on concrete objects
- Cognitive operations include:
  - Conservation* - the recognition that certain properties of an object (e.g., liquid, mass, length) remain the same despite changes in other properties of that object (e.g., shape)
  - Classification* - ability to group objects according to shared characteristics
  - Combinational* - ability to manipulate numbers and learn basic math

**PHYSICAL AND MOTOR CHARACTERISTICS**

- Climbs, skips, hops well
- Very active physically
- Visible signs of reproductive maturation may become evident at around 9-12 years
- Vital signs
  - BP: 97-112/57-71
  - HR: 65-110
  - RR: 18-30

**BEHAVIORAL CHARACTERISTICS**

- Needs parental support in times of stress; may be unwilling to ask
- Understands cause and effect
- Self conscious
- Able to carry out activities on own
- Needs privacy
- Easily influenced by activities of peer group
- Vague, false, nonexistent ideas about illness and body functioning
- A tendency to nod with understanding when in reality they don't
- May listen attentively to all that is said without always comprehending
- Reluctant to ask questions
- Use intellectualization as a coping mechanism
- Has personified concept of death
- Can make logical decisions with assistance
- Beginning of logical thought
- Learns to tell time

## **APPROACHES**

### ***General***

- Involve child in care planning
- Ask them to explain what they understand
- Use body diagrams, pictures, models
- Give them a choice of whether they want their parents present during procedure
- Give them choices to increase their sense of control
- TOYS: Arts and crafts, jigsaw puzzles (20-75 pieces), Etch-a-sketch, board games

### ***Safety***

- Needs to be reminded of dangerous situations

### ***Teaching***

- Use games to teach
- Prepare days to week in advance for major events
- Have child explain what he understands
- Use body diagrams, pictures, models
- Give them a choice as to whether or not they want their parents present during procedures
- Emphasize the "normal" things the child can/will be able to do
- Give as many choices as possible

## ADOLESCENT

### COMPREHENSIVE AGE APPROPRIATE CARE CONSIDERATIONS ADOLESCENT (12-18 years)

#### **PSYCHOSOCIAL STAGE: Identity vs. Role Confusion**

- Develops identity by defining the self favorably in relation to others.
- Role confusion occurs if the adolescent has continued conflicts with the family and society over the current role and anticipated future role.

#### ***Major fears***

- Loss of control
- Altered body image
- Separation from peer group

#### **COGNITIVE STAGE: Formal Operations (12-adulthood)**

- Emergence of abstract thinking
- Some magical thinking and egocentrism

#### **PHYSICAL AND MOTOR CHARACTERISTICS**

- Rapid growth changes in height, weight, body proportions
- Vital signs:  
BP: 112-128/66-80  
HR: 60-90  
RR: 12-16

#### **BEHAVIORAL CHARACTERISTICS**

- Fairly mature level of reasoning
- Self conscious
- Ability to think abstractly
- Some magical thinking may still exist (feel guilty for illness)
- Little understanding of the structure and workings of their body

#### **APPROACHES**

##### ***General***

- Allow them to be an integral part of their care
- Encourage self care and personal grooming
- Respect adolescent's independence and allow them to make choices
- Avoid an authoritative approach, as this will most likely be met with resistance
- Offer help frequently (this age group has difficulty asking for help)
- Give as many choices as possible
- Provide privacy
- TOYS: Electronic games, checkers

##### ***Safety***

- Still needs to be reminded of dangerous situations and consequences of behavior

##### ***Teaching***

- Explain treatments and procedures carefully
- Explain physical activity limitations carefully and what risks are involved if
- Instruct patient/parent regarding:
  - a. Disease process
  - b. Dietary needs
  - c. Safety/health issues related to accidents, drugs, alcohol, smoking, sexual activities

## GERIATRIC

### COMPREHENSIVE AGE APPROPRIATE CARE CONSIDERATIONS

(>65 yrs old )

#### **PSYCHOSOCIAL STAGE: Integrity vs. Despair**

- Integrity is the ability to view one's past life experiences in a positive manner, despite the mistakes along the way.
- Despair is characterized by exhibiting disgust with one's past life, setting of unrealistic and unobtainable goals, and a morbid fear of death.

#### ***Major fears***

- Physical weakness/discomforts
- Morbid fear of death
- Regret for not experiencing life experiences at it's best
- Loss control
- Separation
- Acceptance in his/her own social circles.
- Loss in a crowd
- Loss of self value to his community
- New situations or anything unknown
- Taking risk

#### **COGNITION**

- Aging is a highly individual process that results in great diversity among older adults. Distinction must also be noted between the changes that occur from maturational process and those that are affected by environmental influences.
- Decreased mental functioning related to vascular disease or brain's capacity to store information.
- Decreased performance capacity related to decreased sensory processes and less efficient processing of stimuli by the central nervous system, leading to a decreased reaction time.
- Decrease use of hypothetical approach to problem solving.
- Decrease recent memory or ability to transfer information from recent memory to long term memory for later retrieval.
- Learning ability may be decreased due to same factors mentioned previously.

#### **PHYSICAL AND MOTOR CHARACTERISTICS**

Principles to consider:

- Aging changes vary from organ to organ
- Aging commonly impairs homeostasis and decreases functional reserve ability and response to stress.

Integumentary

- Decrease subcutaneous tissues
- Decreased blood supply with increased fragility of blood vessels
- Decrease sweat glands and skin capillaries.

Neurological

- 15 - 25% decrease in cerebral blood flow
- Sleep pattern changes
- Decreased memory

Musculoskeletal

- Decrease in bone mass
- Increased soft tissue calcification

**Cardiovascular**

- Decreased cardiac output
- Increased incidence of postural hypotension
- Elevation of both systolic and diastolic blood pressure

**Respiratory**

- Weakening of muscle of rib cage
- Decreased mucociliary function

**Gastrointestinal**

- Decreased secretions of digestive juices and enzymes
- Decreased liver blood flow

**Genitourinary**

- Decreased ability to concentrate urine
- Decreased bladder capacity and sphincter control

**Special Senses**

- Decreased visual acuity
- Decreased auditory acuity

**BEHAVIORAL CHARACTERISTICS**

- Introverted or conservative related to diminished reaction time, learning capability and perception.
- Exaggerated behavioral response related to response to stressors, limited biologic resources and loss of social and economic support systems.
- Alteration in self concept is affected by the individual's acute or chronic illness, changes in physical, social and economic environment, loss of social support system or sensory system.

**APPROACHES***General***Integumentary**

- Preventive care to maintain skin integrity
  - a. Turn patient at least every 2 hrs
  - b. Consider special beds
  - c. Maintain good nutrition
  - d. Careful attention to hygiene/incontinent care
  - e. Use care with tapes, adhesives, topical solutions
- Monitor IV sites; careful and judicious use of tourniquets
- Assess carefully for delayed wound healing.

**Neurological**

- Monitor levels of consciousness and orientation
- Environmental safety/fall prevention
- Develop short term goals
- Introduce one subject at a time
- Verify understanding through verbalization and/or demonstration

**Musculoskeletal**

- Fall prevention
- Active and passive ROM exercises
- Do procedures requiring patient movement in an unhurried manner

**Cardiovascular**

- Frequent rest periods
- Avoid sudden changes in position
- Relaxation exercises

### Respiratory

- Prevent upper respiratory infection
- Encourage deep breathing and coughing exercises every 2 hrs
- Keep HOB elevated at least 15°

### Genitourinary

- Monitor intake and output
- Fall prevention
- Monitor food and drug interactions

### Gastrointestinal

- Offer small, frequent feedings
- Monitor intake and provide supplements as needed
- Monitor medication tolerance
- Monitor food and drug interactions

### Safety

- Provide good lighting for reading, ambulation, etc.
- Use large print for patient education and other written materials/instructions
- Initiate fall prevention precautions
- Speak slowly and keep your tone of voice low

### Teaching

- Assess readiness to learn before trying to teach. Watch for clues that would indicate that the client is preoccupied or too anxious to comprehend the material.
- Defer teaching if client becomes distracted or tired or cannot concentrate for other reasons.
- Sit facing the patient so the patient can watch your lip movements and facial expressions.
- Give the patient enough time in which to respond.
- Focus on a single topic to help the patient concentrate.
- Keep environmental distractions to a minimum.
- Invite another member of the household to join the discussion.
- Use audio, visual and tactile cues to enhance learning and help the patient remember information.
- Ask for feedback to ensure that the information has been understood.
- Use past experience; connect new learning to that already learned.
- Support a positive self-image in the learner.
- Use creative teaching strategies.

## Bibliography

- Cloherty JP, Eichenwald EC, Stark AR. *Manual of Neonatal Care*. 6<sup>th</sup> ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007.
- Ebersole P, Hess P. *Towards Healthy Aging: Human Needs Nursing Response*. 7th ed. St Louis, MO: Elsevier Mosby Co. 2008.
- Hazinski M. *Manual of Pediatric Critical Care*. St. Louis, MO: Elsevier Mosby; 1999.
- Hogstel M. *Nursing Care of the Older Adults*. 3rd ed. New York, NY: Delmar Publishers Inc. 1994.
- Merenstein GB, Gardner SL. *Handbook of Neonatal Intensive Care*. 6<sup>th</sup> ed. St. Louis, MO: Elsevier Mosby; 2006.
- Selzer SC. Normal psychological development: theories and concepts. In Greydanus DE, Wolraich ML eds. *Behavioral Pediatrics*. 1992: 1-15.
- Slota M. *Core Curriculum for Pediatric Critical Care Nursing*. 2<sup>nd</sup> ed. Philadelphia, PA: Elsevier Saunders; 2006.
- Thompson ML. *Concepts and Activities: Pediatric Nursing*. Philadelphia, PA; Springhouse Corporation. 1995.
- Verklan MT, Walden M. *Core Curriculum for Neonatal Intensive Care Nursing*. 4<sup>th</sup> ed. St. Louis, MO: Elsevier Saunders; 2010.
- Wong DL, Whaley LF. *Clinical Manual of Pediatric Nursing*. 3rd ed. St. Louis, MO; Elsevier Mosby Co. 1990.

Harbor-UCLA Medical Center  
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# **USE OF RESTRAINTS**

## USE OF RESTRAINTS

### Objectives:

Upon completion of this section, the nurse will be able to:

1. Identify indications for behavioral and non-behavioral restraints.
2. Identify the types of physical restraints.
3. Identify time limitations of physician orders for behavioral and non-behavioral restraints.
4. Identify the required monitoring, assessment and documentation parameters for patients who are restrained for both behavioral and non-behavioral justifications.
5. Identify the appropriate documentation forms to use when caring for restrained patients.
6. Identify the process for activating the Crisis Response Team (CRT) and the information that must be documented on the patient's medical record once Code Green is initiated.

## USE OF RESTRAINTS

### I. DEFINITION

As defined by the Centers for Medicare/Medicaid Services (CMS):

- A. Restraint refers to any manual method or physical or mechanical device, material, or equipment, that immobilizes or reduces the ability of a patient to move his or her arms, legs, body, or head freely.

Note: A drug or medication may be considered as a restraint if it is used as a restriction to manage the patient's behavior or restricts the patient's freedom of movement. The use of medications considered a standard treatment or dosage for the patient's condition does not meet the definition of restraints.

- B. Seclusion refers to the involuntary confinement of a patient alone in a room or area from which the patient is physically prevented from leaving. Seclusion is used only for the management of violent or self-destructive behavior.

### II. BEHAVIORAL AND NON-BEHAVORAL JUSTIFICATIONS FOR RESTRAINT USE

There are two distinct types of justifications and guidelines related to the use of restraints. **Behavioral justifications** include those emergency situations in which a patient exhibits behaviors that are violent, aggressive, assaultive and/or destructive which represent imminent risk of harm to the patient, staff or others and immediate physical intervention is required. **Non-behavioral justifications** include patients restrained for behaviors other than violent, aggressive or destructive behaviors (e.g., attempting to pull out lines, tubes or other necessary medical devices) that have the potential to harm the patient.

**Note:** Restraint does not include devices for medical immobilization (e.g., use of arm board during IV therapy, surgical positioning), orthopedically prescribed devices, surgical dressings or bandages, protective helmets or methods to protect the patient from falling out of bed (side rail use). The physical holding of a patient for the purpose of conducting routine physical examinations or tests is also not considered a form of restraint.

### III. ALTERNATIVE MEASURES

Restraints are to be used only when alternative measures are ineffective in protecting the patient or others from injury. Attempts of alternative measures to control the patient's physical activity in order to protect the patient or others from injury are critical and must be documented prior to placing the patient in restraints. Other alternative measures are to increase observation by more frequent nurse rounding and/or provide a sitter for safety measures. Restraints cannot be used as a punishment, aversive treatment, or for the convenience of staff. The patient and family (with the consent of the patient in the psychiatric areas) will be notified of the reason for placing the patient in restraints.

**Restraints should be applied only when a need is supported by patient behavior that will result in harm to self or others and alternative methods have proven to be ineffective.**

The following is a list of alternative methods and specific examples that can be considered:

- A. Location Change
1. Move the patient closer to the central nursing station.
    - a. Provide the patient closer access to nursing staff. It is also a good idea to move a patient away from the window if the patient is at risk of suicide.
  2. Separate the patient from other patients.

- a. Allow the patient to experience a less stimulating and quieter atmosphere or different environment, (e.g., move the patient from a 4 bed to a 2 bed or a single bed room). In the psychiatric areas, the patient may be placed in open seclusion.

## B. Family Involvement

The patient in the psychiatric area will be informed of the right to have family informed of any episodes of restraint or seclusion.

1. Educate patient and family. Inform the patient and family of the organization's philosophy on the use of restraints and seclusion. Include the patient and family in identifying behaviors requiring restraint/seclusion, identifying alternatives and the treatment plan. Inform the family of the reasons for the use of restraints, placing an emphasis on safety. (In the psychiatric area, this requires the patient's consent.)
2. Encourage family members to bring things that the patient likes or needs. Ask the family to bring pictures of loved ones/significant other, pets or religious items that can help to individualize the patient's environment. Family involvement is encouraged in the psychiatric areas; however, personal items from home that are sharp, breakable or determined to be unsafe by the psychiatric staff must be kept at the nurses' station and are not allowed at the bedside.
3. Family support and involvement in the patient's care must be encouraged. Allow family members to give baths, assist in patient care needs, interpret for the patient or just stay at the bedside to hold the patient's hand.

## C. Therapeutic Interactions

1. 1:1 de-escalation. Remove patient from a situation or discussion when the patient has been observed feeling powerlessness, and help him/her to refocus on "here and now activities". Continue to reinforce the current reality and day-to-day activities. Provide direction slowly and maintain a calm manner.
2. Assist the patient in identifying sources of fear, anxiety, and frustration. Use open-ended questions to help the patient identify the source of his/her fears. Orient and reorient patient to the room environment, plan of care and staff who are providing care.
3. Verbal de-escalation. Encourage patient to express emotions or feelings. Ask the patient how he/she feels and listen to what the patient is saying. Assist the patient in verbalizing feelings by using emphatic responses. Reflect and clarify statements the patient has made. Use direct communication and talk with, not at the person.
4. Redirection. Help the patient identify appropriate expressions of his/her emotions by allowing the patient to verbalize his/her feelings to the appropriate person, provide a journal, and time for quiet reflection, etc.
5. Offer voluntary time out. Allow time for the patient to be alone or pull the curtain around the bed. Provide decreased stimulation. (In the psychiatric units, time out may take place in the patient's room or a seclusion room with the door remaining unlocked).
6. Offer medication(s) to decrease irritability, agitation, or pain. Assist the patient to feel comfortable by offering pain medication as needed. To decrease irritability and agitation caused by hypoxia and/or electrolyte imbalances, assess and provide interventions to maintain the patient's electrolytes and oxygen saturation within

normal limits. Offer psychotropic medications as indicated. Have the nurse with good rapport with the patient offer the medication.

7. Set clear, firm, enforceable limits. Remember, when setting limits with patient, instructions should be clear and simple. Tell the patient what the healthcare team's objectives and expectations are, e.g., calling the nurse when he/she needs to go to the bathroom, not to be out of bed without assistance. Inform patient of consequences associated with behavior. Explain specific behaviors that are inappropriate and the reason why they are inappropriate.
8. Verbally contract with the patient for safe/appropriate behavior. The goal of a nurse-patient verbal contract is to increase the patient's involvement in his/her plan of care and give the patient a sense of control for his/her treatment plan. For example, the nurse orients the patient on initial contact regarding safety practices. Furthermore, the nurse should receive verbal acknowledgment and agreement from the patient regarding the plan of care.

#### D. Environmental

1. Maintain patient territorial space. Inform the patient on admission which areas in the room are for individual use and which areas are shared, such as the bathroom and sink. Respect personal space.
2. Respond promptly to the patient's request for help. Answer the patient call light as soon as possible, provide information or a reason for delay of service/treatment.
3. Decrease environmental stimuli. Encourage all patients in a room to help maintain a reasonable noise level with their visitors, telephone conversations, television or radios. Also keep the lights dim during sleeping hours.
4. Increase the frequency of interactions. Visit the patient more frequently when the patient is confused or having episodes of disorientation. Provide a companion to stay with the patient to observe the patient, keep the patient safe and oriented.
5. Provide clocks and calendars. Orient the patient to time and place and point out assistive devices like clocks and calendars.
6. Involve the patient in diversion activities and meaningful activity/exercise. Have the patient perform simple repetitive tasks (e.g., word games and other such activities). Designate a safe area for the patient to ambulate (if condition allows).
7. Music therapy. Offer to call the volunteer office to borrow a tape recorder and audio cassettes and/or ask the family to bring the patient's favorite musical tapes. Research has shown that listening to music over a period of time can decrease the patient's level of anxiety.

## IV. INITIATION OF PHYSICAL RESTRAINTS

**Underlying medical conditions should be assessed and treated (e.g., hypoxic induced altered mental status) before considering initiation of restraints**

### A. Factors affecting patients in restraints

Prior to placing a patient in restraints, the clinician should consider factors that may affect the patient's experience of being restrained. The experience of being physically restrained may harm patients psychologically by causing anxiety, humiliation, fear/panic, agitation, anger and increased feelings of powerlessness and helplessness. Age, gender, preexisting

conditions, current medical/psychiatric conditions including symptoms and diagnosis, prior episodes of restraint, history of trauma or abuse are all factors that have the potential to influence the patients' response to being restrained by making the individual more psychologically vulnerable. These factors may lead to a greater potential for harm. Therefore, the risks and benefits for each individual and each episode of restraint must be considered by the clinician. For example, a female patient with a history of being sexually/physically abused may respond with increased anxiety/fear, agitation or extreme emotional withdrawal when being restrained by male staff members. Being restrained commonly evokes feelings of increased powerlessness and helplessness. An individual who has experienced a trauma resulting in feelings of powerlessness and helplessness may have these feelings reoccur with the same intensity during an episode of restraint which may progress to a state of panic.

B. Types of physical restraints

4. Soft wrist/ankle restraints including cloth vest
5. Hard wrist/ankle restraints
6. Walking wrist restraints\*

\*A less restrictive alternative used in the behavioral health care inpatients unit.

V. TECHNIQUE FOR APPLICATION AND REMOVAL OF PHYSICAL RESTRAINTS

A. Cloth vest

1. Select the appropriate size for the patient.
2. Place the vest on the patient with opening in the back.
3. Overlap panels and pass the strap through opening.
4. Tie waist straps to bed frame, **not** to the side rail.
5. To remove the jacket, untie the waist straps from the bed frame and remove from shoulders.
6. Slip the jacket off the patient.

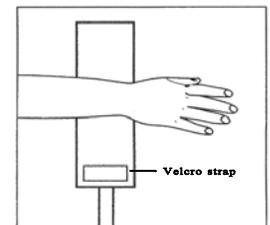


Figure 1a.

B. Soft restraints (pediatric and adult)

1. Position the patient's limb with the restraint under it (Figure 1a).
2. Wrap the restraint around the patient's limb and secure with the Velcro fastener. The restraint should be snug, but not too tight. This assures adequate circulation (Figure 1b).  
**\*Do not apply a restraint over a wound dressing or jewelry (e.g., watch).**
3. Check the skin color, temperature and circulation of the wrist, hand, ankle and foot.

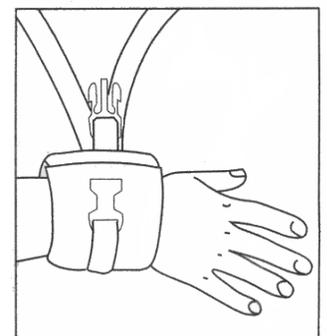
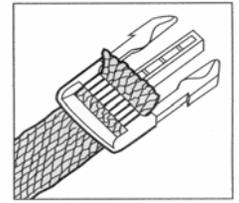


Figure 1b.

4. Take the female receptor wrist strap buckle and connect to the male plug of the buckle (Figure 1c).
5. Close the snap to secure the restraint and then adjust the restraints, allowing a finger space between the cuff and the patient's skin; **do not** over tighten.
6. Secure the strap using the loop fastener device or by quick-release tying the strap(neonate patients) to the bed frame. Adjust the strap length according to requirements. Utilize a shorter strap length for greater control, a longer strap length for freedom of movement.
7. To release, disconnect the closure. Remove the restraint from the limb.



**Figure 1c.** Male plug.

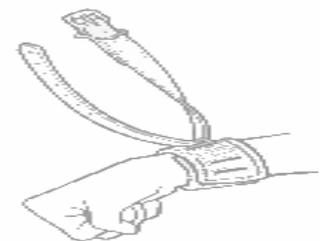
C. Soft restraints (infant)

1. Position the patient's limb with the restraint under it.
2. Wrap the restraint around the patient's limb and secure with the velcro fastener. To ensure adequate circulation, the restraint should not be too tight.
3. Check the skin color, temperature and circulation of the wrist, hand, ankle and foot.
4. Tie the strap to the frame of the radiant warmer or crib.
5. To release the patient, untie the strap from the frame of the radiant warmer or crib.
6. Remove the velcro fastener and unwrap restraint from the patient's limb.

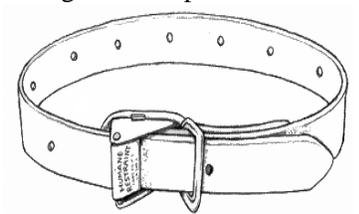


D. Hard polyurethane restraints (pediatric and adult)

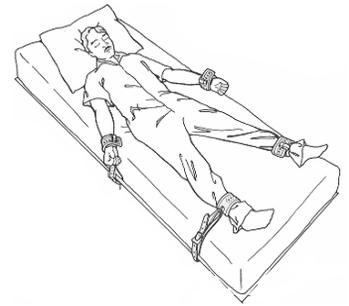
1. Call Code Green at ext. 111 and a Crisis Response Team (CRT) RN Leader will respond and attempt to de-escalate the emergency situation before the initial application of the restraints.
2. After the initial application of the hard restraints, the primary nurse is responsible for removal of the restraints and monitoring the patient continuously for safety.
3. The minimum number of behavioral restraints which can be used is 3 points.
4. There are **2 components** to the behavioral restraints (Figure 2):
  - a. The cuff
  - b. The locking belt



**Figure 2.** Belt threaded through cuff loop.



5. After applying the cuff securely around the limb, thread the tail end of the locking belt through the metal loop on the cuff and wrap it around the bed frame.
  - a. Insert the belt strap through the lock to the desired length and close the lock into the belt hole. The belt should be long enough so the patient can move the limb, but cannot swing his/her limb to hit someone (Figure 3).
  - b. Pull on both straps to tighten the lock. The belt should be taut.
  - c. Push in the spring-loaded pin and push locking "slide" section into the lock.
  - d. After ensuring the patient has limited movement, push in the metal tabs to lock the device.
  - e. To remove the belt, open the locking device by inserting the key with the large tooth facing left.
  - f. Push the key inward to open the locking "slide" section.
  - g. Pull on the end of the belt to loosen the locking device.
  - h. Unwrap the belt from the bed frame.
  - i. Unthread the belt from the metal loop on the cuff.



**Figure 3.** Belt attached to bed frame.

**Restraints (cloth or polyurethane) should be able to be easily removed in the event of fire or other emergency. Restraints must be fastened to the bed frame, not the mattress or side rails. The polyurethane restraint key must be available in the nurse's station/Pyxis.. All registered nurses in the psychiatric areas carry restraint keys.**

## VI. PROCEDURE

The following are steps to be followed when placing a patient in restraints.

- A. Initiation (Appendix A)
  1. Behavioral
    - a. In the Psychiatric care areas, an RN may initiate behavioral restraints prior to obtaining a physician order. **In-person evaluation by the physician and the written order must be obtained within one hour.**

**The physician must conduct an in-person, face-to-face assessment of the inpatient's current clinical condition, including the following:**

- **The patient's immediate situation**
- **The patient's reaction to the intervention**
- **The patient's medical and behavioral condition**
- **The need to continue or terminate the restraint or seclusion**
- **Alternative intervention methods attempted or considered prior to restraints/seclusion**
- **Indications/justifications for restraints/seclusion**

- b. In all other areas, behavioral restraints are initiated by the Crisis Response Team (CRT) RN Team Leader.

2. Non-Behavioral

- a. A physician's order is required prior to initiation of restraints. A telephone order may be accepted in approved areas provided the physician comes to evaluate the patient and signs the order within one hour.

B. Physician's order

The Physician's order must be written on either the Behavioral Restraint Order Form or the Non-Behavioral Restraint Order Form for each application. The order must include the following:

1. Alternative interventions tried
2. Specific behaviors justifying restraints
3. Type and number of restraints to be used
4. Beginning and expiration times
5. Order time limitations: maximum length of time for each restraint order
6. Family notification in the psychiatric areas only

C. Patient/Family education

1. Discuss rationale for the use of restraint with the patient and family (consent required for patients in psychiatric care setting).
2. Involve the patient and family in the plan to reduce or discontinue restraints.

D. Discontinuation of restraints

1. Restraints are to be discontinued as soon as possible.
2. The nurse should consider reducing or discontinuing restraints if there has been an improvement in the behavior that led to the patient being restrained.
3. A physician's order is not required to reduce/discontinue restraints.

## VII. MONITORING AND DOCUMENTATION

A. Continuous monitoring

1. Behavioral Justification. While in restraints, a patient must receive continuous in person observation by a nursing staff member. In the psychiatric area when a patient is in seclusion only, he/she must be continually observed by a nursing staff member for the first hour. After the first hour, further observation may be performed by continuous audiovisual monitoring. Continuous in-person observation is accomplished by utilizing a sitter.

- a. Sitter policy and essential sitter duties.  
When a patient is being continually monitored, the sitter policy must be followed. A sitter will be provided for patients restrained for behavioral reasons in the Adult Medical/Surgical Wards, Adult/Pediatric ED, 7 West Ward and Pediatric Ward. A sitter will also be provided for patients in restraints and for patients in seclusion for the first hour in the locked

psychiatric units. The sitter's duties are as follows:

- Remain within view and immediate contact of the patient at all times. If at any time the sitter is unable to remain within view of the patient, he/she must notify the RN responsible for the patient so that an alternate sitter can be made available to remain with and monitor the patient.
- Provide general nursing care to the patient being observed.
- Provide continuous in-person observation.
- Provide a safe environment including removing potentially dangerous objects from the room and screening any items brought by family and friends.
- Report ongoing behavioral observations to the RN responsible for the patient.

2. Non-Behavioral Justification: Monitor patient every 15 minutes, or more frequently if indicated.

B. 15 minute observations

When placed in restraints for Non-Behavioral justifications, the patient is immediately assessed for appropriate application and then reassessed every 15 minutes for:

1. Any signs of injury associated with restraint or seclusion
2. Circulation and range of motion in the extremities (Not applicable for side rail restraints)
3. Nutrition and hydration needs
4. Hygiene and elimination needs
5. Vital signs (respiratory rate) when restrained for behavior
6. Physical and psychological comfort
7. Readiness for discontinuation of restraint and seclusion

C. Documentation

1. Observations are documented on either the *Behavioral Restrain/Seclusion Nursing Observation and Care Record* or the *Non-Behavioral Restraint Nursing Observation and Care Record* by checking the appropriate boxes and initialing the column. All adverse effects are documented upon observation and described in the nurse's progress notes.
2. Checking the awake/asleep column every 15 minutes indicates that the patient was evaluated for all of the above assessments.
3. When restrained for behavioral reasons, vital signs (minimally, respiratory rate) are recorded every 15 minutes.
  - \* The patient's primary nurse should document the following on the medical record:
    - a. Patient's behavior
    - b. De-escalation techniques tried and failed
    - c. Initiation of Crisis Response Team
    - d. Resolution of CRT's response (e.g., restraint/seclusion)

4. The following must be documented a minimum of every 2 hours for all patient's in restraints:
    - a. Fluids provided if patient is not NPO (while patient is awake).
    - b. Toileting provided (urinary and bowel) measures (while patient is awake).
    - c. Range of motion provided while patient is awake (not applicable for side rail restraints).
    - d. Rotation of restraints (when clinically indicated).
  5. If elimination or food/fluid intake is contraindicated because of the medical condition or plan of care, a notation must be made on the appropriate *Nursing Observation and Care Record*.
  6. Any adverse effects from the use of restraints, such as swelling and/or color change of the restrained limbs, are documented at the time of occurrence and a note is entered on the *Nursing Evaluation and Progress Note*. Any related interventions and responses must be documented in the *Nursing Evaluation and Progress Note* also.
  7. For restraints used with behavioral justification, there are sections to document ongoing assessment, interventions and evaluations. However, this does not eliminate the need for assessment, intervention, and evaluation (AIE) documentation in the nurses' notes.
  8. The date and time restraints are removed must be documented on the appropriate *Nursing Observation and Care Record*.
- D. Debriefing: In the psychiatric areas, a debriefing with the patient and, when appropriate, the family, is expected following all restraint/seclusion episodes. The benefits of debriefing include reestablishing trust with patient, increasing the patient's sense of autonomy and control, and identifying precipitating factors to eliminate further restraint episodes. The debriefing should follow the coping model below:
1. The situation in which the incident occurred will be discussed with the patient and the family.
  2. Identify any patterns that result in an episode of restraint or seclusion. For example:
    - When does the behavior tend to occur?
    - Where does the behavior tend to occur?
    - Who is present when the behavior occurs?
    - What are the potential triggering events which precede the behavior?
  3. Investigate alternative methods of handling the situation.
  4. Negotiate alternatives to be used in the future.
  5. Ensure that patient/family concerns are discussed.
  6. Incorporate any interventions related to patient/family concerns into the plan of care.

