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Fortiter Study Guide

Used to Prepare for CRMA State Recertification Program

Developed by Fortiter, Inc.
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"Consultants and Educators for Health Care"

Dear Student:

You have recently signed up for a certification course to renew your CRMA as required by the state of Maine. The new certification course is very different from the "old" refresher course, which you may be used to. The recertification course is a competency-based program, which assumes you know all about giving medications. The purpose of the competency-based course is to test your ability to safely give medications to clients. Therefore, there is more testing and no review.

During the 8 hour course you will be required to do the following: transcribe medication orders to MAR without error, administer medications to class mate without error, take all 4 vital signs (BP, T, R, P and Apical rate), answer some oral questions and complete a state prepared test. The score for successful completion of recertification test is 80%.

In order to assist you in preparation for this program, I have prepared a brief review manual based on previous refresher manuals. I suggest you read it thoroughly and do the practice exercises contained therein. This guide is for you to keep. Also, you may wish to practice taking vital signs particularly blood pressures with a manual (non-digital) cuff. Remember there is no review portion of this new program, so prior preparation is wise.

Also, I believe that learning is best achieved when comfortable so please come dressed in appropriate, yet comfortable, clothes. Please wear short sleeves to allow for blood pressure taking. Feel free to bring snacks/ drinks to class.

One last note: all participants must bring a copy of his/her original CRMA or bridge certificate with him/her (whichever is most recent) to be admitted to the class. Do not forget a copy of your certificate.

Sincerely,

ShirleyAnn Davison

ShirleyAnn Davison, RN, MA
Instructor

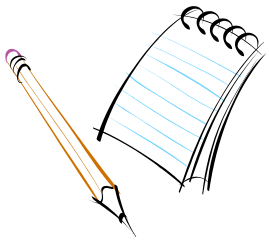


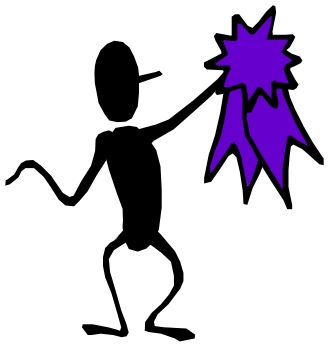
Table of Contents

Recertification Competencies

At the completion of this program, the student must be able to:

1. Safely administer medications as demonstrated by the performance of a medication pass.
2. Adequately take vital signs as demonstrated by performance and a written test.
3. Transcribe medical orders as demonstrated by a written exercise.
4. Demonstrate competency in the following areas:
    A. Safe practice in medication administration
    B. Ways to prevent common errors
    C. Role of CRMA
    D. Assisted Living Regulations regarding administration of medication
    E. Methods and routes of medication administration
    F. Documentation

   by completing a closed book, in class, examination.
5. Achieve an overall average of 80%

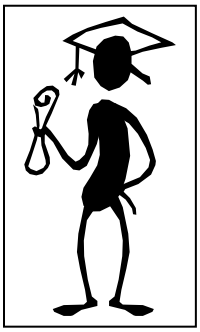


Course Requirements

1. CRMA certificate (original certificate dated 9/1/03 or after) or Bridge certificate which has not been expired for more than 1 month
2. Be present for the entire 8 + hour session.
3. Complete the transcription exercise without error
4. Pass medications to another student without error.
5. Perform vital signs successfully.
6. Obtain a score of 80% or better on the examination.

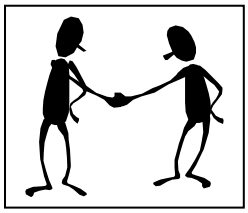
Role of the CRMA

1. The Technical Role:



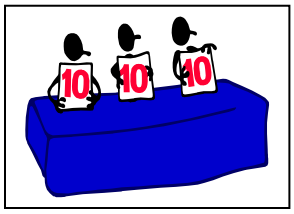
To administer medications (according to the written order of the duly authorized licensed practitioner) as taught in class
To follow infection control principles
To obey the rules in the Assisted Living Regulations
To know the way to approach the person to assure successful administration
To know the actions and side effects of medications being administered