## VIII. CARE OF RESTRAINTS

- A. Restraints must be inspected prior to, during, and after application for the following:
1. Non-Behavioral restraints
    - a. Broken stitching
    - b. Frayed or cut straps
    - c. Broken, cracked deteriorated buckles, ring closures or other type of connectors
    - d. Any other signs of deterioration
  2. Behavioral restraints
    - a. Cuff and belt are clean
    - b. Polyurethane is not deteriorated, broken or cracked
    - c. Locking device locks and can be easily opened
    - d. Restraint key is on the unit
  3. A supply of behavioral restraints will be kept in the following areas:
    - a. Psychiatric Emergency Room
    - b. Medical Emergency Room
    - c. 8 West
    - d. 1 South
    - e. Central Supply
  4. When restraints require cleaning they are to be returned to Central Supply. A complete clean set will be given in exchange.

## IX. CONCLUSION

In summary, restraint and/or seclusion are to be utilized only when alternative, less restrictive interventions have been tried and deemed ineffective. Restraints are utilized only when there is a risk of imminent injury to self or others (**behavioral justification**) or as an adjunct to medical/surgical care in order to prevent the disruption of essential treatment (**non-behavioral**). When restraints are utilized, patient safety is maintained.

Listed below is the criteria for the use of restraints and seclusion.

<b>THE USE OF RESTRAINT AND SECLUSION</b>			
<b>Criteria</b>	<b>Behavioral Justification</b>		<b>Non-Behavioral Justification (medical/surgical)</b>
	<b>Psychiatric Areas</b>	<b>All Other Areas</b>	<b>All Areas</b>
<b>Prior to Initiation (Assessment)</b>	<ul style="list-style-type: none"> <li>Considers any pre-existing conditions/disabilities/limitations that would place the patient at greater risk for harm from the application of restraint/seclusion.</li> <li>Determines the patient's condition or symptom that warrants use of restraint or seclusion</li> <li>Determine benefits to patient and whether a less restrictive intervention would offer the same benefit at less risk.</li> </ul>		
	<ul style="list-style-type: none"> <li>Determines whether patient has an advance directive with respect to behavioral health care and ensures that direct care staff is aware of the behavioral health advance directive.</li> </ul>		
<b>Initiation</b>	Restraints/seclusion can be initiated by Crisis Response (CRT) RN Team Leader or behavioral health RN	Restraints initiated by Crisis Response (CRT) RN Team Leader.	Restraints may be initiated upon order of physician (telephone order accepted).
<b>Application</b>	CRT will place patient in seclusion or apply restraints.		Clinical staff apply restraints.
<b>In-Person Evaluation by Licensed Independent Practitioner</b>	Within 1 hour.	Within 1 hour.	Within 1 hour.
<b>Physician's Orders</b>	<b>May never be written as a standing order or PRN</b>		
<ul style="list-style-type: none"> <li>Obtaining</li> <li>Time Limitation</li> </ul>	Within one hour.	Within one hour.	Prior to application.
	<b>Maximum</b>		<b>Maximum</b>
	<ul style="list-style-type: none"> <li>4 hours for ages 18 and older</li> <li>2 hours for ages 9 – 17</li> <li>1 hour for ages under 9</li> </ul>		<ul style="list-style-type: none"> <li>24 hours all ages</li> </ul>
<ul style="list-style-type: none"> <li>Include the following</li> </ul>	<ul style="list-style-type: none"> <li>Specific violent, aggressive, or destructive behavior.</li> </ul>	<ul style="list-style-type: none"> <li>Medical/Surgical justification e.g., trying to pull out lines, tubes.</li> </ul>	
	<ul style="list-style-type: none"> <li>Alternatives tried prior to initiation</li> <li>Type and number of restraints used</li> <li>MD/RN signature with date and time</li> </ul>		
<b>Physician's Orders</b>	<b>Requires face to face physician re-evaluation before expiration of original order to determine the patient's response to the intervention including the rationale for continued use of the intervention.</b>		
<ul style="list-style-type: none"> <li>Renewal</li> </ul>			
<b>Notification of Use</b>			
<ul style="list-style-type: none"> <li>Family</li> </ul>	Requires patient's consent.		

<b>THE USE OF RESTRAINT AND SECLUSION</b>			
<b>Criteria</b>	<b>Behavioral Justification</b>		<b>Non-Behavioral Justification (medical/surgical)</b>
	<b>Psychiatric Areas</b>	<b>All Other Areas</b>	<b>All Areas</b>
<ul style="list-style-type: none"> <li>Clinical Leadership</li> </ul>	<p>NURSE MANAGER OR DESIGNEE AND ATTENDING PHYSICIAN WILL BE INFORMED OF INSTANCES IN WHICH INDIVIDUAL EXPERIENCE EXTENDED, OR MULTIPLE EPISODES OF RESTRAINT/ SECLUSION.</p> <ul style="list-style-type: none"> <li>episodes of &gt;12 hours</li> <li>2 or more separate episodes within 12 hours</li> <li>every 24 hours if conditions continue</li> </ul>		
<b>Patient/Family Education</b>	<ul style="list-style-type: none"> <li>Inform patient/family of the organization's philosophy on the use of restraint/seclusion.</li> <li>Include patient/family in identifying behaviors/clinical issues requiring restraint/seclusion.</li> <li>Include patient/family in identifying alternatives.</li> <li>Ensure that conditions for release/removal are communicated.</li> <li>Include family in the treatment plan if available/appropriate (Requires patient's consent if in psychiatric areas).</li> </ul>		
	Inform patient of right to have family informed of any restraint/seclusion episode.		
<b>Monitoring</b>	<p><b>Continuous in person observation for restraints/seclusion*.</b></p> <p>*For individuals in seclusion only, after the first hour of continuous in-person observation, further continuous monitoring may be done through the use of audio/visual technology.</p>	Continuous in person observation for restrained patients.	Every 15 minutes
<b>Assessment:</b>	Immediately upon initiation and every 15 minutes while restrained to ensure patient's rights, dignity and safety are maintained.		
<ul style="list-style-type: none"> <li>Time Frames</li> </ul>	<ul style="list-style-type: none"> <li>Check for adverse physical effects or signs of injury.</li> <li>Address nutrition/hydration/elimination needs.</li> <li>Check circulation and ROM in extremities</li> <li>Determine physical and psychological status and comfort.</li> <li>Determine readiness for discontinuation.</li> </ul>		
<ul style="list-style-type: none"> <li>Criteria for every 15 minute observations</li> </ul>			
<ul style="list-style-type: none"> <li>Vital Signs</li> </ul>	Every 15 minutes (Minimally, VS include respiratory rate. Temperature, pulse, and blood pressure as clinically indicated.)		As per unit policy.
<b>Discontinuation of Restraints/Seclusion</b> (A physician's order is not required)	A RN may reduce the patient from restraint to seclusion, reduce the number and/or discontinue restraints/seclusion based on the patient's behavior.	A registered nurse may reduce the number of restraints and/or discontinue restraints when the behavioral reason/clinical justification is/are resolved.	
	If discontinued before expiration of order, a new physician's order must be obtained before reinstating restraints/seclusion.		
<b>Debriefing</b>	As soon as possible but not later than 24 hours after discontinuation of a restraint/seclusion episode, the patient, and if appropriate, family, participate with staff in a debriefing to evaluate the event, review plan of care and modify if necessary.		

<b>THE USE OF RESTRAINT AND SECLUSION</b>			
<b>Criteria</b>	<b>Behavioral Justification</b>		<b>Non-Behavioral Justification (medical/surgical)</b>
	<b>Psychiatric Areas</b>	<b>All Other Areas</b>	<b>All Areas</b>
<b>Documentation</b>	Clinical staff shall assure the adequate documentation of the following: <ul style="list-style-type: none"> <li>• Written physician's orders.</li> <li>• Description of the patient's behavior and circumstances that necessitated use.</li> <li>• Consideration or failure of non-physical interventions.</li> <li>• Rationale for use.</li> <li>• Notification of family/clinical leadership when appropriate.</li> <li>• Behavioral/medical/surgical justification for discontinuation.</li> <li>• Informing patient/family of criteria for discontinuation.</li> <li>• Initial and q 15 minute assessments.</li> <li>• Opportunities for elimination/nutrition/hydration/ROM* needs provided whenever needed and documented a minimum of <u>q 2</u> hours while awake. (*ROM not applicable for side rail restraint)</li> <li>• Rotation of restraints when clinically indicated.</li> <li>• Patient/family education provided.</li> <li>• Patient's response to restraint and/or seclusion.</li> <li>• Revisions made to the plan of care to reflect the use of restraints.</li> <li>• Assistance provided to meet criteria for discontinuation. Continuous monitoring.</li> <li>• In person evaluation and re-evaluation.</li> <li>• Injuries sustained, type of evaluation and treatment</li> </ul>		

**PLEASE COMPLETE THE STUDY QUESTIONS ON THE NEXT PAGE**

## USE OF RESTRAINTS

### Study Questions

Select the best answer to each question. **DO NOT** write in this manual.

**General Questions** - *Content addressed by these questions will be on the adult and pediatric test.*

1. An order for restraints used for behavioral justification for an adult patient expires in:
  - a. 2 hours
  - b. 4 hours
  - c. 8 hours
  - d. 24 hours
  
2. Under what circumstances would 2-point cloth wrist restraints be indicated?
  - a. To prevent suicide attempt
  - b. To prevent patient from getting out of bed
  - c. To stop patient from striking at staff with fists
  - d. To prevent removal of IV fluids, tubes, or other necessary medical devices
  
3. 15 minute observations are documented on the *Nursing Observation and Care Record* by:
  - a. RN only
  - b. RN and LVN
  - c. All nursing staff
  - d. Nursing attendant only
  
4. The nurse determines that a patient being restrained for behavioral justification is no longer a threat to him/herself or others. The nurse should:
  - a. Discontinue restraints
  - b. Keep the patient in restraints
  - c. Continue to observe the patient
  - d. Obtain physician order to discontinue restraints
  
5. A patient whose behavior indicates a behavioral justification for restraints would display which of the following behaviors?
  - a. Cursing at staff
  - b. Attempting to kick staff
  - c. Attempting to extubate self
  - d. Threatening to leave the hospital against medical advice
  
6. For which of the following patients would non-behavioral restraints be appropriate?
  - a. Patient who is demanding attention
  - b. Patient who takes roommate's food
  - c. Patient who refuses to have his blood drawn
  - d. Patient attempting to remove central line
  
7. A physician's order must include all of the following **EXCEPT**:
  - a. Type and number of restraints
  - b. Beginning and expiration times
  - c. Alternative intervention tried
  - d. Expected behavior for release
  
8. The nurse notes swelling and color changes of a restrained limb. The nurse should initially:

- a. Take vital signs
  - b. Notify the physician
  - c. Remove limb restraints and apply cloth vest
  - d. Loosen restraints, assess circulation, sensation, and movement
9. When alternatives have failed to de-escalate violent, aggressive behavior, a \_\_\_\_\_ should be activated.
- a. Code Teal
  - b. Code Purple
  - c. Code Green
  - d. Code Pink
10. The telephone number within the medical center to activate the Crisis Response Team (CRT) is:
- a. 111
  - b. 112
  - c. 113
  - d. 114
11. Which of the following contents need to be documented on the patient's medical record once Code Green is initiated?
- a. Patient's behavior and de-escalation techniques used
  - b. Patient's behavior, de-escalation techniques used, and resolution of CRT's response
  - c. De-escalation techniques used, time Code Green initiated, and resolution of CRT's response
  - d. All of the above

**Adult Questions - Content addressed by these questions will be on the adult test.**

12. All of the following are appropriate alternatives that may be tried prior to placing an adult patient in restraints EXCEPT:
- a. Move the patient to an isolated area and minimize all interaction
  - b. Offer medication to the patient
  - c. Set limits on inappropriate behavior
  - d. Decrease environmental stimuli
13. A 58 year old man was admitted yesterday for alcohol withdrawal. Upon admission and during the night he attempted to punch the nurses. This morning he is lying quietly in his bed, eagerly awaiting his breakfast. He is cooperating with the nursing attendant during his morning care. The last order was written 4 hours ago. The nurse should:
- a. Call the MD for a new order
  - b. Reduce the restraints to two wrist restraints
  - c. Discontinue the restraints
  - d. Leave the restraints on and wait for the MD to come evaluate the patient
14. A 30 year old trauma patient in the ICU repeatedly attempts to pull out his endotracheal tube. He is also attempting to remove an IV in his right arm. Which of the following restraint methods would be appropriate for this patient?
- a. Place an arm board on both upper extremities
  - b. 2 point non-behavioral restraints
  - c. 2 point behavioral restraints
  - d. 4 point behavioral restraints

**Pediatric Questions - *Content addressed by these questions will be on the pediatric test.***

15. A twelve year old girl who was kicking and verbally abusing staff on evening shift is in 4 point soft restraints. Now she is sleeping quietly with her mother at the bedside. The restraint order was written 2 hours ago. The nurse should.
- Call the MD for a new order
  - Reduce the restraints to two wrist restraints
  - Discontinue the restraints
  - Leave the restraints on and wait for the MD to come evaluate the patient
16. A four-month-old infant repeatedly attempts to pull out his endotracheal tube with his right hand. He has an arm board and an IV in his left hand. Which of the following options reflects the correct way to apply restraints to this infant?
- Apply soft restraints to the right and the left wrist
  - Apply an arm board to the right hand
  - Apply a soft restraint to the right wrist only
  - Apply soft restraints to the right wrist and the left ankle

**USE OF RESTRAINTS**  
**Answers to Study Questions**

**Answers to General Questions:**

1. b
2. d
3. c
4. a
5. b
6. d
7. d
8. d
9. c
10. a
11. d

**Answers to Adult Patients:**

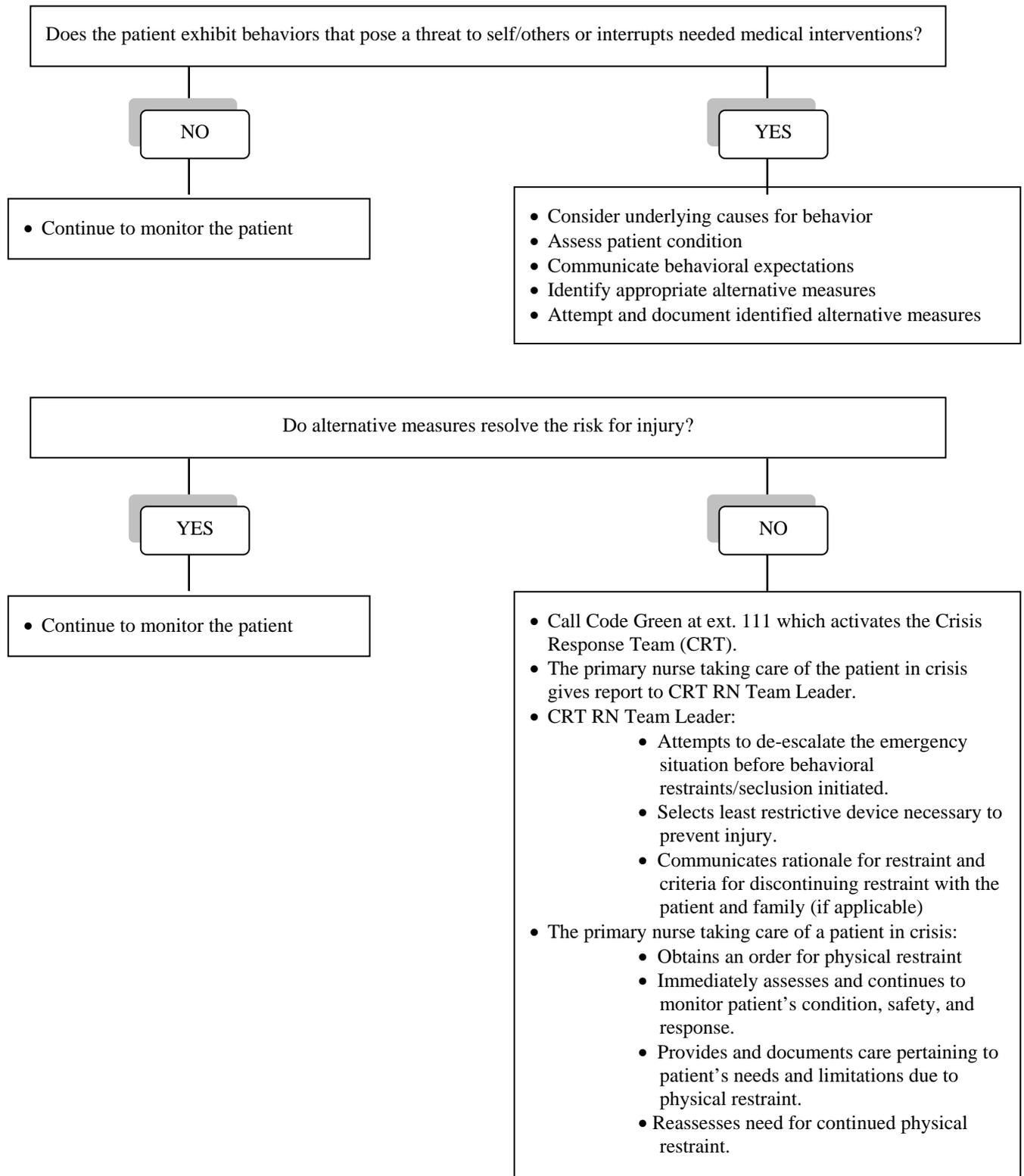
12. a
13. c
14. b

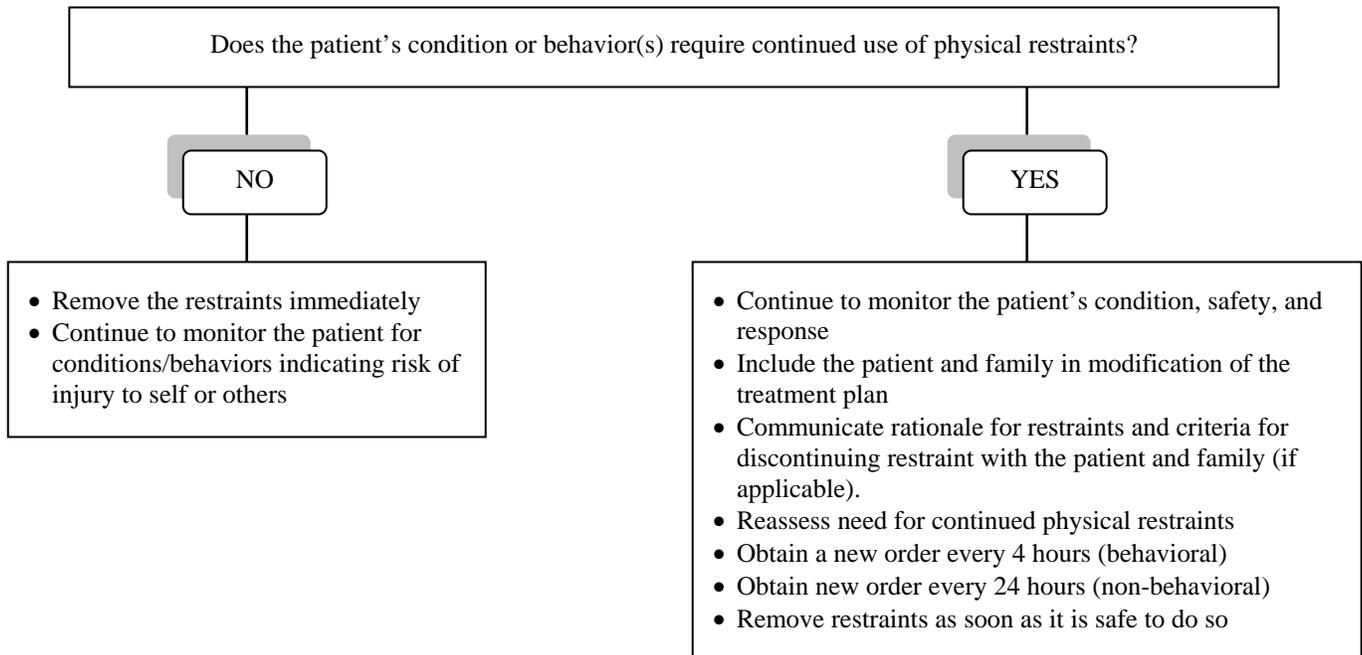
**Answers to Pediatric Questions:**

15. c
16. a

**IF YOU ANSWERED 14 OF THE 16 QUESTIONS CORRECTLY, REVIEW THE PERFORMANCE EVALUATION. IF YOU MISSED 3 OR MORE, REREAD THE CONTENT AND REPEAT THE STUDY GUIDE QUESTIONS.**

**APPENDIX A**  
**Decision Tree for Use of Physical Restraint**





## Bibliography

- Changing the practice of physical restraint use in acute care. Web site:  
<http://www.ncbi.nlm.nih.gov/pubmed/171310658>. Accessed October 23,2012
- Crisis Prevention Institute, Inc. Risk of Restraints, Understanding Restraint-Related Positional Asphyxia. 2004.
- Elkin M, Perry A, Potter P. *Nursing Interventions and Clinical Skills*. 4th ed. St. Louis, MO: C.V. Mosby; 2008.
- Hospital interpretive guidelines: patients equal rights page. Healthcare Financing Administration, State Operations Manual. [hcfa://www.gov.pubforms](http://www.gov.pubforms). Accessed October 23, 2012.
- Joint Commission on Accreditation on Healthcare Organizations. Bed Rail-Related Entrapment Deaths. [http://jointcommission.org/SentinelEvents/SentinelEventAlert/sea\\_27.htm](http://jointcommission.org/SentinelEvents/SentinelEventAlert/sea_27.htm). Accessed October 23,2012
- Joint Commission on Accreditation of Healthcare Organizations. *Comprehensive Accreditation Manual for Hospitals: The Official Handbook*. 2010 Edition. Oakbrook Terrace, IL; January 11, 2011.
- Joint Commission on Accreditation on Healthcare Organizations. Preventing Restraint Deaths. [http://jointcommission.org/SentinelEvents/SentinelEventAlert/sea\\_8.htm](http://jointcommission.org/SentinelEvents/SentinelEventAlert/sea_8.htm). Accessed October 23, 2012
- Medscape Medical News. New Guidelines for Restraint Use in ICU. <http://www.medscape.com>. Accessed October 23, 2012
- Quinn CA. Nurses' perceptions about physical restraints. *Western Journal of Nursing Research*. 1993; 15: 148-162.
- Problems associated with the use of physical restraints. Web site:  
<http://www.ninr.nih.gov/NR/rdonlyres/87C83B44-6FC6-4183-96FE-67E00623ACE0/4769/Restraints.pdf>  
 Accessed October 23, 2012
- Reducing Restraint Use in Nursing Homes. Web site:  
<http://www.cfmc.org/files/nh/Reducing%20Restraint%20Use%20in%20Nursing%20Homes.pdf>  
 Accessed October 23, 2012
- Rogers P, Bocchino N. Restraint free care: is it possible? *American Journal of Nursing*. 1999; 99: 26-34.
- Staten, P. JCAHO solutions: Firmly grasp new restraint and seclusion standards. *Nursing Management*. 2003; 34: 12-14.
- The use of restraints including seclusion. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2011. Policy 347.

Harbor-UCLA Medical Center  
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# **INTRAVENOUS THERAPY: PART I SELF-STUDY GUIDE**

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## **IV Therapy: Part I**

### **Objectives:**

At the end of completing this self-study guide, the nurse will be able to:

1. Identify the RN and LVN scopes of practice as it relates to IV therapy.
2. List the indications of IV therapy.
3. Identify four complications of IV Therapy and discuss its related nursing interventions and preventive measures.
4. Identify frequency of IV site inspection and dressing changes.
5. Discuss information to document on site, tubing and solution labels.
6. State measures to avoid complications in intravenous therapy.
7. State the nursing responsibilities associated with labeling of an IV site.
8. Describe the risks and benefits of intravenous medication administration.

## I. **Complications of IV Therapy: Identification, Prevention and Management**

Assessment of the IV site - The patient can be protected from serious harm if infiltration is detected early. The following nursing considerations should be used as guidelines when caring for a patient with an IV:

- A. Assess the IV site every two hours in adult patients and every hour in pediatric patients. Check IV tubing for kinks or leaks. If a filter is being used, check to see that it is patent and free of trapped air.
- B. Assessment of the site includes checking for an infiltration or thrombophlebitis. The first signs of infiltration or thrombophlebitis will develop at the cannula tip, near the edge of the dressing. Assess for redness, blanching streak formation, palpable cord, temperature change, induration, pain, leakage or swelling. If swelling is present, compare the area to the same area on the patient's other arm. Sometimes, what appears to be swelling from infiltration can be dependent edema or the normal shape of the patient's arm.
- C. Palpate the IV site. If there is pain on palpation, it is an early sign of thrombophlebitis. Compare skin temperature at the IV site to skin temperature of the same area on the other arm. Cool skin may be an early sign of infiltration. Warm skin may indicate thrombophlebitis even before the skin is red or tender.
- D. Infiltration may slow the flow rate of an IV flowing by gravity (e.g., as used for a fluid bolus). However, if a patient has poor skin turgor the flow rate may increase because resistance is lower in the tissue than the vein. If a change in the flow rate is noted, apply pressure to the vein about 1-2 inches distal to the cannula tip. If the IV solution continues to flow, an infiltration has developed. If the vein stops the flow of the IV solution when pressure is applied, it can be a sign also of phlebitis.
- E. Document signs of phlebitis or infiltration and the actions taken. Always include notification of the physician.

### Complications of IV Therapy

- A. **PHLEBITIS:** Phlebitis is an inflammation of the intima of the veins.
  1. Causes
    - a. Mechanical factors related to rubbing of the cannula against the vein wall
    - b. Contamination by transference of microscopic particles in the infusion fluid
    - c. Chemical irritation by fluid being infused
  2. Clinical manifestations include
    - a. Pain
    - b. Erythema along the vein path
    - c. Swelling
    - d. Tenderness
  3. Preventive measures
    - a. Always follow aseptic technique
    - b. Select smallest cannula and largest vein for delivery of the fluid or medication. Select large veins for infusing irritating fluids. Larger veins

- have higher blood flow which rapidly dilutes irritants.
- c. Select a site away from a joint
- d. Check IV sites frequently (every two hours in adults, every hour in pediatrics) for complications. Palpate area at tip of catheter
- e. Use recommended types and amounts of diluents
- f. Change IV cannula and rotate sites every 96 hours (Exception: do not routinely rotate IV sites in pediatrics unless clinically indicated)
- g. Change IV cannula at first sign of inflammation, tenderness, or redness

4. Nursing interventions

- a. Stop the infusion at once
- b. Select a new site and restart the infusion
- c. When restarting an IV use new tubing and solution
- d. Notify MD
- e. Document assessment, intervention, and patient's response

B. **THROMBOPHLEBITIS:** Thrombophlebitis is inflammation of a vein in conjunction with formation of a clot (thrombus).

1. Causes

- a. Injury to vein during venipuncture, large bore needle/catheter use, prolonged needle or catheter use
- b. Irritation to a vein due to rapid infusions or irritating solutions. Smaller veins are more susceptible
- c. Clot formation at the end of needle or catheter due to slow infusion rates
- d. More commonly seen with synthetic catheters than steel needles

2. Clinical manifestations include

- a. Tenderness at first, then pain along the course of the vein
- b. Swelling, warmth, and redness at an infusion site
- c. A vein may appear as a red streak above an insertion site

3. Preventive measures

4. Nursing interventions

- a. Always follow aseptic technique
- b. Select smallest cannula and largest vein for delivery of the fluid or medication. Select large veins for infusing irritating fluids. Larger veins have higher blood flow which rapidly dilutes irritants.
- c. Select a site away from a joint
- d. Check IV sites frequently (every two hours in adults, every hour in pediatrics) for complications. Palpate area at tip of catheter
- e. Use recommended types and amounts of diluents
- f. Change IV cannulas and rotate sites every 96 hours (In 6E, 6EICU, 6ENICU, 7E Level II Nursery do not routinely rotate IV sites unless clinically indicated).
- g. Change IV cannula at first sign of inflammation, tenderness, or redness
- h. Notify MD immediately
- i. Apply cold compresses immediately to relieve pain and inflammation
- j. Later follow with moist compresses to stimulate circulation and promote

- absorption
    - k. Document assessment, intervention and patient's outcome
- C. **INFILTRATION:** An infiltration is the inadvertent administration of a non-vesicant solution into the tissue surrounding an IV cannula.
1. Cause: the most common cause of infiltrations is dislodgement of an IV catheter from the vein.
  2. Clinical manifestations include
    - a. Swelling, blanching, coolness of surrounding skin and tissues
    - b. Discomfort, depending on the nature and amount of solution
    - c. Decrease in IV fluid flow rate or failure to flow
    - d. Absence of blood or backflow in the IV catheter or tubing when aspirated
  3. Preventive measures
    - a. Ensure that IV and distal tubing is secured sufficiently to prevent dislodgement
    - b. Splint arm or hand as necessary
    - c. Check IV sites frequently (every two hours in adults, every hour in pediatrics) for complications
    - d. Provide patient/family with information on measures to reduce the chance of infiltration, such as not manipulating the cannula, pulling on the tubing, picking at the dressing, or using the extremity excessively
  4. Nursing interventions
    - a. Stop the infusion at once
    - b. Evaluate affected extremity
    - c. Depending on solution or medication infused, apply warm or cold compress to site to alleviate discomfort and help absorb infiltration by increasing circulation to affected area
      - 1) If the infiltrate is small and involves a non-caustic solution or medication, warm packs are helpful.
      - 2) Moist warm packs must be used with caution especially on large infiltrates because they can lead to maceration, necrosis, or rapid movement of the drug into the tissue.
      - 3) Sloughing can occur from the application of warm compresses to an area infiltrated with certain medications, such as potassium chloride. In these cases, the application of cold compresses is recommended.
      - 4) Warm compress also should not be used if the infiltrated solution is blood or a vesicant.
    - d. If leaking from the tissues occurs because of extensive infiltration, apply sterile dressing to affected area. Dressing should be applied loosely and with minimal amount of tape to avoid further damage to surrounding tissues. Remove dressing when leaking stops.
    - e. Select a new site and restart the infusion (if patient still requires and IV). Notify MD
    - f. Document assessment, intervention, and patient's response

- D. **EXTRAVASATION:** An extravasation is an infiltration with a vesicant solution or medication into surrounding tissues.
1. Cause: A vesicant is a solution or medication that causes the formation of blisters, with subsequent sloughing of tissues occurring from tissue necrosis (Table 1).
  2. Clinical manifestations include:
    - a. Swelling, blanching, and discomfort
    - b. Coolness of the skin
    - c. Decrease in fluid flow or lack of blood backflow in the catheter and tubing
    - d. Blisters
    - e. Tissue necrosis
  3. Preventive measures:
    - a. Be familiar with solutions and medications that can cause tissue damage if infiltrated.
    - b. Avoid administering vesicants in an area of a previous IV site (vesicants can seep through vein entry sites of previous infusion)
    - c. When available, administer irritating solutions through a central line [ie, peripherally inserted central catheter (PICC), acute or chronic central venous catheter]
    - d. Ensure that the IV and distal tubing is secured sufficiently to prevent dislodgement
    - e. Splint arm or hand as necessary
    - f. Check IV sites frequently (every two hours in adults, every hour in pediatrics) for complications
    - g. Provide patient/family with information on measures to reduce the chance of infiltration, such as not manipulating the cannula, pulling on the tubing, picking at the dressing, or using the extremity excessively
  4. Nursing interventions:
    - a. Stop infusion at once
    - b. Do not remove needle or catheter if the solution was a vesicant or vasoconstrictor. Extravasation of this type may require administration of an antidote through the catheter.
    - c. Aspirate any remaining fluid/medication in the catheter if catheter appears to be lodged in the tissues. This procedure may decrease the amount of medication/drug at the tissue site.
    - d. Notify MD

**Table 1. IV Medications*****Non-Chemotherapeutic Agents***

Acyclovir  
 Aminophylline  
 Calcium  
 Chlordiazepoxide  
 Diazepam (Valium)  
 Digoxin  
 Dobutamine  
 Epinephrine

Mannitol  
 Nafcillin  
 Norepinephrine  
 Penicillin  
 Phenytoin  
 Potassium  
 Vancomycin

***Chemotherapeutic Agents***

Actinomycin D  
 Dactinomycin  
 Daunorubicin  
 Doxorubicin  
 Epirubicin

Idarubicin  
 Mitomycin  
 Vinblastine  
 Vincristine  
 Vinorelbine

- e. Cold compresses are usually used for antibiotic and alkalating vesicants. Warm compresses are applied for extravasation of vinca alkaloids
- f. Elevate affected extremity
- g. If a vasoconstrictor or vesicant has infiltrated, initiate emergency treatment to the local area. Serious tissue damage, necrosis or sloughing may result if actions are not taken immediately.
- h. Educate patient/family to report any sensation change such as pain, burning, or stinging at the site
- i. Document assessment, intervention, and patient's response

## II. Scope of Responsibility

- A. RNs who have completed IV Therapy Part I may:
  - 1. Hang base solutions, base solutions with medications and single dose pre-mixed medications (IVPB).
  - 2. Administer and monitor intravenous infusions &/or blood/blood products, e.g. observe the patient, maintain proper solution flow, care for the venipuncture site, discontinue an IV, and document.
  - 3. Initiate or re-initiate IV infusions through an existing open IV-lock after checking for patency.
- B. RNs/LVNs who have completed IV Therapy Part I and Part II (venipuncture technique) may initiate or re-initiate peripheral IV's upon the written order of a physician.
- C. RNs may inject approved medications directly into the IV-Lock, or into the intravenous tubing.
 

Note: The RN may carry out those procedures only in the area and while assigned to that area consistent with the IV Restricted Policy.
- D. LVNs may start and superimpose peripheral intravenous fluids if , (1) they have met the state requirements, (2) completed IV Therapy Part I and Part II and have proof to that effect on file.
 

Note 1: "Intravenous fluids" includes fluid solutions of electrolytes and vitamins and blood & blood products.

Note 2: "Intravenous fluids" does not include TPN.

Note 3: "Intravenous fluids" does not include solutions containing medications, except as noted in Note 1 above.
- E. LVNs who do not meet the requirements stated in policy #D may not start or superimpose intravenous fluids.
- F. LVNs are responsible for monitoring of intravenous infusions in progress; e.g. observation of the patient, maintaining proper solution flow, discontinuing an IV, recording and reporting.
- G. THE VASCULAR ACCESS NURSE: a) Inserts and removes peripherally inserted central venous catheters (PICC's, PIC's or midlines) on adult patients, b) repairs central lines and vascular access ports, and performs limited IV services (IV start, re-start) when their expertise is required.

TO OBTAIN VASCULAR ACCESS TEAM SERVICE: Call ext 3427 and leave a message on the Code-a-Phone (include the time, ward, patient name, room and bed number) or after hours page through ext 3434.

- H. FEMORAL LINES. Patients with femoral lines may NOT be placed on Medical/Surgical floors. They must be located in ICU's, PCU's, RTU, or TTCU.

**EXCEPTION: Patient with a dialysis catheter placed in a femoral area can be admitted to any medical/surgical unit provided the patient is alert, oriented and the line is not used for anything other than dialysis. The catheter has to be sutured and capped.**

### III. Solutions and Additives Approved for Administration by RN's

- A. PIGGYBACK MEDICATIONS. RNs may piggy-back approved medications consistent with IV Restricted Policy to an existing primary line or via an IV Lock.
- B. MEDICATIONS ADDED TO AN APPROVED BASE SOLUTION. The medications may be administered intravenously by an RN, when added to an approved base solution.

The following solutions may be administered by RN's and LVN's (exception D20 through central line) who have met the state requirements and have proof on file may administer the Approved Base Solutions suitable for peripheral infusion only.

#### Approved Base Solutions

2.5% Dextrose in 0.45% Na Cl	Sodium Chloride 0.45%	
2.5% Dextrose in 0.9% Na Cl	Sodium Chloride 0.9%	
5% Dextrose in Distilled H <sub>2</sub> O	D <sub>5</sub> Lactated Ringers	
5% Dextrose in 0.2% Na Cl		
5% Dextrose in 0.45% Na Cl	D5½NS __ KCl 10mEq/L	D5¼NS __ KCl 10mEq/L
5% Dextrose in 0.9% Na Cl	D5½NS __ KCl 20mEq/L	D5¼NS __ KCl 20mEq/L
5% Dextrose in Lactated Ringers	D5½NS __ KCl 30mEq/L	D5¼NS __ KCl 30mEq/L
	D5½NS __ KCl 40mEq/L	D5¼NS __ KCl 40mEq/L
10% Dextrose in Distilled H <sub>2</sub> O	D5NS __ KCl 10mEq/L	NS __ KCl 10mEq/L
10% Dextrose in 0.45% Na Cl	D5NS __ KCl 20mEq/L	NS __ KCl 20mEq/L
10% Dextrose in 0.9% Na Cl	D5NS __ KCl 30mEq/L	NS __ KCl 30mEq/L
	D5NS __ KCl 40mEq/L	NS __ KCl 40mEq/L
20% Dextrose in Distilled H <sub>2</sub> O (Central Lines ONLY- RN's only.)		

- C. The following solutions may be administered by **RN's** only:

Dextran 40	Intralipids
Hespan	Amino Acid Solutions
5% Albumisol	Albumin 25%

#### IV. **Admixtures**

- A. Drugs and vitamins will be added to large volume IV solutions by the Pharmacy Admixture Service on a 24 hour basis. Note: In an emergency, the RN is responsible for the preparation of medications and the mixing of IV solutions as requested by the physician. If a pharmacist is present, he/she will assist the RN with the preparation of drips and drug dilutions.
- B. In special care units, the RN may add those medications specified in the protocol for the given special care unit.  
\*For Special Care units, see also Procedure Manual, Page 210, “IV Admixtures”

#### V. **Equipment and Equipment Changes**

- A. **IV PUMP LOCKOUT.** The lockout mechanisms must be used with infusion pumps that are equipped with them.
- B. **Base Solution bottle.** IV solutions that are not completely infused within 24 hours, from the time they are started, must be discarded.
- C. When restarting an IV, change the entire infusion system. NOTE: A phlebotic site (or suspected phlebotic site) should be re-sited using all new components regardless of the length of use of the reservoir bottle and administration set.
- D. If an IV site is not dated, the nurse is to determine the date of insertion and write it on the tape.
- E. Vascular catheters inserted in emergency situations (i.e., by Paramedics, during resuscitation, etc.) with possible improper aseptic technique should be changed as soon as a satisfactory site can be established elsewhere.
- F. **Labeling: Insertion Sites, Tubing and Solutions:**

Label for	Label name	Label color	Documentation to include	Instructions
Insertion Site	N/A	N/A	Date, time, initials of person, catheter gauge	Enter information in pt record.
IV Tubing	IV Tubing Changed Label	Fluorescent Pink	Date, nurses initial	Attach just below drip chamber.
IV Solutions <u>without</u> Medication	IV Label	Fluorescent Orange	Pt. name, MRUN, Ward/unit, room/bed, solution, rate(cc/hr, drops/min), started by, date/time.	Attach label to container so as not to obstruct other writing on container. A separate marked tape may be affixed to container to facilitate timing flow rate.
IV Solutions <u>with</u> Medications	Medication Added Label	Fluorescent Red	Name, amt. of meds added, name of person who mixed meds, date & time	Admixtures done by Pharmacy will be labeled with Pharmacy Label.

## G. Infection Control Guidelines for Intravenous Catheters:

Type of Device	Cannula/ Site *	Solution Change	Tubing Change	Dressing Change
* The site should be evaluated daily for signs of infection and changed immediately if line-related sepsis or catheter site complications are suspected. With the exception of tunneled catheters (Broviac, Hickman), the risk of catheter-related sepsis increases when catheters are left in place more than 72°				
Peripheral VENOUS Catheter	96° *	24°	72°	Replace dressings on short-term catheter sites every 2 days with sterile dry gauze or if dressing becomes damp, loose, or soiled. Sterile transparent dressing can be safely left on for the duration of the catheter insertion
Piggybacks	NA*	each IVPB	72° Discard and replace all intermittent IV administration sets every 24 hrs	NA
Peripheral IV catheter (including saline lock)	Adults: 96 hrs Peds: Do not routinely replace	NA	96hrs. Replace tubing used to administer blood, blood products, parenteral nutrition (including 3-in-1 solutions), fat emulsions within 24 hrs of initiating infusion. Replace tubing used to administer propofol every 6-12 hrs, when the vial is changed, per the manufacturer's recommendation	Change if damp, loosened, or visibly soiled
Intralipids	NA*	24°	each bottle	NA
PIC-Peripherally inserted midline catheter	2-4 weeks*	24°	72°	If using chlorhexidine gluconate (Biopatch) change every 5 days Note: Dressing changes done by Vascular Access Nurses only or Specialized Trained Nurses
Central Venous Catheter: SUBCLAVIAN, JUGULAR VEIN, OR BRACHIAL DEDICATED TPN	72-96° *	24°	24°	Replace dressing on short-term catheter sites every 2 days with sterile dry gauze and tape. If using chlorhexidine gluconate (Biopatch) change every 5 days
Central Venous Catheter: SUBCLAVIAN, JUGULAR VEIN, OR BRACHIAL (NON TPN)	72-96° *	24°	72°	Replace dressing on short-term catheter sites every 2 days with sterile dry gauze and tape

Type of Device	Cannula/ Site *	Solution Change	Tubing Change	Dressing Change
Pulmonary Arterial Catheter, e.g., Swan-Ganz Catheters	72-96 <sup>o</sup> *	For pressure monitoring systems, replace continuous flush solution every 72-96 at the time the transducer is changed. Exceptions: NICU and PICU change q24	Hemodynamic Monitoring: Change tubing every 72-96 (including the stop cock)  Exception: PICU/NICU change q24	Replace sterile transparent dressing every 7 days. If using Biopatch, change every five days for central line or when it becomes damp, loosened or soiled
Peripheral ARTERIAL Lines	72-96 <sup>o</sup> *			Leave dressing in place until the catheter is removed, or changed, or the dressing becomes damp, loose or soiled. Must be changed by 72 <sup>o</sup>
Femoral Lines: (Arterial or Central Venous Catheter)	48-72 <sup>o</sup> *			
PICC's (peripherally inserted central catheter)	6-12 months			
Tunneled Central Venous Catheters (Broviac, Hickman, Cook, Groshong)	NA *			
Implantable intravascular Device	NA *			The transparent dressing should be changed every five days if using chlorhexidine gluconate patch (Biopatch) followed by VI2000 transparent dressing. Change gauze dressing every 72-96 hrs or if dressing become damp, loose, or soiled.
Umbilical Catheters (arterial or venous)	NA *	24 <sup>o</sup>	24 <sup>o</sup>	NA
Hemodialysis Catheters	NA *	NA	NA	Per hemodialysis RN

## VI. Documentation

- Record all IV solutions on the Medication Administration Record and Flowsheet.
- Record IV site observation on Flowsheet or Nursing Notes.
- Document any teaching done on "Interdisciplinary Patient/Family Education Record".

**PLEASE COMPLETE THE STUDY QUESTIONS ON THE NEXT PAGE**

### Study Questions

Select the BEST answer by referring to the preceding text and policies and procedures for the answers.

1. All of the following are signs of phlebitis **EXCEPT**:
  - a. Tenderness
  - b. Pain at IV site
  - c. Skin feels cool around IV site
  - d. Redness and/or swelling noted at IV site
2. Observation and evaluation of the peripheral IV site in adults and its surrounding tissue should be done every:
  - a. 2 hours
  - b. 4 hours
  - c. 8 hours
  - d. 30 minutes
3. The nurse should change peripheral IV tubing every:
  - a. 12 hours
  - b. 24 hours
  - c. 96 hours
  - d. 4 times a week
4. On a medical-surgical ward, an antibiotic order should be renewed after:
  - a. 3 days
  - b. 5 days
  - c. 7 days
  - d. 10 days
5. The physician's orders for administration of a blood product must state **all** of the following **EXCEPT**:
  - a. Number of units to be infused
  - b. Type of blood/blood product to be given
  - c. Rate of infusion if not given over usual time frame
  - d. Specific intervals when vital signs should be taken
6. All of the following staff may verify the information on the Transfusion Record form, the blood label on the unit, and the patient's identification band prior to administration **EXCEPT**:
  - a. RN/RN
  - b. RN/LVN
  - c. LVN/LVN
  - d. RN/MD
7. The tubing and filter used to administer total parenteral nutrition is to be changed how frequently?
  - a. Every 24 hours
  - b. Every 36 hours
  - c. Every 48 hours
  - d. Every 72 hours
8. Cannulation of the lower extremities in adults should be avoided because of the high risk of:
  - a. Embolism
  - b. Thrombophlebitis
  - c. Both a and b
  - d. Neither a or b

9. Symptoms associated with complications to a peripheral IV include all of the following **EXCEPT**:
- a. Pain
  - b. Redness
  - c. Tenderness
  - d. Crepitation
10. A PICC line is:
- a. A central line
  - b. A peripheral line
  - c. Not confirmed by x-ray for placement
  - d. Inserted directly into the superior vena cava

**CHECK YOUR ANSWERS TO THE STUDY QUESTIONS ON NEXT PAGE**

**Answers to Study Questions**

- |      |      |      |      |       |
|------|------|------|------|-------|
| 1. c | 2. a | 3. c | 4. c | 5. d  |
| 6. c | 7. a | 8. c | 9. d | 10. a |

**IF YOU MISSED ONE OR MORE QUESTIONS, REREAD THE CONTENT AND REPEAT THE STUDY GUIDE QUESTIONS.**

## Bibliography

- Buck ML. Treatment of intravenous extravasations. *Pediatric Pharmacotherapy* [serial online]. January 1998;4(1). <http://healthsystem.virginia.edu/internet/pediatrics/pharma-news/JAN98.pdf>. Accessed December 4, 2012
- Centers for Disease Control and Prevention. Guidelines for the Prevention of Intravascular Catheter-Related Infections. *MMWR* 2002;51(No. RR-10). <http://www.cdc.gov/mmwr/PDF/rr/rr5110.pdf>. Accessed December 4, 2012
- Hadaway L. Infusing without infecting. [http://www.nursingcenter.com/prodev/ce\\_article.asp?tid=424377](http://www.nursingcenter.com/prodev/ce_article.asp?tid=424377). Accessed December 4, 2012
- Hankins J, Lonsway RAW, Hedrick C, Perdue MB, eds. *The Infusion Nurses Society Infusion Therapy in Clinical Practice* 2<sup>nd</sup> ed. St. Louis, MO: W.B. Saunders Company; 2001.
- Intravenous admixtures. In: *Nursing Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 1999: 210.0-210.1.
- Intravenous Therapy (Peripheral). In: *Nursing Procedure Manual*. Torrance, CA: Harbor UCLA Medical Center; 2012: 215.0-215.18.
- Guidelines for the prevention of intravascular catheter-related infections. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2010. Policy 324.
- Infusion Nurses Society. Infusion nursing standards of practice. *Journal of Intravenous Nursing*. 2000; 23 (suppl 6): S12-S86.
- Macklin D. Phlebitis: a painful complication of peripheral I.V. catheterization that may be prevented. *American Journal of Nursing* 2003; (103) 2: 55-60
- Montgomery, LA, Hanrahan K, Kottman K, Otto A, Barrett T, Hermiston B. Guideline for IV infiltrations in pediatric patients. *Pediatric Nursing*. 1999; 25:167-180.
- Millam DA. On the road to successful I.V. starts. *Nursing 2000*. 2000; 4:34-50.
- Nettina SM. *The Lippincott Manual of Nursing Practice*. 9<sup>th</sup> ed. Philadelphia, PA: Lippincott Williams & Wilkins, 2006.
- Preventing intravenous catheter-associated infections: an update. <http://www.infectioncontroltoday.com/articles/161feat6.html>. Accessed December 4, 2012.
- Rosenthal, K. Tailor your I.V. insertion techniques: Special populations. *Nursing 2005*; 35(5): 36-41.
- Terry J. *Intravenous Therapy Clinical Principles and Practice*. Philadelphia, PA: W.B. Saunders; 1995.

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# **PATIENT TEACHING - ADULTS SELF-STUDY GUIDE**

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## Patient Teaching: Adults

### Objectives:

Upon completion of this self-learning module and the patient teaching practicum, the learner will be able to:

1. Define the three types of learning (knowledge, attitudes, skills).
2. State the general purpose of patient teaching.
3. Define four principles of adult learning theory.
4. Compare the contributing factors that can influence learning.
5. Describe the process of assessment of the learning needs of the patient and family.
6. Explain the process of patient teaching, including the importance of the patient redemonstrating a skill or rephrasing of instructions.
7. Identify resources for patient education at the Medical Center or in the community.
8. Demonstrate the following skills:
  - Assessment of learning needs of a patient and/or family in a specific scenario.
  - Describe how a plan of patient teaching might be developed.
  - Teach a patient and/or family (e.g., how to take a medication specific to the clinical work area, or post-procedure follow-up instructions).
  - Document the evaluation of the teaching interventions provided and the patient's response.

**How does patient teaching compare with learning?**

Patient teaching is the transfer of information to patients and/or families concerning their healthcare needs. It is an essential aspect of nursing care, and follows the nursing process of assessment, problem/diagnosis, planning, intervention, and evaluation.

The purpose of patient teaching is to provide information to patients and/or families about their responsibilities in their healthcare and information that will help them maintain or restore health, promote adjustment to illness, promote compliance with medical or nursing care recommendations, prevent complications, and promote self-care. Patients have a need and a right to know about their illness and treatments.

Learning is a process that occurs immediately and over time, and which may require repeated and varied instruction methods. Patient teaching is performed whenever a learning need is apparent and is ongoing. When the nurse is unable to directly provide patient teaching, a referral to appropriate resources is obtained.

**What are the different types of patient learning?**

Patient and/or families may need patient teaching in order to change their **knowledge, attitude** or **skills**. Knowledge includes information about the patients' responsibilities of their own healthcare, medication, the disease, or treatment (e.g., signs of hypoglycemia and actions to take). Attitude may refer to new ways of viewing an illness or disability. Psychomotor skills include such things as how to give insulin injections. More examples are listed in Figure 1. Information about the medical condition and treatment, and the healthcare system is often part of patient teaching by registered nurses.

**How do the principles of adult learning affect patient teaching?**

Adults learn when they are motivated and can find meaning in what they are learning. Malcolm Knowles has described assumptions about adult learners which are widely accepted as a foundation for planning adult patient teaching<sup>1</sup>.

The first assumption is that as a person matures, his/her self-concept is likely to move from dependence to independence. The adult takes more responsibility for decisions and their consequences. Based on this assumption, adult learners should be considered as wanting to be active participants and not passive recipients in a teaching situation. Adult learners therefore should be involved in the educational process (i.e., planning, expressing ideas and concerns, and making decisions).

**Figure 1: Types and Areas of Patient Teaching**

- Knowles's second assumption is that the previous experience of the adult is a rich resource for learning. Patient's prior experiences may influence how and what a patient (or family) is taught. Negative experiences can be barriers to learning. On the other hand positive experiences can enhance learning. Therefore, *patient teaching needs to be built on the positive aspects of the prior experiences.*
- The third assumption is that the readiness to learn in adults often is related to a developmental task within the age group, or social role. Gessner<sup>2</sup> states that major events simulate adult learning. For example, illness represents a period of change and motivates many to learn. Another example is when a person needs a new job and is motivated to learn new skills. Gessner<sup>2</sup> suggests it is best to provide information close to the time it is needed. *Adults should also be taught when they feel comfortable and are free of pain.*
- Finally, the fourth assumption is adults want to apply new knowledge and skills immediately. *Adults look for information that is problem-centered rather than subject-centered.*<sup>1</sup> For example, hands-on practice of a new skill, such as caring for a tracheostomy will enhance learning. Recognizing a gap between what they know and what they *want* or *need* to know may also motivate learning.<sup>1</sup>

**Knowledge**Medical Condition (What's wrong)

Diagnosis, etiology  
Terminology  
Anatomy and physiology  
Clinical monitors (e.g., B/P, CBC, urine checks)  
Diagnostic procedures (purpose, how, when, where)  
Aggravating factors (e.g., stress, foods)  
Expected outcomes of treatments  
Symptoms and management

Treatment or Therapy (What's to be done)

Medications (names, action, side effects, how taken)  
Prevention or management of side effects  
Foods or alcohol to be avoided  
Treatments (names, preparation)  
Alternative  
Restrictions devices/limitation/Seclusions  
What to report and to whom

Healthcare Systems (Who does what to and for whom)

Patient safety  
Personnel (nurses, physicians, etc.) and their responsibilities in their care  
Hospital or clinic routines and procedures to follow  
Responsibilities as a patient  
Locations of procedures, tests, or treatment  
How to reach a physician or nurse, or to report a concern  
What to do in an emergency  
Financial responsibilities/solutions  
Community resources

**Attitude**

Curability versus fatality of disease  
Hopefulness versus powerlessness  
Active versus passive participant in care  
Comfort versus discomfort  
Balance versus imbalance  
Self-control versus 'other'-control

**Skills**Medical Condition

Mobility  
Skin care  
Use of assistive devices or equipment  
How to use monitoring equipment (e.g., glucometer, thermometer)  
How to access/use community resources

Treatments

Special food or medication preparation  
Medication administration

How to give injections  
How to give rectal suppositories

Treatment

How to care for Hickman Catheter  
How to give an enema  
Self-catheterization  
Wound care and dressing changes  
Site-specific after procedures (e.g., oral surgery/mouth care, cast care, etc.)  
Use of intravenous equipment (e.g., pumps)

## What factors can influence learning?

In addition to Knowles's assumption about adult learners, there are other factors that need to be considered that can influence a patient or family's ability to learn (Figure 2.) It is important to remember that while these are broad categories to consider when preparing to teach patients, each factor must be considered either a positive or a negative influence in relationship to the patient's situation. Some patients have difficulty learning a concept due to the presence of multiple stressors or lack of support.

Stimulation of one's senses affects learning (Table 1). Research has also shown that 75% of what is heard is forgotten after two days. The table shows that there is a higher percentage of retained information when patient teaching is presented through the stimulation of more senses.

**Table 1: Stimulation of Senses and Learning Retention**

<i>Teaching material was:</i>	<i>Learning retention:</i>
Read	10%
Heard	20%
Seen	30%
Heard and Seen	50%
Read, Heard and Seen	80%

**Figure 2: Factors That Can Influence Learning**

<b><u>Factors to Consider</u></b>	<b><u>May Be Negative Influence if</u></b>	<b><u>May Be Positive Influence if</u></b>
Habits	Destructive	Constructive
Physical Condition	Pain	Symptom free
Cultural/Religious/Social Beliefs	Belief patient not responsible	Belief patient responsible for care
Diagnosis	Neurological impairment	Disease responsive to treatment
Language	English as second language	Patient and provider have same language
Health Belief	Misconceptions	Actions make a difference
Education	Low literacy/less formal education	More formal education
Knowledge	None	Some
Motivations	Bored	Eager to learn
Reading Ability	Unable to read	College level English
Experience	Negative experiences	Positive experiences
Emotional State	Anxious	Relaxed/calm
Goals	None defined	Sees desirable outcome
Expectations	Expects worst	Experts best
Coping	Doesn't ask questions	Asks questions
Social Support/Resources	Limited network	Family(s) and others available
Environment	Noisy, crowded	Quiet, comfortable
Staff Knowledge/Expertise	Inexperienced	Knowledgeable
Sensory Levels	Blind, hard of hearing	No alterations
Medical Conditions	Alzheimer's	No impairments
Transportation	Concentration impaired	No side effects
Financial Resources	Poor transportation	Transportation or resources available
Sexual Orientation	Pending or limited resources	Insurance or resources available
Relationship with Healthcare Team	Limited or conflicted support	Extended and supportive others
	Lack of trust or respect	Positive feedback from team; trust/respect

**Potential High Risk Patients**

Multiple learning needs  
Multiple medical problems  
History of coping difficulties and/or noncompliance  
Limited social support  
Learning disability  
Language barrier

### ***Teaching Methods***

Through the years, individuals have utilized different methods of teaching to help another person learn new information. These teaching methods range from basic beliefs, such as the power of magic, good-luck charms and the supernatural, cultural or social belief and practices (e.g., home remedies of poultices and herbal teas), intuition and personal experience (e.g., learning from experience on what helps one to sleep at night), to more formalized methods of knowing gained from instruction or education and the influence of authority figures, or the power of deductive and inductive reasoning.<sup>3</sup> These authors describe the highest form of learning as the scientific method, or the attainment of knowledge by means of repeated observation and controlled testing, the primary means of guiding nurses in what should be the content of patient teaching.<sup>3</sup>

### ***Literacy***

The use of written instruction materials is widely used in patient teaching and offers several challenges to patient educators. Instructions or patient education pamphlets are not well received by students who did not receive formal education and/or who are not able to read or write. The same is true if the patient's primary language differs from the language of written materials. While many patient education materials have been developed in simplified language(s), a large number of materials for major diseases and treatments remain unavailable in language that is less than high school or college level English. "Low literacy and illiteracy are major contributing factors to noncompliance."<sup>4</sup> Handwritten materials or materials printed in all capital letters may also be difficult to read for some patients, whereas hand-printed materials where capital and small letters are used may not be as difficult.<sup>5</sup> Because definitions of literacy vary, **functional literacy** is a term that has been used to describe the ability of the individual to read, understand and interpret what he/she reads and to then use that information as it was intended.<sup>4,5</sup> Having poor reading skills impact the ability of the patient and/or family to organize thoughts and to formulate questions, integrate the information into behaviors, and to problem-solve.<sup>4,5</sup> Explanations of symptoms may be very simple, without a variety of adjectives to describe them.<sup>5</sup> Patients tend to think in specific and concrete ways and will need limited, basic information, perhaps using creative audiovisual or other means of instruction.<sup>4,5</sup> Doak and others<sup>5</sup> concluded that individuals with poor communication skills:

1. Tend to have limited perspective related to direct personal experience.
2. May be unaware of the need to give information to healthcare providers.
3. Think in concrete terms, rather than in classes or categories of information.
4. May be given information in bits and pieces without an identifiable pattern or logical connection.

### ***Cultural Influences***

It is important to understand the influence of culture and social groups on the patient's values and beliefs about healthcare and illness. How the patient and/or family's view the healthcare system, the nurse, and the treatment may largely be determined by cultural or social norms. For example, in most cultures there are folk beliefs and practices that are used to treat minor illnesses, and the use of religious or lay healers or resources is not uncommon. The uses of chicken soup, herbal teas, and/or menthol ointment applied to the patient's chest are all 'folk' remedies for the common cold. Many patients integrate these practices with modern medical care, while others may have more difficulty accepting some aspects of modern medical care.<sup>6,7</sup> In most instances, it is helpful to learn the practices that the patient and/or family incorporate into their healthcare, and to work with the patient and/or family to understand the recommendations of modern healthcare.

Figure 3 summarizes a few tips that could be useful in educating culturally diverse patients.

### Figure 3: Tips for Teaching Culturally Diverse Patients

Understand that patients often perceive nurses in a position of power; therefore, *approaching them with respect may help reduce the negative effects of such perceptions.*

Identify patients' preferred communication style within their cultural group (*e.g., rules of address, formal or informal: in most Asian ethnic groups men and elders prefer to be addressed as Mr. or Mrs. \_\_\_\_\_*).

Assess family relationships. *Identify who has the power in the family, who makes the decisions, or approves recommendations. In Asian ethnic groups, men and elders have authority, making decisions and approving recommendations.*

Utilize the *patient's primary language.*

*Provide instructional material, preferably in the patient's native language.*

*Speak slowly and use a simple sentence.*

*Avoid technical terms.*

Consider *non-verbal communications*: direct eye contact may indicate aggression to some patients.

### How to assess the learning needs of patient and/or family?

The purpose of assessment is to gather information in a systematic way that will address the health status of the patient and the family's beliefs and understanding about the medical problem which may influence learning. Ideally, the assessment and discussion should take place in a quiet and comfortable environment. This environment will not only enhance learning but it will also serve as a place where the patient and family will develop a trusting relationship. During assessment of learning needs, the nurse needs to give attention to symptoms that the patient is experiencing. This will make the process of assessment more effective. In addition, it is important to allow the patient and/or family to express their concerns and needs freely. The following must be considered when conducting an assessment of needs:

### Figure 4: Factors That Affect Learning Needs

Medication diagnoses, dates of onset, treatment(s) to date, prognosis, history of compliance  
 Primary reason for visit (and/or for nursing involvement)  
 Education and experience (work and health related) language preference  
 Reading ability  
 Family's status and support  
 Community or other resources  
 Role (spouse, child, parent, sibling, professional, etc.) and/or developmental level  
 Perceptions about medical diagnosis and treatment(s)  
 Cultural and religious influences  
 Prior experiences  
 Expectations  
 Alternative healing practices  
 Physical and emotional strengths/limitations  
 Perceived learning needs (skills, knowledge, attitudes)  
 Actual learning needs  
 Readiness to learn

The nurse, an interviewer and observer, adds objective assessment information, such as behaviors or statements by the patient and/or family which might indicate motivation and interest in patient teaching, or the lack of it (*e.g., attentiveness and appropriateness of questions asked, versus restless body language, lack of eye*

contact, unrelated or repetitive questions). While assessing the patient and family it is important to consider the influence of cultural and physiological circumstances which influence behavior. For example, lack of eye contact might be considered to be a very respectful behavior in some cultures is not meant to convey lack of interest, whereas restlessness during an interview might be indicative of the physiological need to empty the bladder! It is during the assessment process that the nurse begins to formulate a plan as to the type of information to be included in patient teaching, the methods to be utilized, and the timing of when it should occur.

### **What is the patient teaching process?**

First, the nurse must review all of the information gathered during the initial assessment phase and then, formulates goals. The patient educational information is prioritized in consultation with the patient/family before starting the teaching sessions. Patients who agree with the goals, and/or who helps determine the goals, will most likely be more involved in the process and will be able to realize the value of patient teaching.

Establishing goals and objectives may be simple and straightforward, or complex. It is important to determine what patients need to learn in order to manage their healthcare adequately, and what they want to know as well. It will be easier to teach patients what they need and want to learn and more difficult to teach what they need to learn but do not want to learn. When establishing goals, it is also important to consider needs of the individual with Maslow's hierarchy of needs.<sup>1</sup> For example, breathing difficulties secondary to lung cancer will create a basic physiological need for oxygen; therefore, the nurse would teach the patient on how to manage portable oxygen prior to teaching him/her the potential side effects of radiation therapy for treatment of the disease.

“In acute and chronic illness, patient education is often limited to physiologic and survival needs. Prioritization of these learning needs involves asking the following questions:

1. What are the most acute needs of these individuals?
2. What does he already know? What behaviors can he perform?
3. What learning needs are unmet? Which are life-threatening?”

### **What resources are needed in patient teaching?**

When planning and providing effective patient teaching, the nurse should be aware of the appropriate and available resources that can be used with the various methods of teaching. The methods of teaching include lecture, demonstration and return demonstration, role-playing, behavior modification, contracting, play, simulation, programmed instruction, group discussion, and audiovisual materials (videotapes, films, models, diagrams, pamphlets, audiotapes, chalk boards/flip charts/displays, computer-assisted instruction, reminder cards, books), peer counselors/recovered patients as visitors.<sup>1,4,8</sup> Opportunities to return demonstrate or to play a role are both useful when teaching skills and the applying the knowledge learned. It is important to allow enough time to demonstrate a skill and have the patient or family repeat it.

Roe<sup>9</sup> describes an unfortunate incident when newly diagnosed with insulin-dependent diabetes patient was identified to have a high blood sugar. After a thorough review, the patient was found injecting oranges with insulin (as used in the demonstration) and then eating the oranges! The use of an interpreter is also helpful in patient teaching. The interpreter service coordinating center assists staff in locating appropriate interpreters to assist in patient teaching. An Interpreter Directory is also available through the Harbor-UCLA Intranet.

A thorough knowledge base of materials to be taught, effective communication skills and self-confidence is important for the nurses to effectively provide education. Several authors have suggested strategies to enhance effective patient teaching.<sup>4,8</sup> (See Figure 5)

## Figure 5: Strategies To Enhance Effective Patient Teaching

### Documentation

Documentation in the medical record is necessary because it reflects care delivered to patients. Patient teaching about medications, procedures, or other aspects of the illness or treatment and self-care is an on going intervention. Documentation serves as an important communication tool between healthcare providers when planning care and teaching sessions. Lack of documentation of patient teaching suggests that no specific instruction or information was provided to the patient. In California, the state law mandates that patients need to be informed of their treatments options. For example, the physician of a patient with breast cancer is expected to document that he/she discussed treatment options with this patient.

Documentation of patient teaching should include a statement as to the *need or problem identified, any supporting information provided by the patient or family that supports the need* (e.g., patient states “I don’t understand why I must take insulin every day if I feel better), *the nurse’s observations related to the need* (e.g., patient with known diagnosis of hypertension; given refills of anti-hypertensive medication and pill count indicates none consumed; B/P today 224/150), *the information given verbally, in written or other form, other audiovisual materials used in the teaching process* (e.g., patient watched video on the control of high B/P), *and some evaluation of the patient’s response* (e.g., patient gave return demonstration of injection of insulin on the right thigh and performed technique without difficulty; verbalized understanding of importance of insulin on the right thigh and performed technique without difficulty; verbalized understanding of importance of insulin and dangers of lack of use). *Plans for further teaching or resources to which the patient was referred* should also be included. The educational plan should be reviewed and documented in the *Multidisciplinary care plan or individual disease management pathway.*

Documentation should include the assessment of the patient’s and/or family’s learning needs the specifics of the information provided

***The Nurse Will Be Most Effective if he/she:***

- Presents key points early in the session and repeats periodically
- Uses short and simple words and sentences
- Presents information in different ways and uses a combination of teaching methods
- Encourages and allows time for feedback and discussion
- Reinforces learning that has taken place
- Continuous evaluation of the educational plan and patient’s need
- Allows enough time to teach and provides time for questions. An environment that is relaxed and distraction-free is desirable
- Keeps teaching sessions short and meaningful
- Encourages team effort (the patient and/or family and the nurse together)
- Plans further teaching time, if indicated

including any written or other materials. In addition, the following must also be documented: patients understanding, and skills gained after the teaching session, including successful return demonstration of skills, and of any future teaching needed and planned, and resources consulted. This documentation should be found on the *Interdisciplinary Patient/Family Educational Record, nursing progress notes, the discharge plan, and/or the outpatient progress notes.* “The nurse should document what he/she taught, how the patient responded to the teaching, the results of the evaluation of the teaching plan, and the materials that were distributed to the patient.”<sup>4</sup>

### Case Example

The case example highlights how a nurse uses the process of patient teaching in the process of patient teaching in the care of an individual patient. Please review the principles utilized and apply them to a patient with similar needs.

Mrs. Smith is a 55-year-old Caucasian female admitted because shortness of breath and chest pain and a history of high blood pressure. She is attached to the bedside cardiac monitor, has intravenous line maintained with D5W at 30 cc/hr, and is on bed rest. She just received 40 mg of Lasix IVP in the ER prior to transfer to

the unit, how would the nurse set and prioritize Mrs. Smith's educational needs? In order to do this, the nurse should answer the following questions:

- What is necessary for the patient to learn?
- What are the priorities of learning?
- How will successful learning be measured?

The priorities of learning require that the nurse first reviews the patient's understanding of safety and pain management, and his/her responsibilities as a patient. Mrs. Smith must be informed as to when to call the nurse for assistance and to report any new or increasing chest pain so that immediate assessment and early interventions can be implemented. Mrs. Smith also needs to be educated on why patients are placed on bedrest, why they cannot freely get up and go to the bathroom even when they want to and when the nurses are available to help them.

The nurse must also educate Mrs. Smith about the action, indication and side effects of her medications. Mrs. Smith will need to know what happens routinely with patients on cardiac monitors and the progression in the different phases of diagnostic tests. Early assessment triggers analysis of diagnostic and lab test that leads to timely treatment and prevention of extension of the disease process.

After an initial evaluation that a patient is not in immediate distress during admission, the nurse conducts a brief interview with the patient or family to assess learning potentials (e.g., knowledge, skills, attitude and ability). Factors which may help or hinder the patient from carrying out necessary care (e.g., disabilities, age, family or other support, understanding of the English language, reading ability) and the patient's priorities are also ascertained.

Instructional material is given to support information given to patient. The patient is asked to explain what has been discussed or to return a demonstration of any skill, as appropriate. Sometimes the patients do not understand the given instructions because too much information may have been given at one time, or due to the stress of having surgery or illness which can interfere with the ability to learn. Prior to attaching the monitoring leads on the patient's chest, the patient should be instructed about cardiac monitoring. Patients are provided with the names and phone numbers of contact people for any problems or questions.

All of the patient teaching should be planned with not just the patient alone but also with the patient's family. This gives them the opportunity to share the responsibility of the patient's care. The nurse must also evaluate how well prepared the patient feels and give additional patient resources whenever possible.

Success is measured in several ways. This can be measured by assessment of the patients self-reporting pain regularly and patients compliance to treatments. Questions that can be asked for any patient to evaluate success in patient teaching include:

- What is the patient's understanding of his/her condition or illness, the medications or other treatments, and necessary follow-up?
- Were the physical, emotional, development, and cultural needs address?
- Is the patient/family able to demonstrate new skills learned?
- Is the patient compliant with therapy, medications, appointments, and activities?
- Is the patient following the prescribed or contracted plan of care?
- Is the patient/family consulting with appropriate resources?
- Does he/she have any further questions?

If the goals of patient teaching have not been met, reasons for incomplete success should be evaluated. Another plan of teaching should be developed or contracted and teaching initiated. Again, if problems continue to be identified, additional resources must be consulted, such as the Clinical Nurse Specialists, Clinical Nurse Educators, Resource Nurses, Case Managers, Visiting Nurses (for in-home assessment of compliance and/or follow up teaching, etc.)

**In summary, when planning patient teaching:**

1. Select the best method to meet the goal that is appropriate for the patient
2. Consider the time from the patient's, as well as the caregiver's, point of view
3. Plan with the patient, giving the patient the opportunity to share in the responsibility of his or her care
4. Mobilize patient resources
5. Break down the plan into manageable steps according to priority
6. Involve the patient and family in the care. If the patient has no family, inquire about friends or church members who may be able to help in the recovery period. Sort out with the patient what he/she needs to know for meeting his/her goals
7. Evaluate to determine whether the patient has acquired the knowledge and skills taught. Ask questions to make sure the patient understands the instructions given to him/her.

**PLEASE COMPLETE THE STUDY QUESTIONS ON THE NEXT PAGE**

## Study Questions

1. The purpose of patient teaching is to:
  - a. Help the family support the patient
  - b. Ensure that patients and families understand what is expected of them
  - c. Ensure that patients understand what the medical and nursing teams have told them
  - d. Provide information that will help them to maintain or restore health, promote adjustment to illness, promote compliance with medical or nursing care recommendations, prevent complications, and promote self care
  
2. When nurses teach patients important facts about a disease process/condition, nurses are enhancing the learning of:
  - a. Skills
  - b. Attitude
  - c. Behavior
  - d. Knowledge
  
3. Malcolm Knowles describes 4 principles of adult learning. All of these are true **EXCEPT**:
  - a. Adults learn when they are motivated
  - b. Prior experiences influence learning
  - c. Readiness to learn is dependent on developmental tasks
  - d. Adults prefer to learn about future events rather than what is important today
  
4. A patient is admitted for uncontrolled hypertension and planned to be discharged in the morning. Previously, he had informed the nurse that he loves to eat out. When administering his 6 p.m. medication, how would the nurse prioritize the education that the patient needs regarding his current medications?
  - a. Evaluate his knowledge of medication, diet, risk factors and current condition
  - b. Ask questions regarding his knowledge of the anti-hypertensive medication including drug-nutrient interactions
  - c. Give him information regarding anti-hypertensive drugs, action and side effects and how he can get refill for his medication
  - d. Ask him the name, action, side effects, special considerations he has to observe when he takes his anti-hypertensive medications
  
5. Teaching a patient with diabetes about foot care is an example of:
  - a. Skills
  - b. Attitude
  - c. Behavior
  - d. Knowledge

**CHECK YOUR ANSWERS TO THE STUDY QUESTIONS ON NEXT PAGE**

**Answers to Study Questions**

1. d

2. d

3. d

4. a

5. a

**IF YOU MISSED ONE OR MORE QUESTIONS, REREAD THE CONTENT AND REPEAT THE STUDY GUIDE QUESTIONS.**

## References

1. Knowles MS. *The Modern Practice of Adult Education: From Pedagogy to Andragogy*. Englewood Cliffs, NJ: Cambridge Adult Education; 1980.
2. Gessner BA. Adult education: The cornerstone of patient teaching. *Nursing Clinics of North America*. 1989; 24:589-595.
3. Ford RD. *Patient Teaching Manual 2*. Springhouse, PA: Springhouse Corporation, 1987.\*
4. Rankin SH, Stallings K. *Patient Education: Issues, Principles, Practices*. 3<sup>rd</sup> ed. Philadelphia: JB Lippincott; 1996.
5. Doak CC, Doak LG, Root JH. *Teaching Patients with Low Literacy Skills*. 2<sup>nd</sup> ed. Philadelphia: JB Lippincott Williams & Wilkins; 1996.
6. Tripp-Reimer T, Afifi LA. Cross-cultural perspectives on patient teaching. *Nursing Clinics of North America*. 1989;24:613-619.
7. Falvo DR. *Effective Patient Education: A Guide to Increased Compliance*. Rockville, MD: Aspen Systems Corporation; 1985.
8. Roe C. The muddy waters of clinical teaching. *American Journal of Nursing*. 1992;92:20.

## Bibliography

- Canobbio, M. *Mosby's Handbook of Patient Teaching*. 3<sup>rd</sup> ed. St. Louis, MO: C.V. Mosby 2006.
- Cochrane DA, Oberle K, Nielsen S. Do they really understand us? *American Journal of Nursing*. 1992; 92:19-20.
- Giger JN, Davidhizar RE. *Transcultural nursing*. 4<sup>th</sup> ed. St. Louis, MO: Mosby Year Book; 2004.
- Patient/family education. In: *Hospital & Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2005. Policy 366.
- Adult education theories: informing cooperative extension's transformation.  
<http://www.joe.org/joe/2007february/a1.shtml>. Updated February 2007. Accessed May 16, 2008 December 5, 2012.
- Lorig K. *Patient Education: A Practical Approach*. 3<sup>rd</sup> ed. Thousand Oaks, CA: Sage Publications. 2001.
- National-Louis University. Malcolm Knowles: Apostle of andragogy.  
<http://www.nl.edu/academics/cas/ace/resources/malcolmknowles.cfm>. Updated May 1, 2005. Accessed May 16, 2008. Page no longer available.
- QOTFC The Clinical Educator's Resource Kit. *Adult Learning Theory and Principles*.  
<http://www.qotfc.edu.au/resource/index.html?page=65375>. Accessed December 5, 2012.
- Redman BK. *The Practice of Patient Education*. 9<sup>th</sup> ed. St Louis, MO: C.V. Mosby Year Book; 2001.
- Winslow E. Patient education materials: can patients read them, or are they ending up in the trash? *American Journal of Nursing*. 2001; 101(10): 33-38.

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# **PATIENT TEACHING - CHILDREN SELF-STUDY GUIDE**

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## **Patient Teaching: Children**

### **Objectives**

Upon completion of this self-study guide the participant will be able to:

1. Identify five components of planning patient education.
2. Identify three people who should be considered in planning the goals of patient education for children.
3. Describe 3 factors to consider when assessing a child's readiness to learn.
4. Identify resources available that can be utilized to aid and facilitate patient education.
5. Describe appropriate interventions in teaching children of different cognitive stages.
6. Choose appropriate, accurate, and minimally threatening language when speaking to children of different developmental ages.
7. Demonstrate the following:
  - a. Develop and implement a plan for teaching children regarding a specific learning need
  - b. Distinguish between goals of child, parents, and healthcare providers
  - c. Establish the purpose of education from the perspective of the child
  - d. Assess readiness to learn from perspective of the child and the support available from parents, teachers and other adults
  - e. Provide patient teaching to a child regarding a specific learning need
  - f. Document the teaching provided and patient's understanding of teaching provided

## PLANNING PATIENT EDUCATION

*Planning patient education is like planning a garden. The gardener (nurse, MD, etc.) has a goal for what the garden should look like in full bloom. There are some strategies for planting, fertilizing, watering and maintenance. But, there is a lot of variation that can happen. The owners of the garden (patients) have ideas of their own. Mother nature pulls tricks and there can be unpredictable frosts, early heat waves and torrential rains. There may not be enough time to plant all the seeds, to keep everything trimmed up; therefore, priorities need to be set. What is urgent? How much time is available? Is everything ready in order for one to get the work done? Owners and visitors (family, friends, etc.) can get in the way, pick prize flowers and trample on delicate plants. Or, visitors can help with weeding, watering, bringing new plants and respecting fences. With support and teamwork, pleasing outcomes can emerge. Remember, growing a garden, and providing patient education are not one time events!*

### COMPONENTS OF PLANNING

Planning patient education involves paying attention to the following:

- |         |          |
|---------|----------|
| a. Who  | d. When  |
| b. Why  | e. How   |
| c. What | f. Where |

Paying attention to these key elements will save time and bring better results. Consistent attention to each of these components will save time and bring better results. If you remember these elements for each learning plan, you will minimize confusion and make the good use of available resources. For example, not being clear on why the education is to be done could result in a fine lesson how a child can administer his/her own insulin after discharge and ignore the fact that he/she is to be on a special diet prior to a diagnostic procedure. Compliance with the special diet is more of a priority. Or, there might be an elaborate standardized approach to teaching new diabetics, but the child is being discharged unexpectedly the next day.

### PLANNING THE WHO

With children, at least three people need to be considered:

- a. Child
- b. Parents
- c. Staff

Considering these three groups of people is critical when it comes to determining what will be taught. The planner has to appreciate that the healthcare providers may have goals that are not the same as the child's. The parents may have goals that are a mix of the provider, child and their own goals. Individual members of the healthcare team may have conflicting goals and priorities. The key players need to agree which goals will get attention. At least one objective from each key player will increase success.

### PLANNING THE WHY

The team needs to be clear on the purpose of the education. There may be a multitude of purposes that have to be accomplished over time. Some common purposes of patient education are: choice, cooperation, compliance, control of symptoms, and change of habits. It is important that the purpose be clear to the child.

The purpose is **choice** if the parents, and the child, have to make a decision about what treatment to select, or when to have a treatment or procedure.

The purpose is **cooperation** if the child just has to go along with a decision. Going along with the

decision means that the child does what is asked during a dressing change, swallows a pill on request, lifts his/her arm or cooperates in some fashion. Cooperation is called for when one is going to do something to another person and that person doesn't get in the way.

**Compliance** calls for more participation, asks the child, or parent, to carry out some instruction themselves. Examples of instruction that is geared towards compliance include: "Drink three glasses of juice today", "Call me whenever you have to go to the bathroom", "This is how the dressing change has to be done three times a day."

**Controlling symptoms** is more complex. We teach the child some strategies that will help them manage an unpleasant or hazardous symptom. Examples include teaching PCA for pain management, ambulation for constipation, insulin adjustments for blood sugar control.

The most complicated purpose for patient teaching is when healthcare providers ask people to **change habits** for a healthier lifestyle. For example, diabetics who have to carefully match special diet, exercise and take insulin. "You can play sports if you adjust your insulin and diet. Here are some ideas that might work." Healthcare providers can't tell these patients exactly what to do (compliance) but they can give them guidelines on how to change their lifestyle.

## PLANNING THE WHAT

In order to determine "what" will be taught, the nurse must set goals. In setting goals, the nurse should perform the following:

- a. Set objectives
- b. Identify evaluation criteria

The WHAT piece of patient education is based in the ideal world. If everything were perfect, which skills and information would get covered. However, selecting the content for lessons is a complex mix of knowing what to include to accomplish the purpose of the education and tailoring the content and delivery to the needs of the child and family. The success of the mix is determined by evaluation criteria that are agreed upon in advance.

**Objectives.** When nurses know the purpose of the education, they are ready to plan the content of the lessons. This content is spelled out in statements that identify what the nurses want the learners to learn. The statements have to be measurable and clear enough so that all the players are headed in the same direction. For children, it should be clear as to who is responsible for which objectives: parent or child? The objectives should be related to the purpose and must take into account all the other patient education components (urgency, availability, preferences, readiness, and support system). The Joint Commission requires that the following information be covered:

1. Relevant medications
2. Equipment
3. Drug-food interactions (primarily the responsibility of pharmacy personnel)
4. Nutrition (primarily the responsibility of dietary personnel)
5. Rehabilitation techniques (primarily the responsibility of PT/OT personnel)
6. Availability of community resources
7. How to obtain further treatment

**Evaluation criteria.** The ultimate outcomes for patient education are recovery, return to function, healthy behavior and involvement in care decisions. When formulating evaluation criteria, the following questions can be asked.

- a. How will the nurses know if the education they provided was effective?

- b. Did the patient and family do what was expected of them?
- c. Did the nurses achieve the results they were hoping for?
- d. Whose job is it to find out?

## PLANNING THE WHEN

Once the priorities are set, the nurse needs to plan when the teaching should occur. Teaching is influenced by the following three factors:

- a. Urgency
- b. Availability
- c. Readiness to learn

**Urgency:** How urgent is the need? Immediate (OR is on the way, stitches must be taken), sometime today, sometime before discharge, in the near future (after discharge, or further into the hospitalization), or is there a set date for a planned surgery, or the next clinic visit?

**Availability:** How available is the patient? Does he/she have just a few minutes, hours, days, and weeks or can he/she use time at the next visit? Is it equally important to figure out how available the patient's parents are? And how much time does the nurse need to provide patient education?

**Readiness to learn:** Many factors influence a child's ability and readiness to learn. Understanding these factors is the basis for developing age appropriate and effective teaching methods. These include:

1. Developmental level
2. Stress unrelated to hospitalization (ie; family situations, divorce, etc.)
3. Previous hospitalizations, doctor visits, medical procedures, etc.
4. Emotional response and level of anxiety
5. Previous preparation for hospitalization or procedures
6. Separation from parents or significant caregiver
7. Parental or caregiver anxiety
8. Cultural or religious beliefs/practices

**Developmental level** can affect the way children respond to hospitalization and how they learn. Understanding that developmental stages are age appropriate and will enable the nurse to plan and prepare teaching methods for children of different ages. A more thorough explanation of developmental stages is addressed in the next section.

**Stress unrelated to hospitalization** plays an important part on how a child can effectively cope with hospitalization, procedures, or surgeries. Divorce, single parent families, or unusual family circumstances may cause unconscious stress unrelated to hospitalization. The nurse needs to become aware of what these factors are when developing a teaching plan.

**Previous hospitalizations** can affect how a child will react to present hospitalization depending on whether the first experience was positive or negative for him/her. The nurse must ask about the child's previous hospital experiences through the child's parents.

**Emotional response or level of anxiety** combined with the separation from parents or significant caregiver may create a barrier or resistance to learning for the child, causing difficulty in processing information. Behaviors that a younger sibling may manifest include: eating and sleeping disturbances, or episodes of regressive behaviors. Finding ways to decrease a child's anxiety such as encouraging parents to stay with the child, or choosing appropriate language when speaking to him/her can improve understanding and decrease anxiety during the teaching process. Choosing appropriate language will be

addressed later in the self-study guide.

**Previous preparation for hospitalization or procedures** can have a strong impact on how a child reacts to the experience. If the child is adequately prepared for the hospitalization or procedure, his/her level of anxiety can be reduced or even eliminated.

**Separation from parents or significant caregiver** can cause severe emotional reactions in children. For some children, being apart from their parents, or caregiver is an experience they have not encountered. Encouraging the parent or caregiver to stay with the child while in the hospital can decrease the child's anxiety level, which leads to an environment conducive to learning.

**Parental or caregiver anxiety** children are sensitive to the emotions and anxiety levels of their parents or caregiver. Hospitalization creates anxiety to both the children and their parents. Finding ways to decrease parental anxiety such as providing them appropriate information and explanations in easy to understand terminology and allowing them to assist in simple care of their child will help decrease their anxiety. In addition, listening, and validating parental fears and concerns is another method to decrease parental or caregiver anxiety.

**Cultural or religious beliefs/practices** should be considered when deciding when to teach, what to teach, and how to teach a child. The nurse can assess these cultural and religious beliefs and practices by asking such questions as "What has the child been taught about doctors or hospitals?" or "Do you have any religious or cultural practices that will help us take better care of your child?" The answers to these questions play an important part in how the nurse prepares his/her teaching style for specific situations. Comprehending the language that is spoken during the teaching process is a major factor to consider. If the child's understanding of the English language is limited, the nurse needs to have an interpreter help communicate with the child. Obtaining basic foundations of the child's religious and/or cultural practices and incorporating this information in the teaching process will help facilitate learning for children.

## PLANNING THE HOW

When planning the methods to use to convey the desired information, the nurse should consider the following:

- a. Preferences
- b. Support

**Preferences.** Learners vary in whether they get things better from seeing, hearing or doing. To the extent possible, learning experiences should take this into account. A blend of all three is usually the most powerful approach. The instruction can take many formats. Both the learner and the teacher may have strong preferences with respect to the use of videotapes, supervised demonstrations, role play, pamphlets, small groups, simulations.

**Support.** Children can actively participate in the learning process as long as they understand information given to them. They can also participate in certain procedures when resources are utilized by the nurses to facilitate learning. The success of healthcare interventions depends on establishing a supportive, trusting relationship with the child and family. Providing appropriate play materials such as dolls and safe equipment is one way to begin the teaching process. Allowing children to process information through play activity with appropriate resources will increase their level of understanding and help decrease their anxiety about upcoming tests, surgeries, or procedures.

- A. Support includes resources for patients and for staff conducting the education. For example, patient preferences are often ignored because resources are not available or are too hard to access. Nurses need to know where to find and have easy access to a wide variety of educational resources.

- B. Additional resources can be found with the Child Life Program. Involving children with staff from Child Life will help increase their level of understanding, decrease their anxiety related to hospitalization, separation from parents, and most of all, it will provide coping mechanisms during hospitalization. To contact a Child Life Specialist call extension **2130**. Be prepared to provide the child's name, admission date, diagnosis, and any pertinent information related to care.
- C. The Department of Social Services is an excellent resource for the family. All NICU and PICU patients are assigned to a social worker upon admission. Patients on the 6 East Pediatric Ward are assigned to a social worker three days after admission or upon a doctors referral. The Department of Social Services can be reached at extension **3278**. Be prepared to provide the child's name, admission date, diagnosis, and any pertinent information related to care.

### **PLANNING THE WHERE**

Careful attention should be paid to where learning will take place. Some considerations are as follows: distractions, lighting, space, and privacy. For instance, some hospitals do not allow to use the playroom to hold patient education classes. Sometimes it is important to practice new skills in the setting where they will be used. The child may need to go to his/her classroom, home, or in the facility where he/she will be practicing/using blood sugar checks.

## AGE APPROPRIATE STRATEGIES

### Cognitive Stage...Implications for Nursing

When teaching children, the growth, development, and cognitive stage need to be considered. At each stage of development, children experience and respond to their world differently. Developmental level plays a vital role in determining the child's psychological needs, level of understanding, and coping mechanisms. Integrating age appropriate development into the teaching process allows the nurse to provide minimally threatening changes in the child's environment and to attempt to maintain normal routines for the child. The following table describes each cognitive stage and provides strategies for teaching<sup>2</sup>.

Characteristics	Approach to Teaching
<b>Birth to 2 Years: Sensorimotor Stage</b>	
Begins as completely undifferentiated from environment.	Orient all teaching to parents.
Eventually learns to repeat actions that have effects on objects.	Make infants feel secure as possible with familiar objects from home environment.
Has rudimentary ability to make associations.	Give older infants an opportunity to manipulate objects in their environments, especially if long hospitalization is expected.
<b>2 to 7 Years: Preoperational Stage</b>	
Has cognitive processes that are literal and concrete. Cannot reason beyond what is observable. Thoughts dominate what he/she sees, feels, and hears.	Be aware of explanations that the child may interpret literally (e.g., "The doctor is going to make your heart like new" may be interpreted as "He is going to give me a new heart"). Allow child to manipulate safe equipment such as stethoscopes, tongue blades. Use simple drawings of the external anatomy because knowledge is limited on the function of organs.
Lacks ability to generalize.	Comparisons to other children are not helpful. Comparing one diagnostic procedure to another will not be understood.
Has egocentrism predominating. Views everything surrounding him/her as it relates to himself/herself. "I", "me", and "my" are the focus of his/her thoughts.  Believes that he/she causes events to happen; thus results in feeling guilty that he/she caused his/her own pain or hospitalization.	Child needs reassurance that he/she is not to blame for his/her pain or hospitalization.
Has animistic thinking (thinks that all objects possess life or human characteristics of their own).	Give human qualities to surrounding objects and equipment that is especially frightening. Explain medications such as antibiotics as "Captain Kirk destroying the Clingons".

<b>7 to 12 Years: Concrete Operational Thought Stage</b>	
Has concrete, but more realistic and objective, cognitive processes.	Children at this age have vague understanding of internal body processes. Use drawing and models. Show actual equipment or supplies to be used for procedures and provide dolls to explain surgical techniques to help facilitate learning.
Is able to compare objects and experiences because of increased ability to classify among dimensions. Able to sort, order, organize facts to problem solve systematically.	Relate his/her care to other children's experiences so he/she can learn from them. Compare procedures to one another to help diminish anxiety.
Views world from more objective viewpoint and is able to understand another's position.	Use films, group activities and discussions to expand collection of useful behaviors and establish role models.
Has knowledge of cause and effect that has progressed to deductive logical thinking. Develops permanence-conservation. Realizes volume and weight will remain the same even if outward appearance is different.	Use child's interest in science to explain logically what has happened and what will happen to him/her. Explain medications and procedures straightforwardly (e.g., "This medicine (insulin) unlocks the door to your body's cells just as a key unlocks the door to your house. By unlocking the door to the cell, the insulin can deliver the food and energy in your blood to the cell.")

## How to Talk to Children

### General Guidelines

Children need accurate and minimally threatening descriptions of the sensations that they will experience during and after procedures, surgeries or treatments. Certain techniques, when used appropriately, will promote a supportive and trusting relationship between healthcare workers and children. The following are some general guidelines that describe how to talk to children.<sup>3,4</sup>

- a. **Listen to the child.** Words or phrases that are helpful to one child may be threatening to another. Nurses must listen carefully and be sensitive to the child's use and reaction to language.
- b. **Choose words that give accurate descriptions of specific sensations.** When teaching and preparing children, avoid using the vague word "hurt" to describe a sensation they may experience with a procedure. Children tend to become more anxious when hearing "hurt", as opposed to hearing the words, "sting, pinch, or prick".
- c. **Provide explanations using simple terminology.** Giving children too many details can confuse and/or frighten them. Provide explanations for what the child will see, feel, hear, taste and smell.
- d. **Ask for clarification.** Children often misinterpret explanations given to them or misinterpret what they hear. For clarification, ask the child to describe what he/she thinks is going to happen or what he/she has heard other people say is going to happen.
- e. **Get down to the child's eye level.** How would one feel if a six-foot individual looms over him or her during a scary moment?
- f. **Speak directly to the child or adolescent.** The child is an individual. Talk to him or her, not just to the parents.

- g. **Avoid comparing the child to others** Nothing makes children more mad than "you should be able to do this. Johnny is younger than you, and he can do it."
- h. **Be careful when touching children other than for medical reasons.** Touch children only when they indicate readiness...they are not pets.
- i. **Be honest.** Even with best intentions, hiding the truth from children will only promote mistrust.
- j. **Do not pity.** People/children need support and caring, not gushy sympathy.
- k. **Identify, allow, and respect normal expressions of emotion.** Crying is okay and so is anger. A child will feel and cope better if he/she can let his/her emotions out.
- l. **Refrain from infantilizing the older child.** Treat kids appropriately for their age. Just because the child is under 21, doesn't mean ones voice needs to go up three octaves when speaking to him/her.
- m. **Give the child choices.** But only real choices! If the child can choose juice or water to drink with medication, great! But he/she has no choice about taking the medication so don't offer one.
- n. **Try not to say, "Be a big boy".** Children will do the best they can. Added pressure or embarrassment doesn't help, and it's harmful if the child learns to feel negatively about himself/herself.
- o. **Support the relationship between child and parents.** All children, even teenagers, need their parents, and parents are the experts on their own children.
- p. **All children are not raised the same.** Don't expect other people to use the same child discipline or child rearing techniques that one uses with his/her own children.
- q. **Talk to the child or adolescent about things of interest to him or her.** All kids have school, friends, pets, and hobbies and would love to share that part of themselves with another person.
- r. **Don't threaten children.** Saying, "If you're not good, mommy will have to leave", may result in temporary good behavior because the child will fear. But there may be serious psychological consequences later.
- s. **Maintain own self-control.** When one "loses it", get someone else to work with the child.
- t. **Don't be a grouch.** Maintain a positive attitude. Humor is especially effective with children and adolescents.
- u. **Respect the child's right for privacy.** Everyone needs his/her own space, both physically and emotionally. Adolescents, in particular, are sensitive to violations of this basic human right.

## Choosing Language

Children need information communicated in a developmentally appropriate manner. The nurse needs to be able to evaluate the child's developmental level prior to teaching so the appropriate language can be used for the development level observed. The following are some recommendations on what to say to children and examples of appropriate language for children.

Use language that reflects the child's natural level of understanding.

Use language that communicates respect, and strengthens the child's integrity and self-esteem.

Don't say: I will feed you now.  
**Do say: I am ready to help you eat your lunch.**

Use questions only when one will be able to provide the child with choices.

Don't say: Do you want to take your medication now?  
**Do say: It is time to take your medication now.**

Use pronouns appropriately. Avoid talking with plurals.

Don't say: It is time for us to take our bath now.  
**Do say: It is time for you to take your bath now.**

Use language with a positive interpretation. Using "don't" usually conveys a negative meaning. Telling children what they can do, rather than what they should not do promotes more desired behaviors.

Don't say: Don't move!  
**Do say: It is really important for you to hold still now.**

Use words or sentences that are not threatening, communicates information simply and accurately, and is appropriate to the child's developmental level.

Don't say: The doctor is going to cut your stomach.  
**Do say: The doctor is going to make a small opening in your stomach.**

Don't say: You will feel a burning sensation.  
**Do say: You will feel a warm stinging feeling.**

Encourage children to play active roles in their care. This allows them to feel like they are participating in the process that will help them to get better quicker. It also gives them more control on how things will be done, which increases their self esteem.

Don't say: Stay still, keep your knees curled up.  
**Do say: Your job is to stay curled up with your knees touching your head.**

Don't say: I need to change your bandage.  
**Do say: I need to change your bandage now, you can take the tape off yourself or tell me how you want me to do it.**

Try to give a range of choices when describing what the child might feel during or after a procedure. Offering choices will allow the child to feel like an individual, and will give him/her some empowerment and control over his/her body and situation.

Don't say: You will feel a little poke. It will only last a minute.  
**Do say: Some children tell me it feels like a "pinch", other children tell me it feels like a sting. Some children tell me they did not feel it at all. How do you think it will feel? Afterwards you tell me how it felt to you.**

Making Things Clear

Using phrases or explanations that are unfamiliar to children increases their anxiety. Giving concrete explanations with specific descriptions helps in decreasing their anxiety and increasing their level of comprehension. Below are phrases that give examples of vague explanations with correlating phrases that are specific and less confusing.

<b>VAGUE</b>	<b>MORE CLEAR</b>
The doctor is going to give you some "dye." (To make me die?)	The doctor is going to put some medicine in the tube that will help him/her to see your heart more clearly.
It is time to change your dressing. (Do I have to get undressed?)	It is time to put some clean new bandages on your leg.
I have to obtain a stool specimen. (Why do you want to get some chairs?)	I have to put a little bit of your poop in a cup so the doctor can look at it.
I need to get some urine. (You're in?)	I need to have you pee in this cup.
It is time for your shot.	I am going to give you some medicine through a small, tiny needle.
You will get to ride on a stretcher. (Is someone going to stretch me?)	You will get to ride on a small bed with wheels.
This is a special way of doing this... Avoid using words that usually have a positive meaning. (It does not look special to me)	This is a different way of doing this. You can help me by holding...
You will have a mask over your face with gas that makes you sleep. (I am going to have gasoline on my face?)	You will be breathing with a mask on your face that will have medicine called anesthesia. It is a kind of air that will help you sleep during your operation so you will not feel anything.
Put you to sleep. (Like my cat was put to sleep? It never came back)	This medicine will help you go into a very deep sleep, you will not feel anything until the operation is over and then the doctor will stop giving you the medicine, so you can wake up.
You are going to be moved to the floor. (Why are you going to put me on the floor?)	You are going to be moved to the regular ward because you are getting better. The kids there are not as sick as they are in here.
Take a picture. (CAT, MRI...equipment is larger and more intimidating that a camera)	You are going to get a picture taken of what is inside of you. The camera does not look like a regular camera, it is much bigger.

Instead of using medical terms, use words that the child can understand. If medical terms are going to be used, or it is likely that the child will overhear certain terms in relation to his/her care, the words should be explained or defined. Below are medical words commonly used with alternate descriptions that are familiar to children.

Medical Words	Alternate Descriptions
<b>Vital signs: Temperature Heart rate Respirations</b>	I am going to measure your temperature, to see how warm your body is. I am going to listen to your heart, to see how fast your heart is pumping. I am going to listen to your lungs to hear how you are breathing.
<b>Electrodes</b>	Small round stickers with a wet spot in the middle on one side, and a metal button on the other side.
<b>Leads</b>	Tiny strings, (wires) that attach to the button on the sticker.
<b>Tourniquet</b>	I am going to put this on your arm, it is like a big rubber band.
<b>Blood pressure (B/P)</b>	I am going to put this strap around your arm. It will feel like a bear hug.
<b>PO Meds</b>	This is a medicine you put in your mouth and swallow like you are drinking or eating something.
<b>O<sub>2</sub> Sat</b>	This is like a band aid with a special light in it, like an E.T. light. Have you seen the movie E.T.?
<b>Percuss</b>	I am going to tap your chest like I am playing the drums. This will help you get better quicker.
<b>Suction</b>	I am going to put this small tube down your nose and then pull it out really quick. It is like using a straw to pull up the bad stuff in your lungs.
<b>Abdominal girth</b>	I am going to use this soft ruler to see how big your stomach is.
<b>I.V.</b>	I need to put a little tube in your vein so I can give you some medicine to help you get better. You will feel one little poke and then it won't hurt anymore. I am going to put some tape on your arm to help keep the tube in. (For non-emergent situations the nurse should attempt to use EMLA, (a topical ointment that provides a numbing reaction. The description would then state "You will not feel anything when I put this little tube in your vein.)
<b>Heparin Lock</b>	Medicine that goes inside the little tube that is already in your arm. The tip of the syringe goes in the tube, not in your arm, so you will not feel anything.
<b>Hematocrit</b>	I need to give your finger a little poke so I can put a little blood in this tube. Which finger do you want me to use?

## Summary

- a. Planning patient education involves paying attention to the who, why, what, when, how, and where.
- b. Remember that children bring different experiences and beliefs to learning situations than adults.
- c. Children are affected by other stimuli that influence how they learn.
- d. Consider all resources available that will help the child feel less frightened and anxious.
- e. Provide age appropriate teaching that is dependent on the child's developmental and cognitive level.
- f. When communicating, incorporate strategies that will promote understanding and trust.
- g. Choose appropriate language for child's developmental stage and level of understanding.
- h. Use terms, phrases and descriptions in a minimal threatening way.
- i. Provide explanations of medical terms in a descriptive way that is familiar and easy to understand.

**PATIENT TEACHING - CHILDREN**  
**Study Questions**

Select the best answer to each question. **DO NOT** write in the manual.

1. When planning patient education, the nurse should consider the best time to provide the teaching.
  - a. True
  - b. False
  
2. Which of the following is the best strategy to increase the success of patient teaching in pediatrics?
  - a. Teach what the MD orders
  - b. Avoid teaching the same content repeatedly
  - c. Plan teaching session at the nurse's convenience
  - d. Include a key objective from the child, parent, and staff
  
3. When preparing a teaching plan for a child who is less than 3 years old, the nurse should be aware that the child's cognitive stage of development includes:
  - a. Ability to compare and classify objects
  - b. Concrete, realistic thoughts and processes
  - c. Understanding another person's viewpoint
  - d. The inability to reason beyond what they can see, hear, and smell
  
4. To provide minimal threatening explanations, the nurse should include which of the following phrases in the teaching process for a 6-year-old.
  - a. "I will feed you breakfast now"
  - b. "It is time for us to take our bath now"
  - c. "Your arm is going to hurt for a few minutes"
  - d. "It is really important for you to hold still now"
  
5. When teaching a 10-year-old child, which of the following statements reflect an effective strategy?
  - a. Give realistic choices
  - b. Compare to other children
  - c. Discuss with parents, excluding child in care
  - d. Talk loudly to ensure understanding
  
6. When admitting a 4-year-old boy, the nurse should use which of the following explanations describing his/her action?
  - a. I need to get some urine
  - b. I am going to draw some blood
  - c. I am going to take your vital signs now
  - d. I am going to see how warm your body is

7. Which of the following(s) affect a child's readiness to learn? Indicate with an "X" which item(s) are correct?
- a. Developmental level
  - b. Developmental level and previous hospitalization
  - c. Developmental level, previous hospitalization and cultural/religious beliefs
  - d. Developmental level, previous hospitalization, cultural/religious beliefs and parental or caregiver anxiety

**PLEASE TURN THE PAGE TO CHECK ANSWERS TO STUDY QUESTIONS**

**PATIENT TEACHING-CHILDREN**  
**Answers to Study Questions**

1. a
2. d
3. d
4. d
5. a
6. d
7. d

**IF YOU MISSED ONE OR MORE QUESTIONS, REREAD THE CONTENT AND REPEAT THE STUDY GUIDE QUESTIONS.**

### References

1. Knowles MS. *The Modern Practice of Adult Education: From Pedagogy to Andragogy*. Englewood Cliffs, NJ: Cambridge Adult Education; 1980.
2. Bille DA. *Practical Approaches to Patient Teaching*. Boston, MA: Little Brown; 1981.
3. Child Life Program. Cleveland Clinic Foundation: Social Work Department.
4. Gaynard L, Wolfer J, Goldberger J, Thompson R, Pedburn L, Laidley L. *Psychosocial Care of Children in Hospitals*. Bethesda, MD: Association for the Care of Children's Health; 1990.

### Bibliography

Azarnoff P, Hardgrove C. *The Family in Child Health Care*. New York, NY: John Wiley & Sons; 1981.

Board R, Ryan-Wenger N. State of the science on parental stress and family functioning in pediatric intensive care units. *American Journal of Critical Care*. 2000;9: 106-122.

Cloherly JP, Eichenwald EC, Stark AR. *Manual of Neonatal Care*. 6<sup>th</sup> ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2007.

Dunst C, Trivette C, Deal A. *Enabling and Empowering Families: Principles and guidelines for Practice*. Cambridge, MA: Brookline Books; 1988.

Edelman L, Greenland B, Mills, BL. *Family Centered Communication Skills*. St Paul, MN: Pathfinder Resources; 1993.

Hazinski M. *Manual of Pediatric Critical Care*. St. Louis, MO: Mosby; 1999.

Merenstein GB, Gardner SL. *Handbook of Neonatal Intensive Care*. 6<sup>th</sup> ed. St. Louis, MO: Mosby; 2006.

Slota M. *Core Curriculum for Pediatric Critical Care Nursing*. 2<sup>nd</sup> ed. Philadelphia, PA: Elsevier Saunders; 2006.

Thomas KA, Renaud MR, DePaul D. Use of the parenting stress index in mothers of preterm infants. *Advances in Neonatal Care*. 2000;4: 33-41.

Verklan MT, Walden M. *Core Curriculum for Neonatal Intensive Care Nursing*. 3<sup>rd</sup> ed. St. Louis, MO: Elsevier Saunders; 2004.

Whaley LF, Wong DL. *Nursing Care of Infants and Children*. 7<sup>th</sup> ed. St Louis. MO: C.V. Mosby; 2003.

Harbor-UCLA Medical Center  
Department of Nursing

# **MEDICATION SAFETY**

## Medication Safety

### Objectives:

Upon completion of this section, the nurse will be able to:

1. Discuss the nurse's legal responsibilities regarding medication administration.
2. Discuss strategies nurses can implement to prevent medication errors.
3. Identify the number of patient identifiers required prior to medication administration.
4. Give examples of patient identifiers for various types of patients.
5. Distinguish correct from incorrect and complete from incomplete medication orders.
6. Identify appropriate actions to take if orders are incorrect, incomplete, illegible, or contain unapproved abbreviations.
7. Discuss Harbor-UCLA's policy on verbal orders, including situations in which verbal orders may be accepted, staff who may accept verbal orders, process for repeat back, time frame within which the physician must sign the order.
8. Discuss Harbor-UCLA's policy on telephone orders, including maximum number of telephone orders that may be accepted at one time, staff who may accept telephone orders, process for read back, time frame within which the physician must sign the order.
9. Discuss Harbor-UCLA's policy on unapproved abbreviations, including identification of documentation forms that the on which the abbreviations must not be used and identification of 10 abbreviations, acronyms and symbols **NOT** to be used in documentation.
10. Identify high alert medications that require an independent double check prior to administration.
11. Identify medications that are look-alike-sound-alike.
12. Identify medications that can safely be crushed prior to administration.
13. From a list of resources, select the best resource for obtaining information related to medication administration.
14. Identify nursing strategies to improve the safety of patient controlled analgesia (PCA).
15. Discuss the policy and procedure for labeling of medications and solutions in perioperative and procedural areas.

## I. INTRODUCTION

Medication errors account for more than 7,000 deaths each year in the United States.<sup>1</sup> The process of safely providing medications to hospitalized patients is highly complex and involves multiple systems and diverse healthcare professionals. The nurse plays an important role in maintaining patient safety throughout this complex, multiphase process. This competency will review the legal responsibilities of the nurse related to medication administration, discuss types and causes of medication errors, identify factors contributing to medication errors, and explore safe medication strategies that nurses may use to promote patient safety.

**In a recent survey, only one-third of nurses said they would feel safe as a patient in a hospital (ISMP 7/05)**

## II. LEGAL RESPONSIBILITIES OF THE NURSE

The California Board of Registered Nursing (BRN) and the California Board of Vocational Nurse and Psychiatric Technician Examiners (BVNPT) gives authority to RNs and LVNs respectively to administer medications within their scope of practice that have been ordered by licensed physicians, dentists or approved providers.<sup>2</sup> In a statement clarifying the nurse's role in carrying out orders, including medication orders, the BRN has stated that the RN is to assess all orders before implementation to determine if the order is in the client's best interest and is in accordance with all applicable policies and procedures.<sup>3</sup> It is clear that the nurse has a legal responsibility to assess medication orders to ensure that he/she administers the right drug and right dose to the right patient via the right route at the right frequency.

## III. MEDICATION ERRORS – FREQUENTLY ASKED QUESTIONS (FAQS)

**Q.** Where do medication errors occur?

**A.** Medication errors can and do occur in all phases of the medication process including ordering, transcribing, dispensing, administering, and monitoring. A recent news release, from the United States Pharmacopeia, indicated that almost half of medication errors in intensive care units occurred during prescribing and transcribing.<sup>4</sup>

**Q.** What are the types of medication errors?

**A.** There are many types of medication errors. One incident can involve more than one type of error. Harbor-UCLA Medical Center's Hospital and Medical Administration Policy and Procedure Manual, Medication Error Reporting, Policy No. 363 defines several types of error.

1. **Omitted dose.** Failure to administer an ordered dose to a patient before the next scheduled dose. This does not include omissions because a patient refused a medication or a decision not to administer the drug.
2. **Improper dose.** Quantity or strength is different from that ordered by the physician. For example: administering 2 g of a medication, but 2 mg is ordered. Improper dose errors include overdosage, underdosage, and extra doses.
3. **Wrong strength/concentration.** Administration of a drug in a strength other than that ordered or not in accordance to policy. For example: administering D5 ¼ NS, but D5 ½ NS is ordered.
4. **Wrong drug.** Administration of a drug other than that ordered. For example: administering hydrocodone, but hydromorphone was ordered.
5. **Wrong dosage form.** Administration of a dose in a dosage form other than that ordered by the physician. For example: Cardizem 120 mg is administered, but Cardizem SR 120 mg is ordered.
6. **Wrong technique.** This includes incorrect procedures like crushing an extended release tablet.

**Incorrect administration technique and wrong route are the most frequent type of error that result in harm.<sup>6</sup>**

7. **Wrong route.** Administration of a drug via a route other than that which is ordered.
8. **Wrong rate.** Administration of a drug at a rate different than stated in policy and/or recommended. For example: administering phenytoin (Dilantin) IV over 30 seconds.
9. **Wrong duration.** Administering a medication beyond the time for which it is ordered or indicated by hospital policy. Example: the physician writes an order to give indomethacin x 3 doses, and the nurse(s) continue(s) to administer indomethacin beyond the 3 doses.
10. **Wrong time.** Administration outside a predefined time interval from the scheduled administration. Example: the nurse administers the morning dose of a medication ordered BID at 0800 (per hospital policy, medications ordered BID are to be given at 1000 and 2200).
11. **Wrong patient.** Administering a drug to a patient other than whom the drug was prescribed.
12. **Monitoring error.** Failure to review a prescribed regimen for appropriateness and detection of procedure, or failure to use appropriate clinical or laboratory data for adequate assessment of patient response to prescribed therapy. Example: administering a drug that is contraindicated in certain conditions, giving a drug to which a patient is allergic, or ordering a dose of warfarin to be given to a patient with an International Normalized Ratio (INR) of >6 (normal INR is 0.9-1.2, therapeutic value for a patient receiving warfarin is 2-3).
13. **Deteriorated drug error.** Administering a drug that has expired or whose physical or chemical integrity has been compromised. For example: administering a lipid-containing parenteral nutrition solution when there is clear evidence of emulsion separation.

**Q.** What are the causes of medication errors?

**A.** There are five main causes of medication errors: communication issues, name confusion, labeling problems, human factors, and packaging/design issues.<sup>5</sup> Table 1 gives examples of specific problems under each cause. Performance deficit, not following policy/procedure, and communication issues are the most frequently cited causes of medication errors.<sup>6,7</sup>

**Table 1. Causes of Medication Errors<sup>5</sup>**

<p><b>Communication</b></p> <ul style="list-style-type: none"> <li>• Verbal miscommunication</li> <li>• Written miscommunication - illegible handwriting, use of unapproved abbreviations</li> </ul> <p><b>Name Confusion</b></p> <ul style="list-style-type: none"> <li>• Look-alike sound-alike drugs</li> </ul> <p><b>Labeling</b></p> <ul style="list-style-type: none"> <li>• Container package looks like package of a different drug</li> <li>• Distracting logos on package</li> <li>• Label confusing or misleading</li> <li>• Wrong information (e.g., patient name, drug, dosage, strength) on dispensed package label</li> <li>• Package insert inaccurate or misleading</li> <li>• Reference material inaccurate, unclear, outdated or unavailable</li> </ul> <p><b>Human Factors</b></p> <ul style="list-style-type: none"> <li>• Knowledge deficit</li> <li>• Performance deficit</li> <li>• Miscalculation of dosage or infusion rate</li> <li>• Drug preparation error</li> <li>• Transcription error</li> <li>• Stress</li> <li>• Fatigue/lack of sleep</li> </ul>
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- Q.** What contributing factors are associated with medication errors?
- A.** There are a number of systems related issues which have been associated with medication errors. The most commonly cited factor is distractions.<sup>6</sup> Additional factors include inadequate lighting, too much noise, inadequate staffing, lack of training, and inexperienced personnel.

#### **IV. NURSING STRATEGIES FOR SAFER MEDICATION ADMINISTRATION**

##### **A. Utilize the “Five Rights”**

The five rights are considered the gold standard for safe medication administration and every nurse can recite them. However, the five rights are not the “be-all end-all” of medication safety. Even when nurses firmly believed they verified the five rights, errors (including fatal ones) have occurred. So if a nurse verifies the five rights, why do medication errors continue to occur?

The five rights fall short on three accounts.<sup>8</sup> First, the five rights provide goals for medication administration, they do not provide a strategy that explains how to achieve these goals. For example, the five rights do not address how to avoid errors of omission or methods to address improper rate/method of IV drug administration or administration technique. How does a nurse check the right dose of a newer medication if it is not contained in a unit drug reference and the pharmacist is not available? Second, the five rights focus on individual performance and do not take into account the fact that safe medication practice is the culmination of multidisciplinary efforts and reliable systems. The five rights do not address illegible handwritten orders, the use of unapproved abbreviations that may lead to misinterpretation, confusing drug labels, or distractions. Finally, the five rights do not take into consideration “human factors” and the significant contribution they play in our daily life. Human factors is the study of humans and how they interact with the environment. The medication process is complex; to make the process more efficient, nurses generate pictures in their minds as to what certain drugs may look like. When nurses go to select a familiar item, this same template that has been generated prevents the nurse from seeing any disconfirming evidence if the wrong drug is selected. Human factors help to explain why a nurse who gave a wrong drug will say that he/she did look at the drug before administering it. **We see only what we intend to find.** There are many human factor variables that can contribute to errors.

The five rights are important for safe medication practice, but they do not stand alone as measures to prevent medication error. Other strategies for preventing medication errors must be implemented in addition to following the five rights.

##### **B. Assess allergy status before administering any medication**

All healthcare providers must be aware of any allergies that the patient has prior to administering medication. If a patient develops an allergic response, he/she must be informed and instructed to notify future healthcare providers of the name of the medication and his/her response to it. Patients with a severe allergy may want to consider obtaining and wearing a Med Alert bracelet.

##### **C. Use two patient identifiers prior to administering medications**

Two pieces of information are required to validate a patient’s identification prior to the administration of any medication. Whenever possible, patients will be actively included in the identification process. The two patient-specific identifiers must be directly associated

Patient identification. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012. Policy 452.

with the individual and, in the case of medication administration, the same two identifiers must be directly associated with the medication (such as an attached label).<sup>10</sup>

1. What is an identifier?

An identifier is a piece of information specific to a person, for example a patient's name, identification number, telephone number, date of birth, social security number. An identifier **is not** the medium on which the information is kept (e.g., driver's license, identification card). In other words, two patient identifiers could mean name and identification number, name and social security number, **but not** identification card and bed card.<sup>9</sup>

2. Inpatients and Emergency Department

Verify name **and** MRUN from the identification band (Figure 1). If the patient is able, also ask him/her to state his/her name. Do not ask, "Are you Mrs. Smith?" Patients who are anxious or who do not speak English may respond, "yes" without appropriately hearing or understanding the question. Some patients who come to the emergency department may not be able to provide their identifying information because they are unconscious or unable to communicate. These patients can be assigned a temporary "name", e.g., John Doe, Trauma Patient and an E.D. or medical record number. These identifiers could then be used to identify the patient and match against specimen labels, medications ordered for the patient, or blood product labels.<sup>9</sup>

3. Ambulatory Care Clinics

Ask the patient to state his/her name and date of birth. Confirm this information against the patient's identification plate. In the event that the plate is not available, ask the patient his/her name and birth date and confirm by comparing with one of the following additional sources of identification:

- a. Driver's license
- b. Picture ID
- c. Passport
- d. Alien registration card

**Figure 1. Patient Identifiers for Various Types of Patients (identifiers shown inside circles)**

Patient Identification	Trauma Patient Identification
CARILLO, GEORGE 000-00-00 07/18/1957 0 M OTH DSH 12/03	TRAUMA, PT 000-00-00 01/01/1904 0 M OTH MZR 10/03
John/Jane Doe Identification	Newborn Identification
DOE, JANE 000-00-00 01/01/1904 0 M OTH MZR 12/03	ADAMS, BABY MARY 000-00-00 12/31/03 5 24 PM M ADAMS, MARY 000-00-00

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### Lessons from the Front Lines

**Mr. Smith Mix-Up.** Joe Smith [not his real name] a 42 year old man was on a medical surgical floor. Raymond Smith [not his real name] was in the same room. Raymond Smith was scheduled to receive a dose of haloperidol (Haldol) IV. The nurse obtained the prefilled syringe from Mr. Smith's medication drawer and went over to Joe Smith to administer the drug. Had a rounding medical student not been present and asked the nurse what she was giving, the nurse would have administered the Haldol to the wrong Mr. Smith.<sup>10</sup>

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**D. Do not carry out any order that is not complete, not accurate, illegible, or contains unapproved abbreviations.**

A fundamental aspect of the registered nurse's role is to carry out physician orders. The likelihood of errors occurring increases when written orders are illegible, ambiguous or contain dangerous abbreviations. Errors can also occur when verbal and telephone orders are not accurately understood. Nurses are often placed in a position where they feel they must "interpret" orders that are difficult to read or are ambiguous. This dangerous practice has resulted in tragic patient outcomes.<sup>11</sup> It is the responsibility of the nurse to clarify the order with the prescriber prior to carrying it out.

1. Complete and Correct Orders

a. Physician orders must be legible and complete.

Medication Prescribing. In: Hospital and Medical Administration Policy and Procedure Manual. Torrance, CA: Harbor-UCLA Medical Center; 2012: Policy 325.

b. A complete order includes the following information:

- 1) Patient's name
- 2) Patient's MRUN
- 3) Date
- 4) Time
- 5) Location
- 6) Signature of ordering practitioner
- 7) Identification number of ordering physician

c. In addition, medication orders must include:

- 1) Name of drug
- 2) Dose
- 3) Frequency
- 4) Route of administration
- 5) PRN medications must also include indication (e.g., pain, nausea)

d. Medication orders for pediatric patients:

- 1) All medication orders must include total dose. Additionally, for medications that are dosed according to body weight, the physician orders must include the dose/kg/time interval, e.g., Lasix 5 mg IV now (1 mg/kg), Ampicillin 125 mg IVPB q6h (100 mg/kg/day). Some drugs have recommended doses based on a one time dose, for example furosemide, acetaminophen, metoclopramide. Most antimicrobials have a recommended dose based on a total amount per day. Pediatric drug references will indicate if the dose is based on a single dose or total amount per day (Table 2). A few drugs, although not many, have recommended doses not based on the specific weight of the child. Examples of drugs that do not have a

recommended dose/weight include topicals, phytonadione (Aquamephyton), and eye drops.

**Table 2. Examples of Pediatric Dosing Regimens**

Single Dose	Daily Dose
Acetaminophen 10-15 mg/kg/dose	Ampicillin 100-200 mg/kg/day divided every 6 hours

2) All oral and intravenous potassium supplements, including potassium chloride, potassium acetate, potassium phosphate and potassium gluconate, must be ordered in terms of mEq of potassium contained in the drug. If the medication is dosed according to body weight, then both the total amount to be given as well as the mEq/kg/time interval must be specified in the physician order.

e. No medication order will contain a range in dose or dosing frequency. For example:

Acceptable

Lorazepam 2 mg IV/IM q4h as needed for agitation

Morphine sulfate 2 mg IVP q4h as needed for moderate pain

NOT acceptable

Lorazepam 2-4 mg IV/IM q4h as needed for agitation

Morphine sulfate 2 mg IVP q3-4h as needed for moderate pain

**E. Follow safety procedures for verbal and telephone orders.**

1. The Joint Commission requirements and perspectives

The practice of accepting verbal and telephone orders has become a common and often necessary part of nursing practice. Physicians or Mid-Level Provider (MLP): A Nurse Practitioner (NP), Certified Registered Nurse Anesthetist (CRNA), Nurse Midwife, or Physician' Assistant (PA) are not always physically present at a patient's bedside to respond to a patient's changing needs.

In such situations, the nurse discusses the patient's needs with the physician or MLP over the telephone and the physician or MLP may subsequently issue orders. When orders are issued aloud or over the telephone, safety of the patient depends on the accurate hearing and interpretation of the order by the nurse. Verbal and telephone orders are inherently problematic because of different accents, dialects, and pronunciations. Background noise, poor phone reception and interruptions add to the problem.<sup>10</sup> When verbal and telephone orders are accepted, they must then be transcribed as a written order, which adds complexity and another point of error-risk to the situation.

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## Lessons from the Front Lines: Verbal Orders

**“40 of K”:** An 81 year old female on warfarin therapy for chronic atrial fibrillation developed runs of ventricular tachycardia. The nurse contacted the physician who was in the cardiac catheterization laboratory. The physician gave a verbal order for “40 of K” IV. The intent of the order was 40 mEq of potassium chloride IV. The order was misunderstood and the nurse gave 40 mg of Vitamin K intravenously. The patient’s INR was subtherapeutic for 3 days, but no untoward clinical consequences occurred.<sup>12</sup>

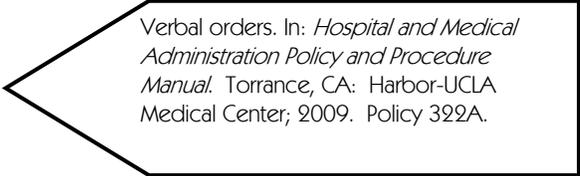
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When verbal orders are necessary, the order must be written down **while it is being transmitted** and the order then read back verbatim to the practitioner who gave it. This “read back” requirement applies to **all** orders, not just those for medications.<sup>9</sup>

The Joint Commission does realize that in some situations, such as a code blue or in the operating room, it may not be feasible to write down the verbal order before carrying it out. In such situations, a “repeat-back” is acceptable, meaning the receiver verbally repeats back the order while someone else is documenting the name of the drug, dose, time, route, and rate.

### 2. Harbor-UCLA policy: Verbal orders

- a. Definition: a verbal order is an order given by the prescribing physician or MLP to the care provider in the **direct presence** of the prescribing physician or MLP and care provider.



Verbal orders. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2009. Policy 392A.

b. Who

- 1) Verbal orders may be accepted from interns, residents, post-graduate, MLPs, and attending physicians.  
**Verbal orders may not be accepted from medical students.**
- 2) Registered Nurses (RNs) and Respiratory Care Practitioner (RCP) may receive verbal orders.

c. Circumstances

- 1) Verbal orders are acceptable only at a time of **extreme emergency** or during the course of treatment or surgical procedure.
- 2) Examples of extreme emergency
  - a) Cardiac arrest
  - b) Impending hemorrhage
  - c) Shock
  - d) Cardiac arrhythmias
  - e) Respiratory distress
  - f) Seizures
  - g) Impending coma
  - h) Fetal distress
  - i) Umbilical cord prolapse

d. Documentation

- 1) All verbal orders must be written on an order form to include date, time, specific order, followed by “Verbal Order per ‘\_\_\_\_\_,’” and signed by the care provider who took and carried out the order.

- 2) Verbal orders must be countersigned, dated and timed as soon as the procedure or emergency permits and **before** the physician or MLP leaves the patient except for extreme emergency. The signature will be considered delinquent after 48 (forty-eight) hours.

3. Harbor-UCLA policy: Telephone orders

- a. Definition: a telephone order is an order transmitted **via telephone** to the RN by the prescribing physician or MLP.

Telephone orders. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2009. Policy 322B.

- b. Who

- 1) Telephone orders may be given by interns, residents, post-graduate and attending physicians. **Telephone orders may not be given by medical students.**
- 2) Telephone orders may be accepted by Registered Nurses only.

- c. Procedure

- 1) The physician or MLP must make the RN aware that he/she is issuing a telephone order and provide the following information:
  - a) His/her name and provider ID number
  - b) Patient's name and MRUN
  - c) Diagnosis
  - d) Specific order given
- 2) While the physician or MLP is issuing the telephone order, the RN must write the order directly onto the *Prescriber's Orders* sheet, including date and time order was received.
- 3) Upon completion of the telephone order, the RN must read back the order to the physician or MLP to confirm accuracy.
- 4) After the physician or MLP and RN agree on the order's accuracy, the phrase "Telephone order issued by" or the abbreviation "T.O. by" followed by the printed physician's or MLP's full name and provider ID number must follow the written order.
- 5) The RN may refuse the telephone order under the following conditions:
  - a) In his/her professional judgment, the telephone order is inappropriate.
  - b) If he/she is unable to identify the physician or MLP.
- 6) Once the order is documented completely, the RN must sign, date and time the order in the "noted by" section of the order sheet.
- 7) A sticker identifying that the order requires a physician's or MLP's signature is to be placed on the outside edge of the *Prescriber's Orders* sheet so that it is visible once the chart is closed.
- 8) The physician must sign the order as soon as possible and, in all cases, within 48 hours.

- d. Order restriction

- 1) Telephone orders are limited to three (3) orders.
- 2) Telephone orders are **not** allowed for the following:
  - a) Admissions, discharges, transfers
  - b) Behavioral restraints/seclusion
  - c) Research drugs
  - d) Transfusion (in non-consented patient)
  - e) IV narcotics and sedatives
  - f) Chemotherapy

**Table 3. Comparison of Verbal vs. Telephone Order**

	<b>Verbal Order</b>	<b>Telephone Order</b>
<b>Where it occurs</b>	In direct presence of prescriber	Over the telephone
<b>Who can initiate</b>	Intern Resident Post-graduate Physician Attending Physician Nurse Practitioners Certified Registered Nurse Anesthetist Nurse-Midwife Physician's Assistant	Intern Resident Post-graduate Physician Attending Physician Nurse Practitioners Certified Registered Nurse Anesthetist Nurse-Midwife Physician's Assistant
<b>Who can accept</b>	RN, RCP	RN
<b>Area restrictions</b>	May be issued anywhere an "extreme emergency" occurs	Not accepted in: <ul style="list-style-type: none"> <li>• OR/PAR</li> <li>• Endoscopy</li> <li>• Interventional Radiology</li> <li>• Cath Lab</li> <li>• Ambulatory care</li> <li>• OSSA</li> <li>• ER</li> </ul>
<b>Order restrictions</b>	Given only in cases of extreme emergency.	Not allowed to be ordered via telephone: <ul style="list-style-type: none"> <li>• Admissions, discharges</li> <li>• Behavioral Restraints / Seclusion</li> <li>• Research drugs</li> <li>• Transfusion (in non-consented patient)</li> <li>• IV narcotics and sedatives</li> <li>• Chemotherapy</li> </ul> No more than 3 orders
<b>Verification of understanding</b>	Repeat back	Read back
<b>MD signature</b>	Must sign BEFORE leaving, will be considered delinquent after 48 hours	Must sign within 48 hours

**F. Do not use unapproved abbreviations.**

Misinterpretation of dangerous expressions and abbreviations has shattered the lives of innocent patients, their families, and healthcare providers who have made tragic mistakes. The Joint Commission's National Patient Safety Goal on improving communication within an organization calls for organizations to standardize the abbreviations, acronyms and symbols used throughout the organization, including a list of abbreviations, acronyms and symbols **NOT** to use.<sup>9</sup> The dangerous abbreviations apply to **all** orders and all medication-related documents, including preprinted forms. Harbor-UCLA's list of "do not use" abbreviations is in Table 4.

**Table 4. Abbreviations NOT to be Used in Any Medication Order or Related Document**

Abbreviation	Potential Problem	Preferred Term
U (for unit)	Mistaken as zero, four or cc.	Write "unit".
IU (for international unit)	Mistaken as IV or 10.	Write "international unit".
q.d. or Q.D.	Mistaken as q.i.d. especially if the period after the "q" or the tail of the "q" is missing.	Write "daily"
q.o.d. or Q.O.D.	Mistaken for "q.d" (daily) or "q.i.d" (four times daily) if the "o" is poorly written. The period after the Q can be mistaken for an "l" and the "O" can be mistaken for "l".	Write "every other day".
Trailing zero (X.0 mg) Zero after decimal point	Decimal point is missed and dose read as ten times too much.	Never write a zero by itself <b>after</b> a decimal point (X mg).
Lack of leading zero (.X mg)	Decimal point is missed and dose read as ten times too much.	Always use a zero <b>before</b> a decimal point (0.X mg)
MS, MSO <sub>4</sub> , MgSO <sub>4</sub>	Confused for one another. Can mean morphine sulfate or magnesium sulfate.	Write "morphine sulfate" or "magnesium sulfate".
µg	Mistaken for "mg".	Write "mcg" or "microgram".
x 3"D", x 3 "d" (to mean times 3 days)	Mistaken for 3 doses.	Write "days".
t.i.w., T.I.W. (to mean 3 times a week)	Mistaken for 3 times a day or twice weekly.	Write 3 times a week.

Physician orders that contain any of the "do not use" abbreviations must be corrected prior to the order being noted and carried out by the nurse. If, however, finding the prescriber to correct the order would result in a delay that would place the patient at additional risk, the nurse may carry out the order as long as in the judgment of the nurse the order is clear, complete, and correct. The order must still be corrected as soon as possible thereafter. Remember, patient safety always comes first!

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### Lessons from the Front Lines: Dangerous Abbreviations

**Misinterpretation of "d":** A physician wrote an order for a maintenance dose of phenytoin using "mg/kg/d". The intent was that the "d" meant "day". However, the drug was administered based on mg/kg/dose and received three times the indicated dose. The subsequent phenytoin level was 98 mcg/mL (therapeutic range 10-20 mcg/mL).<sup>13</sup>

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#### G. Utilize strategies for high alert medications.

High alert medications are drugs that have a heightened risk of causing significant harm when they are used in error. Mistakes involving high alert medications may or may not be more common than mistakes involving other medications, however, the consequences can be devastating.

Handling high-alert medications – all sites of care.  
In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012. Policy 396.

Table 5 provides examples of high alert medications using the PINCHED acronym.

**Table 5. PINCHED Acronym for High-Alert Medications.**

<p><b>P</b>ressors (adrenergic agonists) including dopamine, dobutamine, epinephrine, phenylephrine</p> <p><b>I</b>nsulin subcutaneous and intravenous administration</p> <p><b>N</b>arcotics administered by continuous infusion and PCA pump, methadone and transdermal fentanyl</p> <p><b>N</b>euromuscular blockers</p> <p><b>C</b>hemotherapy - oral and intravenous dosage forms</p> <p><b>H</b>eparin/anticoagulants/thrombolytics including heparin, tenecteplase, and vitamin K antagonists (warfarin)</p> <p><b>E</b>lectrolytes including potassium, sodium-containing salts (includes parenteral preparations that may be given orally) and magnesium sulfate (in Obstetric areas only). Does not include potassium chloride up to 40 mEq/L in maintenance IV solutions</p> <p><b>D</b>ilators include agents such as nitroprusside and nitroglycerin continuous infusions</p> <p><b>D</b>igoxin (pediatrics) in both oral and intravenous formulations</p>
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High alert medications requiring independent double checks have been clarified and expanded. Independent double checks now require both licensed personnel to initial the MAR. Medications where early or delayed administration of maintenance doses of greater than 30 minutes before or after the scheduled dose may cause harm or result in substantial sub-optimal therapy or pharmacological effect. Strategies to prevent errors involving high alert medications must be implemented throughout a healthcare organization. Although the exact strategy is dependent on the specific high alert medication, one nursing strategy employed with high alert medications is use of an independent double check. Double checks work best when performed independently. This means that the nurse performing the double check must not have cues from the other nurse as to the correct answer. While not all high alert medications require an independent double check, the following medications do: insulin, chemotherapy, potassium “riders” or “boluses”, 3% sodium chloride, heparin, and digoxin (pediatrics only). Steps for performing an independent double check are described in Table 6.

Time critical medications must be administered within 30 minutes before or after the scheduled dose. Time critical medications include: meal-sensitive agents (rapid and short-acting insulins, sulfonylureas), opioids (all scheduled not PRN), immunosuppressive agents (cyclosporine, mycophenolate, sirolimus, tacrolimus), and medications dosed every 4 hours or more frequently.

**Table 6. Procedure for Performing Independent Double Check**

<p><b>Independent double check when administering a high-alert drug via IV push, IV piggyback, SQ, PO.</b></p> <p>A second licensed nurse:</p> <ol style="list-style-type: none"> <li>1. Checks the order.</li> <li>2. Performs an independent calculation of the amount to be given, based on observation of the stock solution.</li> <li>3. Verifies that his/her answer matches the amount planned to be given by the administering nurse.</li> <li>4. Verifies that the dose is safe and appropriate for patient.</li> <li>5. Validates the second verification by co-signing MAR</li> </ol> <p><b>Independent double check when administering a high alert drug via continuous IV infusion.</b></p> <p><i>Prior to initiating infusion, 2 nurses (or nurse and MD/PharmD):</i></p> <ol style="list-style-type: none"> <li>1. Check the order.</li> <li>2. Verify the prepared medication with the order to ensure appropriate drug, concentration, route, solution, volume, and time.</li> <li>3. Calculate the dose to be given based on the concentration of the infusion and observation of pump setting.</li> <li>4. Verify that the correct dose will be administered to patient.</li> <li>5. Validates the second verification by co-signing MAR</li> </ol>
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*When assuming care for a patient (e.g., at change of shift), the RN:*

1. Checks the order.
2. Calculates the dose to be given based on the concentration of the infusion and observation of pump setting.
3. Verifies that the correct dose is being administered to patient.

**H. Inform patient of the drug, dose, potential side effects and relevant laboratory values.**

In order for the patient to play an active role in his/her healthcare, he/she must know about any medications that he/she is taking, how and when to take them, and what the effects and side effects are. The informed patient can also help prevent mistakes from happening. The Institute for Safe Medication Practices suggests the following safety tips for hospitalized patients to prevent medication errors:<sup>14</sup>

1. Keep an accurate and up to date list of all medications, including herbal remedies, vitamins and nutritional supplements, and over the counter medications.
2. Request the name of any new medication and what it is being used for, before taking it.
3. Know the brand and generic names of medications so the medications are not duplicated.
4. Notify healthcare providers of any allergies to medications or foods such as shellfish.
5. Get the name and phone number of the physician so that he/she can be contacted if there are questions related to medications.

**I. Consult current references as necessary (e.g., pharmacist, current drug references).**

Consult current references for complete drug information, including dosage information, drug interactions, side effects, and special nursing interventions. At Harbor-UCLA Medical Center, staff may access Micromedex via the Novell desktop. Micromedex offers a current database of medication information. In addition, the pharmacist may be consulted for medication information.

Drug references must be current to be reliable. As new medications, incompatibilities, adverse event information, and practice changes evolve, this information is included in drug references. If an old reference is used, there is a significant risk of error. For example, an order is written for the anticonvulsant Carbatrol (extended release carbamazepine). The nurse finds only Tegretol (the immediate release formulation of carbamazepine) in the patient's cassette and administers it. The nurse looks up carbamazepine in the out-dated drug reference, but the reference does list the newer extended release product. If the nurse administers the immediate release formulation in-lieu of the prescribed extended release, the patient is at risk for overdose.

**J. Read the label three times.**

Medication Regulations and Administration. In: *Nursing Policy Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012: Policy 297.0.

Reading a label three times provides extra precaution that the right drug and right dose will be given to the right patient. The drug label should be read:

1. Before removing the medication from the shelf or cassette
2. Before pouring or removing the drug from its original container
3. Before replacing the stock bottle in the medicine cabinet or discarding the unit dose wrapper

**K. Be aware of medications with look-alike or sound-alike names.**

Many drug names look or sound like other drug names, which can lead to potentially harmful medication errors. Poor handwriting, poorly communicated verbal/telephone orders, and poor storage techniques can exacerbate the problem. Look-alike or sound-alike drug product

names, packaging, and/or labeling was listed as one or more causes of error in almost 32,000 reports submitted to MEDMARX from January 2000 to March 2004.<sup>15</sup> Reading the label three times is one strategy that can minimize the risk of error due to look-alike sound-alike drugs. Some of the common look-alike/sound-alikes are:

<i>Hydromorphone and morphine</i>	<i>Lantus and Lente</i>
<i>Humalog and Humalin</i>	<i>Vinblastine and Vincristine</i>
<i>Zantac and Xanax</i>	<i>Celebrex and Celexa</i>
<i>Celexa and Zyprexa</i>	<i>Lasix and Luvox</i>
<i>Oxycontin and Oxycodone</i>	

**L. Administer medications only for whom the pharmacy delivered them.**

Do not borrow drugs that belong to another patient, even if it is the same drug and dosage ordered for another patient. All medication orders are required to be screened by a pharmacist who plays a vital role in detecting drug interactions, screening for appropriate drug and dose selection, and screening for allergies. Borrowing another patient's medications bypasses important safety steps otherwise provided by the pharmacist.

**M. Be sure the correct formulation of a drug is being administered.**

Some medications are available in a conventional formulation and a liposomal formulation. Three common examples are amphotericin B, doxorubicin, and daunorubicin. Liposomal drugs are encapsulated in fat globules and can circulate in the blood stream for several hours after injection, as compared to the same drug in a non-liposomal form. Liposomal formulations may result in an extended treatment effect and a simplified dosing regimen for physicians and patients. However, the liposomal and conventional forms of these drugs are dosed differently and are not interchangeable. To further complicate the issue, as in the case of the three different manufactured liposomal amphotericin B (Abelcet, Amphotec, Ambisome), doses may vary from product to product.

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**Lessons from the Front Lines: Ignoring Drug formulation**

**“Substituting conventional form for liposomal form”.** A physician wrote an order 350 mg of the liposomal form of amphotericin B, Abelcet. The nurse gave 350 mg of the conventional form, resulting in death of the patient.<sup>16</sup>

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**N. Administer the drug according to administration guidelines.**

1. Administer IV medications at the recommended rate.

Although the term “IV push” is frequently used, and even ordered, very few drugs should be administered in less than one minute. Nurses must have ready access to information about maximum rates of administration (e.g., mg per minute) for medications that have a high risk of adverse effects if given too fast. Because terms “IV push” and “IV bolus” can be misleading, it would be better for orders to be written using terms like, “IV over 5 minutes”. Table 7 describes complications of administering some medications ordered as “IV push” or “IV bolus” too fast.

**Table 7. Complications Arising from Administering IV Medications Too Fast.**

Drug	Complications of Administering Too Fast	IV Administration Duration
Calcium (chloride/gluconate)	Cardiac arrest	Administer over 3-5 minutes in life threatening situations. Infants/Children: For non-life threatening situations, administer over 60 minutes.
Fentanyl	Respiratory arrest	Administer over 1-2 minutes.
Labetalol (Normodyne)	Hypotension	Children: Administer over 2-3 minutes; do not administer faster than 2 mg/minute. Adults: Administer at a rate of 2 mg/min.
Magnesium	Cardiac arrest	Children: Infuse over 2-4 hours. Do not exceed 125 mg/kg/hour. May be administered over 20-30 minutes for treatment of severe asthma or torsade de pointes. Adults: IV administration should not exceed 150 mg/minute except in severe eclampsia where 4 grams over 20-30 minutes may be required.
Metoprolol (Lopressor)	Heart failure	Adults: Administer 5 mg over 1-2 minutes.
Midazolam (Versed)	Respiratory arrest	Neonates: Administer over at least 5 minutes. Children: Administer over 2-3 minutes. Adults: Administer over at least 2 minutes
Phenytoin (Dilantin)	Cardiovascular collapse	Neonates: Do not exceed 0.5 mg/kg/minute. Infants/children/adults: Do not exceed 1-3 mg/kg/min with maximum rate of 50 mg/minute. Adults: Do not exceed 50 mg/minute.
Potassium chloride	Cardiac arrest	Maximum rates of infusion are based on cardiorespiratory monitoring capabilities, location of patient and age of patient. Refer to "Medication Regulations and Administration" in the Nursing Department Procedure Manual for potassium administration guidelines for a specific unit.
Promethazine (Phenergan)	Hypotension	Should be diluted to maximum concentration of 25 mg/mL and infused at a rate of 25 mg/minute.
Vancomycin	Severe hypotension and flushing of upper body (Red Neck Syndrome)	Neonates and children: Administer over 60 minutes. Adults: Administer over at least 60 minutes (rate less than or equal to 10 mg/minute).

2. Administer medications using the correct technique.

Medications come in many forms. The most common preparation is the solid form that includes tablets and capsules. Some tablets may be scored which allows for partial doses to be given. Partial doses of solid medications should occur only if the medication is scored and able to be broken to the actual amount ordered. If the dose is less than the actual scoring seen on the tablet then it should be returned to the pharmacy and the appropriate amount dispensed.

Some medications have a coating. The coating can have several purposes. A coating may simply serve the purpose of making the pill easier to swallow or taste better (e.g., ibuprofen). Enteric coating protects the gastrointestinal tract from harmful effects of the pill. Some coatings may prolong the effectiveness of the pill. There may be other chemical features about a tablet or capsule that prolongs its effectiveness. There are many abbreviations used to designate this timed-release

**Table 8. Common Abbreviations to Designate a Timed Release Drug.**

CR – controlled release
LA – long acting
SR – sustained release
TR – time release
XL – extended release
XR – extended release
ER – extended release

feature of medications (Table 8). Solid medications that are produced as timed-release, capsules, enteric coated, sublingual or buccal form, usually should not be altered for administration. Crushing or altering these medications may change their effectiveness, onset and/or duration of action.

3. Administer medications from the original packaging or label appropriately.

Take the drug in its original package and the medication kardex or MAR to the

Medication Regulations and Administration. In: *Nursing Policy Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012. Policy 297.0-9.

patient's bedside. **Drugs should not be removed from their package until at the patient's bedside.**

This practice will allow the nurse to verify the drug name with the order immediately before administering it. Parenteral drugs that are prepared

away from the bedside should be labeled with the drug name and dosage before removing the drug from the preparation area.

4. Label pumps and lines.

- a. Label distal ends of medication administration tubing. Critically ill patients frequently require multiple medications administered simultaneously. For example, consider the patient who has a double lumen central line. One lumen may have nitroprusside infusing; while the other lumen may have maintenance IV fluid infusing. If the nurse accidentally administers a fluid bolus through the lumen that has the nitroprusside infusing, the patient will become suddenly hypotensive due to the rapid infusion of nitroprusside.

- b. Label the pumps. Many pumps now have built in libraries from which the nurse selects the name of the drug being administered by the pump. Trace tubing before administering any medication.

#### O. Institute safe practices for patient controlled analgesia (PCA) by proxy

1. PCA has greatly improved pain management for children and adults. PCA is meant to be activated by the *patient*. However, family members and health care professionals have administered doses to the patient, by proxy, hoping to keep them

Patient Controlled Analgesia (PCA). In: *Nursing Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012: Procedure 415.0-5.

comfortable. Over 6000 PCA errors have been reported to the U.S. Pharmacopeia database; 460 resulted in death or significant harm to the patient.<sup>17</sup> Fifteen of these 460 were the direct result of PCA by proxy. Although well intentioned, PCA by proxy can result in oversedation, respiratory depression

and death. Patients, staff and family members must be warned against this dangerous practice.

2. Monitor patient according to policy.
3. Educate patient/family about the proper use of PCA and the dangers of others pushing the button, including respiratory and/or cardiac arrest.
4. Educate patients and family members/legal guardians that the PCA button is to be pushed only by the patient. Notify provider if family or any visitor does not comply with instruction to not push the PCA button. Non-compliance with instruction to not push the PCA button may result in removal of family member(s)/visitor(s) from unit of discontinuance of PCA.

**P. Label all medications, medication containers or other solutions on and off the sterile field.**

In 2008, a Joint Commission National Patient Safety Goal required that anytime one or more medications are prepared for surgery or a procedure but not administered immediately, the container (e.g., syringes, medicine cups, basins) must be labeled. At a minimum, the label must include the drug name, strength, date and initials of the person preparing the label. This requirement pertains to ALL drugs AND solutions in all perioperative and procedural settings, including procedures performed at the patient's bedside (e.g., central/arterial line placement, endoscopy). Solutions that must be labeled include saline, sterile water, and chlorhexidine.<sup>18</sup> Additional requirements for labeling medications on the sterile field per Harbor-UCLA policy include:

1. Medications and solutions both on and off the sterile field must be labeled even if there is only one medication being used.
2. Labeling occurs when any medication or solution is transferred from the original packaging to another container.
3. All labels must be verified both verbally and visually by two qualified individuals. No more than one medication or solution is labeled at a time, e.g., if two drugs are being prepared, the first drug must be transferred and labeled before proceeding with the transfer and labeling of the second drug.
4. Any medication or solution found unlabeled must be immediately discarded.
5. All original containers from medications or solutions must remain available for reference in the perioperative area until the conclusion of the procedure. All labeled containers on the sterile field must be discarded at the conclusion of the procedure.
6. At shift change or break relief, all medications and solutions both on an off the sterile field and their labels must be reviewed by entering and exiting personnel.

**V. CONCLUSION**

There are many strategies that nurses may use to promote patient safety throughout the medication administration process. Safe medication practices are a nursing responsibility and important aspect of patient safety. Institutions must look at the human factors involved in the medication administration process and take measures to improve the process to promote safety. In addition, a well-informed patient plays a crucial role in medication safety.

## MEDICATION SAFETY

### Study Questions

Select the best answer to each question. **DO NOT** write in the manual.

1. A physician wrote an order for lisinopril (Zestril) 100 mg PO daily. The LVN gave the drug as ordered. A drug error was committed because the prescribed dose is more than twice the maximum recommended dose. Which of the following best describes the RN's legal accountability in this situation?
  - a. The RN has legal liability because he/she is responsible for the LVN's mistakes.
  - b. The RN is excused from legal liability because it was the LVN who gave the drug.
  - c. The RN is excused from legal liability because it was the MD who wrote an incorrect order.
  - d. The RN does have legal liability because the RN is to assess all medication orders before they are implemented.
  
2. The nurse is preparing to administer a medication to a patient on a ward. In order to correctly identify the patient, the nurse should verify the patient's:
  - a. Name and MRUN
  - b. Room and bed number
  - c. Name and bed number
  - d. Bed number and diagnosis
  
3. A physician writes the following order: "Digoxin 125 mcg PO QD". The nurse should:
  - a. Complete an online Patient Safety Net Event Report
  - b. Have the physician correct the order, then note the order
  - c. Note the order then notify the physician to correct the order
  - d. Note the order then transcribe the order to the medication administration record (MAR)
  
4. According to Harbor-UCLA policy, in which of the following situations is it appropriate to accept a **verbal** order?
  - a. Patient has a fever and needs acetaminophen
  - b. Patient requires IV placement for antibiotic administration
  - c. Patient is coding and the heart rate indicates the need for epinephrine
  - d. Patient's urine output is decreased and the physician orders furosemide (Lasix)
  
5. Within what time frame must the physician sign a **verbal** order?
  - a. 1 hour
  - b. 8 hours
  - c. 24 hours
  - d. Prior to leaving the patient
  
6. Acetaminophen 650 mg PO is ordered for a patient. The pharmacy sends a 500 mg capsule. The nurse tells physician who is at the nurse's station that she has only a 500 mg capsule of acetaminophen and the physician says to give it. The nurse administers the 500 mg capsule of acetaminophen. Which of the following statements best describes the nurse's action in this scenario?
  - a. The nurse acted appropriately by carrying out a verbal order.
  - b. The nurse acted inappropriately by administering a medication without an order.
  - c. The nurse acted appropriately by giving the medication, however she should have documented the order as a verbal order on the *Prescriber Orders* sheet.
  - d. The nurse should have given the medication only after repeating back the order to the physician and documenting it as a verbal order on the *Prescriber Orders* sheet.

7. During an emergency situation, a physician gives a verbal order for “epinephrine one milligram IV now”. The nurse’s first step is to:
- Give epinephrine one milligram IV
  - Ask the physician to write the order
  - Repeat back the order to the issuing physician
  - Write down the verbal order on the *Prescriber Orders* sheet
8. Which of the following individuals can accept a **telephone** order?
- RN only
  - LVN and RN
  - Unit clerk, LVN, and RN
  - Respiratory Care Practitioner (RCP), LVN, and RN
9. The maximum number of orders that may be issued over the telephone is:
- 1
  - 2
  - 3
  - 4
10. Within what time frame must the physician sign a **telephone** order?
- 8 hours
  - 12 hours
  - 24 hours
  - 48 hours
11. Which of the following is true regarding “dangerous unapproved abbreviations”? These abbreviations:
- Are allowed as long as they are on pre-printed order sheets
  - May be used by nurses on handwritten Medication Administration Records (MARs)
  - Are prohibited from use in any physician order or medication-related document, pre-printed or handwritten.
  - Are prohibited from use in physician orders, but may be used on preprinted Medication Administration Records (MARs)
12. Which of the following is an acceptable abbreviation?
- mL
  - µg
  - .5 mg
  - MSO4
13. Lasix and Luvox are examples of
- High alert medications
  - Sound-alike medications
  - Time-release medications
  - The same drug made by different manufacturers
14. If a hand-written medication order were illegible, which would be the best nursing decision?
- Check with the pharmacy
  - Rewrite the order to make it more legible
  - Ask physician who wrote the order to rewrite the order
  - Ask physician who wrote the order to verbally explain it

15. A patient has an order for lorazepam 2 mg IV q 4 hours PRN agitation. The nurse administers lorazepam 2 mg IV at 0800. At 0845, the patient continues to be very agitated. At 0850, the nurse administers another 2 mg of lorazepam IV. Which of the following best describes the nurse's action?
- The nurse carried out the order appropriately as ordered by the physician
  - The nurse acted in the best interest of the patient and should be commended
  - The nurse committed a medication error by administering a medication without an order
  - The nurse appropriately implemented treatment based on her assessment of the patient and her professional nursing judgment.
16. Medications that can be crushed include:
- Capsules
  - Scored solid tablets
  - Sustained-release medications
  - All of the above
17. A 10 kg infant requires an order for acetaminophen. Which of the following orders may the nurse note and carry out?
- Acetaminophen 5 mL PO now
  - Acetaminophen 150 mg PO now
  - Acetaminophen 15 mg/kg PO now
  - Acetaminophen 150 mg (15 mg/kg) PO now
18. Olanzapine (Zyprexa) is ordered for a patient. The nurse is unfamiliar with this drug. Which of the following resources would be most appropriate for the nurse to use?
- Micromedex
  - Drug Facts & Comparisons, 2002 edition
  - Davis' Drug Guide for Nurses, 2004 edition
  - Handouts from a conference on schizophrenia held in 2006
19. Which of the following medications requires an independent double check prior to administration?
- PO KCl, SQ insulin, morphine PCA
  - SQ insulin, SQ heparin, morphine PCA
  - IV heparin, 0.9% normal saline, vincristine
  - IV insulin, D5W 0.45% normal saline with 20 mEq KCl per liter, dopamine
20. Patient controlled analgesia (PCA) is safest when PCA doses are administered by the:
- Nurse
  - Patient
  - Doctor
  - Family member
21. The hospital policy regarding labeling of medications and solutions applies to:
- IV medications in the operating room only
  - Only solutions prepared for surgery or a procedure
  - Only IV medications prepared for surgery or a procedure
  - All medications and solutions prepared for surgery or a procedure

**CHECK YOUR ANSWERS TO THE STUDY QUESTIONS**

- |     |   |     |   |     |   |     |   |
|-----|---|-----|---|-----|---|-----|---|
| 1.  | d | 2.  | a | 3.  | b | 4.  | c |
| 5.  | d | 6.  | b | 7.  | c | 8.  | a |
| 9.  | c | 10. | d | 11. | c | 12. | a |
| 13. | b | 14. | c | 15. | c | 16. | b |
| 17. | d | 18. | a | 19. | b | 20. | b |
| 21. | d |     |   |     |   |     |   |

If you answered 19 out of 21 questions correctly, go on to the next section. If you missed 1 or more, read the content again and repeat the study questions.

## MEDICATION SAFETY

### References

1. New safety campaign to prevent medication errors. *NurseWeek*. 2006; January 9:16.
2. California Business and Profession Code-The Nursing Practice Act, § 2725.a.2. <http://www.rn.ca.gov/regulations/bpc.shtml#2725>. Accessed November 29, 2012
3. Acceptance and Implementation of Orders. Board of Registered Nursing. <http://www.rn.ca.gov/pdfs/forms/brnfall2003.pdf>. Accessed November 29, 2012.
4. Medication Error Reporting. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2011. Policy 363.
5. Joint Commission on Accreditation of Healthcare Organizations. Sentinel event statistics: As of September 20, 2004. <http://www.jcaho.org/accredited+organizations/sentinel+event/sentinel+event+statistics.htm>. Accessed November 29, 2012
6. The five rights cannot stand alone. *Nurse Advise-ERR*. November 2004:1.
7. Special report! 2004 The Joint Commission national patient safety goals: Practical strategies and helpful solutions for meeting these goals. *Joint Commission Perspectives on Patient Safety*. January 2003;3:3-4.
8. Instilling a measure of safety into those “whispering down the lane” verbal orders. *ISMP Medication Safety Alert*. January 24, 2001. <http://www.ismp.org/Newsletters/acutecare/articles/20010124.asp>. Accessed November 29, 2012
9. Kirkpatrick, C. Safety first: The Joint Commission introduces new patient safety goals. *NurseWeek*. 2003; March 24. 20-21.
10. Cases & commentary: Medicine. 40 of K. *AHRQ Web M&M: Morbidity & Mortality Rounds on the Web*. November 2003. <http://www.webmm.ahrq.gov/case.aspx?caseID=36#case>. Accessed November 29, 2012
11. Case & commentaries: Pediatrics. Medication overdose. *AHRQ Web M&M: Morbidity & Mortality Rounds on the Web*. April 2003. <http://www.webmm.ahrq.gov/case.aspx?caseID=9&searchStr=phenytoin>. Accessed November 29, 2012
12. Recommendations and safety tips: How to prevent medication errors. Institute for Safe Medication Practices. 2004. [www.ismp.org](http://www.ismp.org). Accessed November 29, 2012
13. Look-alike/sound-alike drug products affect cognition. USP Patient Safety CAPSLink. May 2004. <http://www.usp.org/pdf/EN/patientsafety/capsLink2004-05-01.pdf>. Accessed November 29, 2012
14. Confusion between liposomal and conventional forms of drugs. *Nurse Advise-ERR*. April 2005: 3;1.
15. Joint Commission on Accreditation of Healthcare Organizations. Patient controlled analgesia by proxy. *Sentinel Event ALERT*. December 20, 2004. [http://www.jointcommission.org/sentinel\\_event\\_alert\\_issue\\_33\\_patient\\_controlled\\_analgesia\\_by\\_proxy/](http://www.jointcommission.org/sentinel_event_alert_issue_33_patient_controlled_analgesia_by_proxy/). Accessed November 29, 2012

16. Joint Commission on Accreditation of Healthcare Organizations. Joint Commission 2006 National Patient Safety Goals Implementation Expectations. <http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals>. Accessed December 10, 2009.

### **Bibliography**

Physician orders. In: *Nursing Policy Manual* . Torrance, CA: Harbor-UCLA Medical Center; 2006:410.0-410.4

Patient identification. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012. Policy 452.

Verbal orders. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2009. Policy 322A.

Telephone orders. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2009. Policy 322B.

Handling high-alert medications – all sites of care. In: *Hospital and Medical Administration Policy and Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012. Policy 396.

Medication Regulations and Administration. In: *Nursing Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012: Procedure 297.0-9

Patient controlled analgesia (PCA). In: *Nursing Procedure Manual*. Torrance, CA: Harbor-UCLA Medical Center; 2012: Procedure 415.0-415.5

Harbor-UCLA Medical Center  
Department of Nursing

# **MEDICATION CALCULATION**

## MEDICATION CALCULATION

### Objectives:

Upon completion of this section, the nurse will be able to:

1. Identify metric units of measurement commonly used in dosage calculation of oral and parenteral medications
2. State common equivalents in the metric system that are used for medication administration
3. Convert metric weights and volumes within the metric system
4. Express metric weights and volumes using correct notation rules
5. Describe the use of milliequivalents (mEq), units, and percentages (%) in dosage calculation
6. Use one of the following methods, to accurately calculate medication dosages:
  - $\frac{D}{H} \times Q = X$
  - Ratio and proportion
7. Convert body weight from pounds to kilograms
8. Calculate medication dosages based on weight
9. Determine appropriateness of an ordered drug dosage based on recommendations from the literature

### NOTE

*There are two parts to this competency.*

1. Part I reviews basic medication calculations and must be completed by licensed staff working in **all areas** of the hospital.
2. Part II reviews advanced medication calculations for continuous infusion medications (ie, drips) and must be completed by registered nurses working in neonatal, pediatric, and adult ICUs; the pediatric and adult emergency room; and the post anesthesia recovery unit.

Calculation questions on the Medication Calculation test will be fill in the blank, **not** multiple choice. You may use a calculator when completing the test.

### Instructions to the Employee:

Gather scratch paper and pencils. Please read the following section. Record the calculations and the answers to the study questions on your scratch paper. You may use a calculator to complete this competency. **Do not write in this manual.**

**MEDICATION CALCULATION**

# Part I

## **Basic Medication Calculations**

To be completed by licensed staff in all nursing areas.

## I. INTRODUCTION

Safe administration of medications to patients is an important function of nurses in the clinical setting. Medication administration has become more complex in this rapidly changing healthcare environment. Nurses must be aware of their responsibility to accurately calculate medication dosages. Errors in drug delivery related to miscalculation can result in negative patient outcomes. Medication errors are the most common healthcare mistake, accounting for more than 7000 deaths annually.<sup>1,2</sup> Research has shown that errors are rarely the fault of one single individual, but rather the result of a complex interaction of multiple factors within the healthcare environment.<sup>3</sup> Hospitals are being mandated by organizations such as the Joint Commission on Accreditation of Healthcare Organizations to create an environment in which safety is a priority. Nursing has a responsibility to ensure the competence of its practitioners and foster a culture that encourages the identification and prevention of errors.<sup>3</sup> At the core of safe medication administration is the ability to perform arithmetic. By utilizing simple arithmetic concepts such as multiplication and division, the nurse is able to ensure safe dosages of medications and volume or number of pills of a medication to give a patient.

This competency will focus on the dosage calculation of oral and parenteral medications. If a review of basic math concepts is needed, please refer to the resources available in the A.F. Parlow Medical Library (see “Other Resources” at end of this section). This competency will review drug measurement systems most commonly encountered in the clinical setting. Two common formulas for dosage calculations are presented for use in working through the practice problems. Reviewed also are dosage calculations based on weight.

## II. SYSTEMS OF DRUG MEASUREMENTS

### A. Metric System

The metric system is the most commonly used system of measurement for prescribing and administering medications. The metric system is a decimal system based on multiples of ten. Numbers to the left of the decimal are whole numbers and numbers to the right of the decimal are fractions of whole numbers. Each number has a place value. The value of each place is ten times the value of the place immediately to its right.

The first number after the decimal point is the tenth place.  
0.1 is read as one tenth ( $1/10$ ).

The second number after the decimal point is the hundredth place.  
0.01 is read as one hundredth ( $1/100$ ).

The third number after the decimal point is the thousandth place.  
0.001 is read as one thousandth ( $1/1000$ ).

Because each place is a multiple of ten, moving a decimal point one place produces a

10-fold change in the number. A medication error involving a misplaced decimal point can result in serious under or overdosages of a medication. For example, if a nurse gives 12 mL of a medication instead of 1.2 mL, the patient will receive 10 times the dose!

The metric system has three basic units of measure: meter (length), liter (volume), and gram (weight). Metric units important in dosage calculation are the liter (L) and the gram (g). Common prefixes are used to indicate the value of each unit of length, volume, or weight.

The following indicate smaller parts than the basic unit of measure:

Prefix	Value	Decimal Equivalent	Relationship to Basic Unit (meter, liter, gram)
deci	= one tenth	= 0.1	= 10 times smaller
centi	= one hundredth	= 0.01	= 100 times smaller
milli	= one thousandth	= 0.001	= 1,000 times smaller
micro	= one millionth	= 0.000001	= 1,000,000 times smaller

One prefix indicates a larger unit than the basic unit of measure:

kilo	= one thousand	= 1000.0	= 1000 times greater
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It is helpful to memorize some of the common metric unit abbreviations and their equivalents used in clinical dosage calculations (Table 1).

**Table 1. Metric Equivalents**

WEIGHT	
1 kilogram (kg)	= 1000 grams (g)
1 gram (g)	= 1000 milligrams (mg)
1 milligram (mg)	= 1000 micrograms (mcg)
VOLUME	
1 liter (L)	= 1000 milliliters (mL) or 1000 cubic centimeters (cc)*
1 milliliter (mL)	= 1 cubic centimeter (cc)

\*The cubic centimeter (cc) is the amount of space that 1 mL occupies. The two measures are interchangeable.

As shown above, each of the common units of measure used in dosage calculations differs from the next by 1000. Since each place is a multiple of ten, and each zero represents one place value, to convert between these units of measure the decimal point is moved three places. The direction the decimal point is moved is dependent on whether the value is moving down to a smaller unit of measure or moving up to a larger unit of measure. If moving down in value, the quantity becomes larger so the decimal point is moved three places to the right (Table 2). If moving up in value, quantities become smaller and the decimal point is moved three places to the left (Table 3). Being able to convert these common units is important when calculating dosages.

**Table 2. Moving Down in Value: Example**

**0.5 g is equivalent to how many milligrams?**

$$0.5 \text{ g} \quad 0.500. \quad = \quad 500 \text{ mg}$$



We converted down the scale. Milligrams are a smaller unit of measure than grams. To convert grams to milligrams, move the decimal point three places to the right and change the units to milligrams. In order to do this, two zeros must be added.

Another method to convert grams (large) to milligrams (small) is to multiply by 1000.

$$0.5 \text{ g} \times 1000 = 500 \text{ mg}$$

**Table 3. Moving Up in Value: Example**

**2500 mL is equivalent to how many liters?**

$$2500 \text{ mL} \quad 2.500. \quad = \quad 2.5 \text{ L}$$

We converted up the scale. A liter is a larger unit of measure than a milliliter. To convert mL to L, move the decimal point three places to the left and change the units to L. Once done, it is possible to drop two zeros as retaining them does not change the value.

Another method to convert milliliters (small) to liters (large) is to divide by 1000.

$$2500 \text{ mL} \div 1000 = 2.5 \text{ L}$$

**NOTE: Errors in metric system dosage calculations occur more frequently when the dosage contains a decimal. Whenever possible, perform the**

**conversions to eliminate the decimal point. It is also important to ALWAYS place a zero in front of decimal fractions.**

**Table 4. Proper Notation**

.3 mg is an improper notation  
0.3 mg is the correct notation

## B. Other Systems of Drug Measurements

*Units* - Drugs are sometimes measured in units. A unit measures a drug in terms of its action rather than its weight. There are three major drugs measured in units: heparin, penicillin, and insulin.

*Milliequivalents* - Milliequivalents (mEq) are the number of grams of a drug contained in a mL of solution. Milliequivalents are used to designate measurement in a variety of solutions, especially electrolytes.

*Percentage* - Percentages (%) are parts per hundred. Specifically, percentages represent the number of grams of drug per 100 mL of solution. The higher the percentage strength, the stronger the mixture. Percentages, as a unit of measure, are used in solutions, topical ointments and other medications. The following illustrates the concentration of medications expressed as percentages:

Lidocaine 2% = 2 g of drug per 100 mL of solution  
D<sub>10</sub>W = 10 g of dextrose per 100 mL of water

Notice that the denominator is always 100, and the numerator shows how many parts out of 100.

**Table 5. Changing Percent (%) to Fraction**

1. Drop the % sign.
2. Write the number as the numerator.
3. Write 100 as the denominator.
4. Reduce to lowest terms

**EXAMPLE:**

Dextrose 5% =  $\frac{5 \text{ g}}{100 \text{ mL}}$  =  $\frac{1 \text{ g}}{20 \text{ mL}}$

**PLEASE COMPLETE THE STUDY QUESTIONS ON THE NEXT PAGE**

**MEDICATION CALCULATIONS**  
**Study Questions - Metric Units of Measure and Equivalents**

Using scratch paper, complete the following questions. **DO NOT** write in this manual.

1. How many micrograms (mcg) are in a milligram (mg)? \_\_\_\_\_
2. How many milliliters (mL) are in a liter (L)? \_\_\_\_\_
3. Which is larger?
  - a. g
  - b. kg
4. Which is smaller?
  - a. mg
  - b. mcg
5. What is the concentration of Calcium Gluconate 10%?
  - a. 10 mg/100 mL
  - b. 10 mg/1 L
  - c. 10 g/100 mL
  - d. 10 g/1 L

**Convert the following metric measures:**

6. 420 mL = \_\_\_\_\_ L
7. 120 mg = \_\_\_\_\_ g
8. 2 kg = \_\_\_\_\_ g
9. 0.05 g = \_\_\_\_\_ mg = \_\_\_\_\_ mcg
10. 800 mcg = \_\_\_\_\_ mg = \_\_\_\_\_ g
11. 10 cc = \_\_\_\_\_ mL
12. 6.7 L = \_\_\_\_\_ mL
13. 0.7 mg = \_\_\_\_\_ mcg
14. 35 mg = \_\_\_\_\_ g
15. 1.2 g = \_\_\_\_\_ mg
16. 1450 mcg = \_\_\_\_\_ mg
17. 0.05 mg = \_\_\_\_\_ mcg

**MEDICATION: CALCULATIONS**  
**Answers to Study Questions - Metric Units of Measure and Equivalents**

1. 1000
2. 1000
3. b
4. b
5. c
6. 0.42 L
7. 0.12 g
8. 2000 g
9. 50 mg = 50,000 mcg
10. 0.8 mg = 0.0008 g
11. 10 mL
12. 6700 mL
13. 700 mcg
14. 0.035 g
15. 1200 mg
16. 1.45 mg
17. 50 mcg

If you answered all of the questions correctly, go on to the next section of this competency. If you missed 1 or more of the questions, read the content again and repeat the study guide questions.

### III. DOSAGE CALCULATIONS

Unit dose systems do not relieve the nurse of the responsibility of being able to accurately calculate medication dosages. Most medication orders contain the name and amount of drug to be given but **NOT** how many tablets or capsules contain the dosage. Calculation is required to determine this. If a nurse administers a wrong dosage as a result of miscalculation, the nurse is legally responsible.

**Tablets** and **capsules** each contain a specific amount of drug (Table 6). Most tablets and capsules come in multiples of the ordered dosage. When necessary, scored tablets may be divided. Most orders require giving  $\frac{1}{2}$  to 3 tablets. If a nurse's calculation results in an unusual number, this could be a warning that a calculation mistake has been made. **Liquid** drug preparations contain a specific amount of drug in a certain volume of solution.

**Table 6. Drug Preparations: Example**

One drug may come in a tablet and liquid preparation.

Tablet	=	250 mg tablet
Liquid	=	250 mg/5 mL

When the dosage ordered is different from what is available, dosage calculations are necessary. There are several different ways to calculate drug dosages. The following section will present two common methods of dosage calculations for preparing oral and parenteral medications, dimensional analysis and ratio and proportion. Practice the medication calculations using each method presented. Then select one method and work the study questions.

#### A. Drug Calculations Using Dimensional Analysis:

Dimensional analysis is a method to calculate medication doses using fractions. With dimensional analysis, the problem is set up according to the following:

$$\frac{D}{H} \times Q = X$$

**D** represents the desired dosage or what the physician has ordered

**H** represents the dosage on hand or the strength available

**Q** represents the quantity that contains the available dose

**X** represents the volume desired and is the unknown value.

*If the problem involves tablets the Q is always 1 and therefore can be eliminated from the equation (eg, 250 mg/tablet). However, when solving for medication in solution, the Q amount varies (eg, 250 mg/5 mL) and must be included in the equation.*

**Table 7. Steps to Calculate Drug Dosages Using Dimensional Analysis**

1. Ensure all units are in the same size. Convert if necessary in a manner that will eliminate the decimal point. When converting be sure to convert **to** the units of the available drug.
2. Estimate what would be a reasonable amount to administer.
3. Place all the information into the correct position in the formula.
4. Calculate the answer.

### EXAMPLES: Drug Calculations Using Dimensional Analysis

**Order:** 600 mg p.o.  
**Available:** 300 mg tablets

*Step 1:* Units are already in the same size (mg), no conversion is necessary.

*Step 2:* A reasonable estimate is that more than 1 tab will be given because the dosage ordered is larger than the dosage on hand.

*Step 3:* 
$$\frac{(D) \ 600 \text{ mg}}{(H) \ 300 \text{ mg}} \times (Q) \ 1 \text{ tab} = X$$

*Step 4:* 
$$\frac{600 \text{ mg}}{300 \text{ mg}} \times 1 \text{ tab} = \mathbf{2 \text{ tabs}}$$

---

**Order:** 0.025 mg p.o.  
**Available:** 50 mcg scored tablets

*Step 1:* Convert to like units. Convert mg to mcg, to eliminate the decimal point. To do this, multiply by 1000 OR move the decimal point 3 places to the right and change units to mcg: 0.025 mg = 25 mcg.

*Step 2:* A reasonable estimate is that less than 1 tab will be given because the dosage ordered is less than the dosage on hand

*Step 3:* 
$$\frac{(D) \ 25 \text{ mcg}}{(H) \ 50 \text{ mcg}} \times (Q) \ 1 \text{ tab} = X$$

*Step 4:* 
$$\frac{25 \text{ mcg}}{50 \text{ mcg}} = \mathbf{\frac{1}{2} \text{ tab}}$$

---

**Order:** 50 mEq p.o.  
**Available:** 20 mEq/15mL

*Step 1:* Units are already in the same size, no conversion is necessary.

*Step 2:* A reasonable estimate is that more than 15 mL will be given because the dosage ordered is more than the dosage on hand

$$\text{Step 3: } \begin{array}{l} \text{(D) } \underline{50 \text{ mEq}} \\ \text{(H) } 20 \text{ mEq} \end{array} \times \quad \text{(Q) } 15 \text{ mL} \quad = \quad X$$

$$\text{Step 4: } \frac{50 \text{ mEq}}{20 \text{ mEq}} \times 15 \text{ mL} = \frac{75}{2} = \mathbf{37.5 \text{ mL}}$$


---

**Order:** 0.25 g I.M.

**Available:** 200 mg/2 mL

*Step 1:* Convert to like units. Convert g to mg to eliminate the decimal point. To do this, move the decimal point 3 places to the right and change units to mg: 0.25 g = 250 mg

*Step 2:* A reasonable estimate is that more than 2 mL will be given because the dosage ordered is larger than the dosage on hand.

$$\text{Step 3: } \begin{array}{l} \text{(D) } \underline{250 \text{ mg}} \\ \text{(H) } 200 \text{ mg} \end{array} \times \quad \text{(Q) } 2 \text{ mL} \quad = \quad X$$

$$\text{Step 4: } \frac{250 \text{ mg}}{200 \text{ mg}} \times 2 \text{ mL} = \frac{50}{20} = \mathbf{2.5 \text{ mL}}$$


---

**Order:** 600,000 units IM

**Available:** 3,000,000 units/5 mL

*Step 1:* Units are already in the same size, no conversion is necessary.

*Step 2:* A reasonable estimate is that less than 5 mL will be given because the dosage ordered is less than the dosage on hand.

$$\text{Step 3: } \begin{array}{l} \text{(D) } \underline{600,000 \text{ units}} \\ \text{(H) } 3,000,000 \text{ mL} \end{array} \times \quad \text{(Q) } 5 \text{ mL} \quad = \quad X$$

$$\text{Step 4: } \frac{600,000 \text{ units}}{3,000,000 \text{ mL}} \times 5 \text{ mL} = \frac{5}{5} = \mathbf{1 \text{ mL}}$$


---

## B. Drug Calculations Using Ratio and Proportion Method

A *ratio* is a comparison of two numbers which are somehow related to each other. A medication dosage ratio can be used to show the amount of drug contained in one tablet. A dosage ratio can also be used to show the amount of drug in a given volume of solution. These relationships (ratios) are expressed by either placing a colon between the numbers or writing the numbers in fraction form.

**Table 8. Expression of a Ratio**

A drug is available in a dose of 250 mg per 5 mL. The ratio is expressed as:

$$5 \text{ mL} : 250 \text{ mg} \quad \text{or} \quad \frac{5 \text{ mL}}{250 \text{ mg}}$$

A proportion is used to prove that two ratios are equal (Tables 9 and 10). A proportion may be separated by an equal sign (=) or double colon (::).

**Table 9. Expression of a Proportion - Written as Fraction**

$$\frac{250}{1} = \frac{500}{2}$$

Read as 250 is to 1 as 500 is to 2

Proof of the ratios in a proportion being equal is demonstrated by cross multiplication. When expressed as a fraction, the numerator (top number) of each ratio is multiplied by its opposite denominator (bottom number). When expressed as a ratio, the inside numbers are multiplied, then the outside numbers are multiplied. The products in a true proportion are equal. In the above example in Table 9, the product (answer) of the numerator in the ratio on the left "250" multiplied by the denominator in the ratio on the right "2" is "500". The product of the numerator in the ratio on the right "500" multiplied by the denominator in the ratio on the left "1" is "500". Thus, these ratios are equal. In Table 10, proof of the ratios being equal is evident by multiplying the means ( $1 \times 500 = 500$ ) and multiplying the extremes ( $250 \times 2 = 500$ ).

**Table 10. Expression of a Proportion - Written as Ratio**

$$250:1 :: 500:2$$

Read as 250 is to 1 as 500 is to 2

$$\begin{array}{c} \text{means} \\ \downarrow \quad \downarrow \\ 250 : 1 :: 500 : 2 \\ \uparrow \quad \uparrow \\ \text{extremes} \end{array}$$

The middle numbers in a proportion are called the "means", and the two outer numbers are called the "extremes".

Ratio and proportion can be used to calculate dosages when only one complete ratio is known and the second is incomplete. If three numbers of the two ratios are known, the fourth can be determined. In the ratio and proportion method of dosage calculation, the unknown number is represented by X. When setting up a proportion, remember the following key points

- Ratio for known equivalent = ratio for unknown equivalent. Keep the "known" information on the left.
- Set up the equation according to the following:

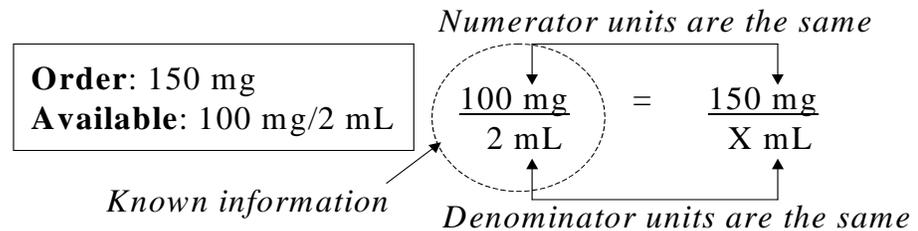
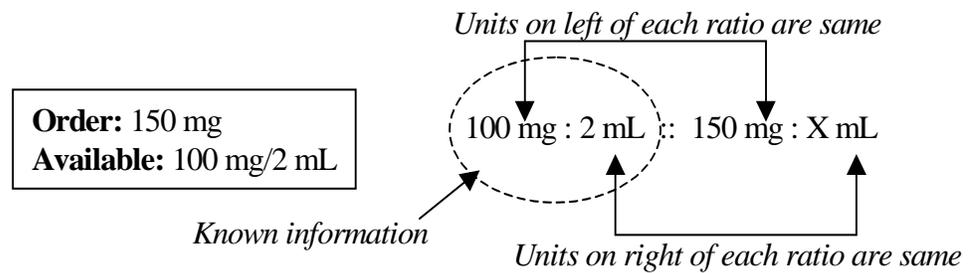
*If using fractions, set up like this:*

$$\frac{\text{dosage on hand}}{\text{amount on hand}} = \frac{\text{dosage desired}}{\text{amount desired (X)}}$$

*If using ratio, set up like this:*

$$\text{dosage on hand} : \text{amount on hand} :: \text{dosage desired} : \text{amount desired (X)}$$

- Label the units and make sure the units in the numerators match and the units in the denominators match

**Example (fraction):****Example (ratio):****Table 11. Steps to Calculate Drug Dosages Using Ratio and Proportion Method**

1. Ensure all units are in the same size, converting if necessary. When converting be sure to convert **to** the units of the available drug.
2. Estimate what would be a reasonable amount to administer.
3. Set up the problem as a proportion.
4. Calculate the answer by multiplying and solving for X.

Using the same example sets used to demonstrate the formula method, ratio and proportion will now be used to calculate medication dosages.

### EXAMPLES: Drug Calculations Using Ratio & Proportion Method

**Order:** 600 mg p.o.  
**Available:** 300 mg tablets

**Step 1:** No conversion necessary

**Step 2:** A reasonable estimate is that more than 1 tab will be given because the dosage ordered is more than the dosage on hand.

**Step 3:** 
$$\frac{300 \text{ mg}}{1 \text{ tab}} \begin{array}{c} \leftarrow \\ \rightarrow \end{array} = \begin{array}{c} \rightarrow \\ \leftarrow \end{array} \frac{600 \text{ mg}}{X \text{ tabs}}$$

**Step 4:** Cross multiply, keeping X on the left side of the equation

$$\frac{300 \text{ mg}}{1 \text{ tab}} = \frac{600 \text{ mg}}{X \text{ tabs}}$$

$$300X = 600$$

Solve for X by dividing the number on the right side of the equation by the number in front of X.

$$\frac{300X}{300} = \frac{600}{300}$$

$$X = \mathbf{2 \text{ tabs}}$$

*Same problem, but in this example, the equation is set up using ratios (NOTE: this is the only example in which solving ratio and proportion by setting up the equation using ratios is described)*

**Step 1:** No conversion necessary

**Step 2:** A reasonable estimate is that more than 1 tab will be given because the dosage ordered is more than the dosage on hand.

**Step 3:** 300 : 1 :: 600 : X

**Step 4:** Multiply means and extremes

$$300X = 600$$

Solve for X by dividing the number on equation by the number in front of X.

$$\begin{array}{c} \text{multiply} \\ \downarrow \quad \downarrow \\ 300 : 1 :: 600 : X \\ \uparrow \quad \uparrow \\ \text{multiply} \end{array}$$

the right side of the

$$\frac{300X}{300} = \frac{600}{300}$$

$$X = \mathbf{2 \text{ tabs}}$$

**Order:** 0.025 mg p.o.

**Available:** 50 mcg scored tablets

**Step 1:** Convert to like units. To convert mg to mcg, move the decimal point 3 places to the right and change the units to mcg:  $0.025 \text{ mg} = 25 \text{ mcg}$

**Step 2:** A reasonable estimate is that less than 1 tab will be given because the dosage ordered is less than the dosage on hand.

**Step 3:** 
$$\frac{50 \text{ mcg}}{1 \text{ tab}} = \frac{25 \text{ mcg}}{X \text{ tab}}$$

**Step 4:** Cross multiply and solve for X

$$\begin{array}{rcl} \frac{50 \text{ mcg}}{1 \text{ tab}} & \begin{array}{c} \leftarrow = \rightarrow \\ \leftarrow = \rightarrow \end{array} & \frac{25 \text{ mcg}}{X \text{ tab}} \\ 50X & = & 25 \\ \frac{50X}{50} & = & \frac{25}{50} \\ X & = & \mathbf{0.5 \text{ or } \frac{1}{2} \text{ tab}} \end{array}$$


---

**Order:** 50 mEq p.o.

**Available:** 20 mEq/15 mL

**Step 1:** Units are already in the same size, no conversion is necessary.

**Step 2:** A reasonable estimate is that more than 15 mL will be given because the dosage ordered is more than the dosage on hand.

**Step 3:** 
$$\frac{20 \text{ mEq}}{15 \text{ mL}} = \frac{50 \text{ mEq}}{X \text{ mL}}$$

**Step 4:** Cross multiply and solve for X

$$\begin{array}{rcl} \frac{20 \text{ mEq}}{15 \text{ mL}} & \begin{array}{c} \leftarrow = \rightarrow \\ \leftarrow = \rightarrow \end{array} & \frac{50 \text{ mEq}}{X \text{ mL}} \\ 20X & = & 750 \\ \frac{20X}{20} & = & \frac{750}{20} \\ X & = & \mathbf{37.5 \text{ mL}} \end{array}$$


---

**Order:** 0.25 g I.M.

**Available:** 200 mg/2 mL

*Step 1:* Convert to like units. To convert g to mg, move the decimal point 3 places to the right and change units to mg: 0.25 g = 250 mg.

*Step 2:* A reasonable estimate is that more than 2 mL will be given because the dosage ordered is more than the dosage on hand.

$$\text{Step 3: } \frac{200 \text{ mg}}{2 \text{ mL}} = \frac{250 \text{ mg}}{X \text{ mL}}$$

*Step 4:* Cross multiply and solve for X

$$\begin{array}{rcl} \frac{200 \text{ mg}}{2 \text{ mL}} & = & \frac{250 \text{ mg}}{X \text{ mL}} \\ 200X & \leftarrow = \rightarrow & 500 \\ \frac{200X}{200} & = & \frac{500}{200} \\ X & = & 2.5 \text{ mL} \end{array}$$


---

**Order:** 600,000 units IM

**Available:** 3,000,000 units/5 mL

*Step 1:* Units are already in the same size, no conversion is necessary.

*Step 2:* A reasonable estimate is that less than 5 mL will be given because the dosage ordered is less than the dosage on hand.

$$\text{Step 3: } \frac{3,000,000 \text{ units}}{5 \text{ mL}} = \frac{600,000 \text{ units}}{X \text{ mL}}$$

*Step 4:* Cross multiply and solve for X

$$\begin{array}{rcl} \frac{3,000,000 \text{ units}}{5 \text{ mL}} & = & \frac{600,000 \text{ units}}{X \text{ mL}} \\ 3,000,000X & \leftarrow = \rightarrow & 3,000,000 \\ \frac{3,000,000X}{3,000,000} & = & \frac{3,000,000}{3,000,000} \\ X & = & 1 \text{ mL} \end{array}$$

**PLEASE COMPLETE THE STUDY QUESTIONS ON THE NEXT PAGE**

## MEDICATION CALCULATIONS

### Study Questions - Dosage Calculations

Using scratch paper, complete the following questions. **DO NOT** write in this manual.

Using either dimensional analysis  $\frac{D}{H} \times Q=X$  or the ratio and proportion method of dosage calculations, work the following problems. Include units in the answer.

1. 15 mg of drug is ordered by the physician to be given p.o. Available are 10 mg scored tablets. How many tablets will the nurse administer?
2. 3000 units of medication are ordered to be given as a subcutaneous injection. Available is a vial containing 6000 units per 1.2 mLs. How many mLs will the nurse administer?
3. Available is 250 mg/5 mL syrup. The physician orders 0.75 g p.o. How many mLs will the nurse administer?
4. 300 mcg of medication is ordered. On hand are 0.1 mg tablets. How many tablets will the nurse administer?
5. 30 mEq of a liquid medication is ordered to be given p.o. Available is 20 mEq/15 mL. How many mLs will the nurse administer?
6. 120 mcg of medication is ordered. On hand is a liquid suspension of 0.06 mg/mL. How many mLs will the nurse administer?
7. Order is for 5 mEq. Available is 40 mEq/20 mL. How many mLs will the nurse administer?
8. 250,000 units of a medication is ordered IM. On hand is 100,000 units per mL. How many mLs will the nurse draw up?
9. 320 mg of a medication is ordered. Available is 80 mg/15 cc. The nurse will administer how many mLs?
10. On hand is 200 mg/mL. How many mL would be needed to administer 0.35 g?
11. *Order:* 5000 units  
*Available:* 1000 units/mL  
How many mLs will the nurse administer?
12. *Order:* 2 g  
*Available:* 500 mg/mL  
How many mLs will the nurse administer?
13. *Order:* 80 mg  
*Available:* 160 mg/5 mL  
How many mLs will the nurse administer?
14. *Order:* 30 mg  
*Available:* 20 mg/5 mL  
How many mLs will the nurse administer?

15. *Order:* 0.6 mg  
*Available:* 50 mcg/mL  
How many mLs will the nurse administer?
16. *Order:* 1 g  
*Available:* 2 g/50 mL  
How many mLs will the nurse administer?
17. *Order:* 0.5 g  
*Available:* 500 mg/mL  
How many mLs will the nurse administer?
18. Vicodin contains the following: 500 mg acetaminophen and 5 mg hydrocodone bitartrate. The maximum adult dose of acetaminophen is 4000 mg in 24 hours. What is the maximum number of Vicodin tablets that the patient may receive in 24 hours before exceeding the maximum acetaminophen dose?

### CHECK YOUR ANSWERS TO THE STUDY QUESTIONS

#### Answers to Study Questions - Dosage Calculations

- |             |            |           |             |            |               |
|-------------|------------|-----------|-------------|------------|---------------|
| 1. 1.5 tabs | 2. 0.6 mL  | 3. 15 mL  | 4. 3 tabs   | 5. 22.5 mL | 6. 2 mL       |
| 7. 2.5 mL   | 8. 2.5 mL  | 9. 60 mL  | 10. 1.75 mL | 11. 5 mL   | 12. 4 mL      |
| 13. 2.5 mL  | 14. 7.5 mL | 15. 12 mL | 16. 25 mL   | 17. 1 mL   | 18. 8 tablets |

If you answered all the questions correctly, go on to the next section of this competency. If you missed 1 or more questions, read the content again and repeat the study guide questions.

## IV. DOSAGES BASED ON BODY WEIGHT

Body weight is a factor in calculating medication dosages. Most patients state their body weight in pounds, however most drug sources state dosages in terms of mcg/kg or mg/kg. This section of the competency will review how to convert between lbs and kgs and offer examples of calculating dosages based on weight.

A. Equivalency: 1 kg = 2.2 lb

B. Conversions between pounds and kilograms can be accomplished using multiplication and division or the ratio and proportion method.

1. Multiplication/Division

- a. To convert from lb to kg, divide the number of lb by 2.2.
- b. To convert from kg to lb, multiply the number of kg by 2.2.

2. Ratio and proportion

- a. Set up the problem as a proportion, using the equivalency above.
- b. Solve for the unknown.

3. Regardless of method, round the answer to the nearest tenth

- a. **EXCEPTION:** When converting pounds to kilograms in neonates, round to the nearest thousandth.

**Table 12. Converting Pounds & Kilograms**

<b>Convert 60 lb to kg</b>			
<i>Division method:</i>		<i>Ratio and proportion method:</i>	
$60 \div 2.2 = 27.27$	$=$	$\frac{2.2 \text{ lb}}{1 \text{ kg}} =$	$\frac{60 \text{ lb}}{X \text{ kg}}$
$=$		$2.2X =$	$60$
$=$		$X =$	$27.27 \text{ kg}$
$=$		$X =$	<b>27.3 kg</b>
<b>Convert 15 kg to lbs</b>			
<i>Multiplication method:</i>		<i>Ratio and proportion method:</i>	
$15 \times 2.2 = 33.0$	$=$	$\frac{1 \text{ kg}}{2.2 \text{ lb}} =$	$\frac{15 \text{ kg}}{X \text{ lb}}$
$=$		$X =$	<b>33 lb</b>

## EXAMPLES: Calculating Drug Dosages Based on Body Weight

**Order:** 20 mg/kg

**Patient Weight:** 176 lb

How many grams of medication will you administer?

1. *Convert lb to kg*

$$\frac{2.2 \text{ lb}}{1 \text{ kg}} = \frac{176 \text{ lb}}{X \text{ kg}}$$

$$2.2 X = 176$$

$$X = 80 \text{ kg}$$

2. *Set up the problem using ratio/proportion*

$$\frac{20 \text{ mg}}{1 \text{ kg}} = \frac{X \text{ mg}}{80 \text{ kg}}$$

$$X = 1600 \text{ mg}$$

3. *Convert mg to g*

$$1600 \text{ mg} = \mathbf{1.6 \text{ grams}}$$

Most medication dosages for infants and children are based on body weight. Some medication dosages for adults are also based on body weight, for example, chemotherapeutic agents, enoxaparin (Lovenox) and gentamicin. Because the nurse is responsible for verifying safe medication dosages, the nurse must be able to calculate drug dosages per kilogram of body weight. Recommended doses are listed in one of two ways: amount/kg/dose or amount/kg/24 h. Consider the following two recommended drug doses:

Acetaminophen (Tylenol): 10-15 mg/kg/dose q 4-6 hours - this means that each time Tylenol is administered, the dose should be in the range of 10-15 mg/kg. Additionally, that amount can be given every 4 to 6 hours.

Amoxicillin: 20-50 mg/kg/24 hr ÷ TID - this means that the total amount of Amoxicillin that the child can receive in 24 hours is in the range of 20-50 mg/kg. Each single dose is only a third of the total daily dose.

When calculating safe dosages two concepts to remember are:

- a. Recommended dose (from literature)
- b. Actual dosage (ordered amount)

---

**Order:** Tylenol 150 mg p.o. q 6 hr

**Patient weight:** 10 kg

**Recommended dose in literature:** 10-15 mg/kg/dose q 4-6 hr

*Step 1.* Calculate mg/kg the child would receive with the ordered dose.

$$150 \text{ mg} \div 10 \text{ kg} = 15 \text{ mg/kg}$$

*Step 2.* Compare ordered mg/kg to recommended mg/kg

Ordered dose of 150 mg = 15 mg/kg and is the recommended dose of 15 mg/kg.

---

This becomes a bit more complicated when the recommended drug dose is based on 24 hours. For example, the recommended dose for Amoxicillin is 20-50 mg/kg/24 hr ÷ TID. The recommended dose is a total dose for a 24 hour period, and that amount is divided into 3 doses.

**Order:** Amoxicillin 70 mg q 8 hr

**Patient weight:** 10 kg

**Recommended dose in literature:** 20-50 mg/kg/24 hr ÷ TID

*Step 1.* Calculate mg/kg the child would receive with each ordered dose.

$$70 \text{ mg} \div 10 \text{ kg} = 7 \text{ mg/kg}$$

*Step 2.* Calculate total daily dose the child would receive with the ordered dose (multiply dose/kg for each dose by the number of times/day the drug is ordered to be given).

$$7 \text{ mg/kg} \times 3 \text{ times a day} = 21 \text{ mg/kg/day}$$

*Step 3.* Compare to recommended daily dose.

Ordered dose of 70 mg q 8 hours = 21 mg/kg/day and is within the recommended dose of 20-50 mg/kg/24 hr.

**PLEASE COMPLETE THE STUDY QUESTIONS ON THE NEXT PAGE**

**MEDICATION CALCULATIONS**  
**Study Questions - Dosages Based on Body Weight**

Using scratch paper, complete the following questions. **DO NOT** write in this manual.

**Convert the following weights**

1. 20 kg = \_\_\_\_\_lb
2. 64 lb = \_\_\_\_\_kg
3. 5.8 kg = \_\_\_\_\_lb

**Calculate the following:**

4. *Order:* 50 mg/kg  
*Patient Weight:* 110 lb  
How many **milligrams** of medication will the nurse administer?
5. *Order:* 35 mg/kg  
*Patient Weight:* 198 lbs  
How many **grams** of medication will the nurse administer?
6. *Order:* Ampicillin 1.9 g q 6 h  
*Available:* 500 mg/mL  
*Patient weight:* 15 kg  
*Recommended dose:* 100-200 mg/kg/24 hours  
Is the ordered dose within the recommended dose range? Why or why not?
7. *Order:* Lovenox 70 mg  
*Available:* 80 mg/0.8 mL  
*Patient weight:* 70 kg  
*Recommended dose:* 1 mg/kg
  - a. Is the ordered dose a safe dose to administer? Why or why not?
  - b. How many mL will the nurse administer?

**SEE FOLLOWING PAGE AND CHECK YOUR ANSWERS TO THE STUDY QUESTIONS**

**MEDICATION: CALCULATIONS**  
**Answers to Study Questions - Metric Units of Measure and Equivalents**

1. 44 lb
2. 29.1 kg
3. 12.8 lb
4. 2500 mg
5. 3.15 g
6.  $1.9 \text{ g} \div 15 \text{ kg} = 0.126 \text{ g/kg/dose} = 126 \text{ mg/kg/dose}$   
 $126 \text{ mg/kg/dose} \times 4 \text{ doses a day} = 506 \text{ mg/kg/day}$   
Ordered dose = 506 mg/kg/day and is not within the recommended dose range
7. a.  $70 \text{ mg/kg} \div 70 \text{ kg} = 1 \text{ mg/kg}$   
Ordered dose = 1 mg/kg and is the recommended dose  
b. Administer 0.7 mL

If you missed 1 or more questions, read the content again and repeat the study guide questions.  
If you work in any of the following areas, proceed to the next page and complete Part II: 3WICU, 3WCTU, 4WCCU, 5EICU, 6WICU, 6EICU, 6ENICU, Adult ER, Pediatric ER, PACU.

**NOTE:** Calculation questions on the Medication Calculations clinical competency test will be fill in the blank, **not** multiple choice. You may use a calculator when completing the test.

## V. INTRAVENOUS SOLUTIONS

It is sometimes necessary to deliver fluids and medications intravenously to a patient. IV fluids are administered via an intravenous infusion set and regulated either manually or electronically by an infusion pump. It is the nurse's responsibility to regulate, monitor, and maintain IV fluids and flow rates. This section of the study guide will review how to calculate the time and flow rate of IV infusions.

### A. Calculating IV Infusion Time

Intravenous solutions are usually administered at a prescribed number of milliliters per hour.

**Table: Calculating Number of Hours to Infuse**

$\frac{\text{Amount of solution to be infused}}{\text{mL/hour}} = \text{Number of hours}$
<p><i>Example</i></p> <p><b>Order: Infuse 1000 mL at 125 mL per hour. How many hours will the IV solution last?</b></p> $\frac{1000 \text{ mL}}{125 \text{ mL/hour}} = 8 \text{ hours}$

### B. Calculating Flow Rates

The nurse must calculate the IV volume to be delivered in milliliters per hour when necessary.

**Table: Calculating the Flow Rate**

$\frac{\text{Amount of solution to be infused}}{\text{mL/hour}} = \text{mL/hour}$
<p><i>Example</i></p> <p><b>Order: Infuse 1000 mL over 8 hours Calculate the flow rate.</b></p> $\frac{1000 \text{ mL}}{8 \text{ hours}} = 125 \text{ mL/hour}$

In some cases, an IV with medication added or an IV Piggyback may be ordered to be administered in less than one hour.

**Table: Calculating the Flow Rate Using Time in Minutes**

$\frac{\text{Amount to be infused}}{\text{Time in minutes}} \times 60 \text{ minutes/hour} = \text{mL/hour}$
<p><i>Example #1</i></p> <p><b>Order: Infuse Ampicillin 500mg IV in 50 mL D<sub>5</sub>W over 30 minutes. Calculate your flow rate.</b></p> $\frac{50 \text{ mL}}{30 \text{ minutes}} \times \frac{60 \text{ minutes}}{1 \text{ hour}} = 100 \text{ mL/hour}$
<p><i>Example #2</i></p> <p><b>Order: Infuse Normal Saline 500 mL IV over 2 hours. Calculate your flow rate.</b></p> <p>Step 1 <i>Convert hours into minutes</i></p> $\frac{1 \text{ hour}}{60 \text{ minutes}} = \frac{2 \text{ hours}}{X \text{ minutes}} = 120 \text{ minutes}$ <p>Step 2 <i>Calculate</i></p> $\frac{500 \text{ mL}}{120 \text{ minutes}} \times \frac{60 \text{ minutes}}{1 \text{ hour}} = 250 \text{ mL/hour}$

**MEDICATION CALCULATIONS**  
**Study Questions - Intravenous Solutions**

Using scratch paper, complete the following questions. **DO NOT** write in this manual.

1. The physician orders 500 mL IV solutions of D<sub>5</sub>NS to be infused at 100 mL/hour. How many hours will it take for this infusion to be complete?
2. The physician orders vancomycin 1 gm in 100 mL of D<sub>5</sub>W to be administered via an infusion pump in 60 minutes. What is the flow rate?
3. The order is to infuse 1 g of ceftriaxone sodium in 100 mL of D<sub>5</sub>W via infusion pump over 30 minutes. What is the flow rate?

**CHECK YOUR ANSWERS TO THE STUDY QUESTIONS**

**Answers to Study Questions - Intravenous Solutions**

1.  $\frac{500 \text{ mL}}{100 \text{ mL/hour}} = 5 \text{ hours}$
2.  $\frac{100 \text{ mL}}{60 \text{ minutes}} \times \frac{60 \text{ minutes}}{1 \text{ hour}} = 100 \text{ mL/hour}$
3.  $\frac{100 \text{ mL}}{30 \text{ minutes}} \times \frac{60 \text{ minutes}}{1 \text{ hour}} = 200 \text{ mL/hour}$

If you answered all the questions correctly, go on to the next section of this competency. If you missed 1 or more questions, read the content again and repeat the study guide questions.

## MEDICATION CALCULATION

### References

1. The Joint Commission. Speak up: Help prevent errors in your care.  
[http://www.jointcommission.org/PatientSafety/SpeakUp/speak\\_up\\_general.htm](http://www.jointcommission.org/PatientSafety/SpeakUp/speak_up_general.htm) Accessed May 29, 2009.
2. The National Academies. Institute of Medicine. Preventing death and injury from medical errors requires dramatic, system-wide changes.  
<http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=9728> Accessed May 29, 2009.
3. Tri-Council for Nursing. American Association of Colleges of Nursing. Response to the Institute of Medicine's report to err is human: Building a safer health system.  
<http://www.aacn.nche.edu/Publications/positions/tricouncsept00.htm> Accessed May 29, 2009.

### Bibliography

Brown M, Mulholland JM. *Drug Calculations: Process and Problems for Clinical Practice*. 7<sup>th</sup> ed. St. Louis, MO: Mosby; 2004.

### Other Resources

*If a review of basic math concepts is needed prior to completion of this competency, the following resources are available in the A.F. Parlow Medical Library:*

#### **Computer Assisted Instruction (CAI)\*:**

- Math, General Hospital

*\*See reference librarian if needed for assistance with accessing CAI terminals*

#### **Library Loan Books**

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**MEDICATION CALCULATION**

# **Part II**

## **Advanced Medication Calculations for Continuous Infusion Medications**

To be completed by registered nurses working in the following areas

**3WICU**

**3WCTU**

**4WCCU**

**5EICU**

**6EICU**

**6ENICU**

**6WICU**

**Adult ER**

**Pediatric ER**

**PACU**

**Cardiac Catheterization Laboratory**

**Interventional Radiology**

## I. INTRODUCTION

- A. Pharmacological agents used in critically ill patients are administered in a variety of doses. Examples of these doses include the following:

1. Mcg/kg/min
2. Mcg/min
3. Mg/hr
4. Units/kg/hr

- B. Dosing

The dose of the medication is the amount of medication that must be administered over a certain period of time (eg, dopamine 5 mcg/kg/min). The units of measure differ between the various medications. The length of time is expressed either in 1 minute or in 1 hour. If the medication is weight-based, then the dosing is calculated per kilogram of patient weight. Table 13 lists dosing units for commonly administered continuous infusion medications. Note, that many drugs use different dosing methods in adults and children.

**Table 13. Dosing Units for Common Continuous Infusion Medications**

Drug	Dosing Units	
	Adults	Infants/Children
Amiodarone	mg/min	mcg/kg/min*
Dobutamine	mcg/kg/min	mcg/kg/min
Dopamine	mcg/kg/min	mcg/kg/min
Epinephrine	mcg/min	mcg/kg/min
Fentanyl	mcg/kg/hr	mcg/kg/hr*
Heparin	units/hr	units/kg/hr
Midazolam	mg/hr	mg/kg/hr*
Morphine	mg/hr	mcg/kg/hr*
Nitroprusside	mcg/kg/min	mcg/kg/min
Vecuronium	mcg/kg/min	mg/kg/hr

\* Once a child reaches a weight in which the weight-based dose would exceed the adult dose, non-weight based is used.

- C. Rate

The flow rate is the rate at which the medication is delivered. The rate is always expressed in mL/hr.

- D. Concentration

The concentration is the amount of medication diluted in a given volume of IV solution (eg, 400 mg of dopamine diluted in 250 mL D<sub>5</sub>W).

## II. CONTINUOUS IV MEDICATION INFUSION

NOTE: This section of the Medication Competency will be completed by nurses who care for neonatal, pediatric and adult patients. Although many drips in adults are not dosed on weight (eg, mg/min, mcg/min), this competency will address only calculations related to weight based dosing (eg, mcg/kg/min, mcg/kg/hr).

- A. All units of measure in the formulas must be the same. Sometimes, it is necessary that conversions be made to the concentration of the medication prior to performing the calculation (eg, concentration of dopamine is stated in mg, but the actual dosing of dopamine is stated in mcg). Furthermore, the calculation is made simpler if the concentration is expressed per milliliter of fluid, rather than the total volume of the diluent in the IV bag/syringe.
- B. The mathematical formula for continuous IV drip medications involves three factors; they are the dosing, the flow rate and the concentration. When two out of three factors are known, the third can be calculated by using the basic formula.

### DRUGS DOSED AS DOSE/KG/HR

#### To calculate FLOW RATE

$$\frac{\text{Dose (mg/kg/hr OR mcg/kg/hr)} \times \text{wt (kg)}}{\text{Concentration (mg/mL or mcg/mL)}} = \text{flow rate (mL/hr)}$$

EXAMPLE: Fentanyl 1000 mcg/100 mL NS to infuse at 2 mcg/kg/hr. Patient weighs 70 kg.

- a. Determine concentration of drug in 1 mL

$$\frac{1000 \text{ mcg}}{100 \text{ mL}} = \frac{10 \text{ mcg}}{1 \text{ mL}}$$

- b. Enter known factors into formula

$$\frac{2 \text{ mcg/kg/hr} \times 70 \text{ kg}}{10 \text{ mcg/mL}} = 14 \text{ mL/hr}$$

#### To calculate DOSE

$$\text{Concentration (mcg/mL OR mg/mL)} \times \text{rate (mL/hr)} = \text{dose/kg/hr} \times \text{wt (kg)}$$

EXAMPLE: Fentanyl 250 mcg/50 mL NS is running at 0.6 mL/hr. Patient weighs 3 kg.

- a. Determine concentration of drug in 1 mL

$$\frac{250 \text{ mcg}}{50 \text{ mL}} = \frac{5 \text{ mcg}}{1 \text{ mL}}$$

- b. Enter known factors into formula

$$\frac{5 \text{ mcg/mL} \times 0.6 \text{ mL/hr}}{3 \text{ kg}} = 1 \text{ mcg/kg/hr}$$

### DRUGS DOSED AS DOSE/KG/MIN

#### To calculate FLOW RATE

$$\frac{\text{Dose (mcg/kg/min)} \times 60 \text{ min/hr} \times \text{wt (kg)}}{\text{Concentration (mg/mL or mcg/mL)}} = \text{flow rate (mL/hr)}$$

*EXAMPLE: Dopamine 160 mg/50 mL D<sub>5</sub>W to infuse at 5 mcg/kg/min. Patient weighs 15 kg.*

- b. Determine concentration of drug in 1 mL

$$\frac{160 \text{ mg}}{50 \text{ mL}} = \frac{3.2 \text{ mg}}{1 \text{ mL}}$$

- b. Convert concentration units to dosing units

$$3.2 \text{ mg} \times 1000 \text{ mcg/mg} = 3200 \text{ mcg/mL}$$

- c. Enter known factors into formula

$$\frac{5 \text{ mcg/kg/min} \times 60 \text{ min} \times 15 \text{ kg}}{3200 \text{ mcg/mL}} = 1.4 \text{ mL/hr}$$

#### To calculate DOSE

$$\text{Concentration (mcg/mL or mg/mL)} \times \text{rate (mL/hr)} \div 60 \text{ min/hr} \div \text{wt (kg)} = \text{dose/kg/min}$$

*EXAMPLE: Nitroprusside 50 mg/250 mL D<sub>5</sub>W is running at 5 mL/hr. Patient weighs 55 lbs.*

- a. Determine concentration of drug in 1 mL

$$\frac{50 \text{ mg}}{250 \text{ mL}} = \frac{0.2 \text{ mg}}{1 \text{ mL}}$$

- b. Convert concentration units to dosing units

$$0.2 \text{ mg} \times 1000 \text{ mcg/mg} = 200 \text{ mcg/mL}$$

- c. Convert patient's weight from pounds to kilograms

$$\frac{55 \text{ lbs}}{2.2 \text{ kg/lb}} = 25 \text{ kg}$$

- d. Enter known factors into formula

$$200 \text{ mcg/mL} \times 5 \text{ mL/hr} \div 60 \div 25 = 0.67 \text{ mcg/kg/min}$$

**PLEASE COMPLETE THE STUDY QUESTIONS ON THE NEXT PAGE**

**MEDICATION CALCULATION****Study Questions - Part II: Advanced Medication Calculations for Continuous Infusion Medications**

Using scratch paper, complete the following questions. **DO NOT** write in this manual.

1. Dobutamine is mixed 500 mg/250 mL D<sub>5</sub>W. Ordered dose is 5 mcg/kg/min. The patient weighs 65 kg. At what rate (mL/hr) should the dobutamine be infused?
2. Dopamine is mixed 400 mg/250 mL D<sub>5</sub>W. Ordered dose is 10 mcg/kg/min. The patient weighs 5 kg. At what rate (mL/hr) should the dopamine be infused?
3. Fentanyl is mixed 1000 mcg/100 mL NS. Ordered dose is 2 mcg/kg/hr. The patient weighs 70 kg. At what rate (mL/hr) should the fentanyl be infused?
4. Dobutamine is 100 mg/50 mL D<sub>5</sub>W. It is running at 2.7 mL/hr. The patient weighs 15 kg. What dose is the patient receiving?
5. Fentanyl is mixed 1000 mcg/100 mL NS. It is running at 17 mL/hr. The patient weighs 85 kg. What dose is the patient receiving?

**CHECK YOUR ANSWERS TO THE STUDY QUESTIONS****Answers to Study Questions - Dosage Calculations**

1. 9.75 mL/hr
2. 1.875 mL/hr
3. 14 mL/hr
4. 6 mcg/kg/min
5. 2 mcg/kg/hr (170 mcg/hr)

If you missed 1 or more questions, read the content again and repeat the study guide questions.

**NOTE:** Calculation questions on the Medication Calculation test will be fill in the blank, **not** multiple choice. You may use a calculator when completing the test. The formulas listed in Part II of this competency will be provided for you during the test.

**MEDICATION CALCULATION**

## References

1. Joint Commission on Accreditation of Healthcare Organizations. Speak up: Help prevent errors in your care. Available at: <http://www.jointcommission.org/assets/1/6speakup.pdf>. Accessed December 5, 2012.
2. The National Academies. Institute of Medicine. Preventing death and injury from medical errors requires dramatic, system-wide changes. Available at: <http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=9728>. Accessed December 5, 2012.
3. Tri-Council for Nursing. American Association of Colleges of Nursing. Response to the Institute of Medicine's report to err is human: Building a safer health system. Available at: <http://www.aacn.nche.edu/Publications/positions/tricouncsept00.htm>. Accessed December 5, 2012.

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