2. The Ethical Role:



To respect resident rights, including confidentiality, right to refuse, and right to know
To keep promises made
To follow facility policies
To do the best job you can
To be punctual
To behave and dress professionally
To know and respect professional boundaries
To keep information confidential
To do only those tasks you have been trained to perform

3. The Legal Role:



To follow proper facility procedures and policies
To remain within the scope of practice
To realize that certification makes you responsible
To know that if a resident is injured due to your practice, you may be held legally accountable and charged with negligence
To insure the safety of the resident/consumer
To seek training before doing new tasks, i.e.: epi pen and insulin administration

Sources of Drug Information

Nurse Consultant

Drug Reference Books

New Kid on the Block: The Internet

Instruction Sheets

Pharmacist

REGULATIONS GOVERNING THE LICENSING AND FUNCTIONING OF ASSISTED HOUSING PROGRAMS:

Level IV Residential Care Facilities

Part of 10-144 Chapter 113

Effective Date (Last Amended): August 20, 2008

MAINE DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF LICENSING AND REGULATORY SERVICES
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Augusta, ME 04333-0011
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Medications and Treatments

7.1 **Use of safe and acceptable procedures**. The administrator shall ensure that all persons administering medications and treatments (except residents who self-administer) use safe and acceptable methods and procedures for ordering, receiving, storing, administering, documentation, packaging, discontinuing, returning for credit and/or destroying of medications and biologicals. All employees must practice proper hand washing and aseptic techniques. A hand-washing sink shall be available for staff administering medications. *[Classes I/II/III]*

7.1.1 Residents shall receive only the medications ordered by his/her duly authorized licensed practitioner in the correct dose, at the correct time, and by the correct route of administration consistent with pharmaceutical standards. *[Classes I/II/III]*

7.1.2 No injectable medications may be administered by an unlicensed person, with the exception of bee sting kits and insulin.

7.1.3 Before using a bee sting kit, unlicensed persons must be trained by a registered professional nurse in regard to safe and proper use. Documentation of training shall be included in the employee record.

7.1.4 Unlicensed assistive personnel must be trained by a registered professional nurse in regard to the management of persons with diabetes. Review of this training shall be on an annual basis.

The registered professional nurse must provide in-service training and documentation to include: *[Class III]*

7.1.4.1 Dietary requirements;

7.1.4.2 Anti-Diabetic Oral medications – inclusive of adverse reactions and interventions, hyper and hypo glycemic reactions;

7.1.4.3 Insulin mixing including insulin action;

7.1.4.4 Insulin storage;

7.1.4.5 Injection techniques and site rotation;

7.1.4.6 Treatment and prevention of insulin reaction including signs/symptoms;

7.1.4.7 Foot care;

7.1.4.8 Lab testing, urine testing and blood glucose monitoring; and

7.1.4.9 Standard Precautions.

Documentation of training shall be included in the employee record.

Review of this training shall be on an annual basis.

7.1.5 Urine testing shall not be done around medication or areas where food is stored or prepared. Proper Standard Precautions relative to body fluids shall be implemented. Toilets shall be used for the disposal of urine and test sample waste. Toxic urine testing chemicals (tablets, solutions) shall be stored in a locked area totally apart from oral medications.

7.1.6 For those residents for whom the facility is responsible for assistance with medication administration, no medications, including those brought into the facility by the resident, family or friends, shall be administered or discontinued without a written order signed by a duly authorized licensed practitioner or other person licensed to prescribe medications. *[Class III]*

7.1.7 Orders for medications and treatments shall be in writing, signed and dated by a duly authorized licensed practitioner and shall be in effect for the time specified by the duly authorized licensed practitioner, but in no case to exceed twelve (12) months, unless there is a written reorder. Orders for psychotropic medications shall be reissued every three (3) months, unless otherwise indicated by the duly authorized licensed practitioner. Standing orders for individual residents are acceptable when signed and dated by the duly authorized licensed practitioner.

7.1.7.1 Upon admission to another facility, all existing orders are no longer in effect. Upon return to the facility, all orders must be reviewed and approved by the resident's duly authorized licensed practitioner within 72 hours. During that timeframe, orders that are signed and dated by the discharging duly authorized licensed practitioner are the current acceptable orders. Prior to admission to another facility all medications must be removed from service and placed in a locked area in accordance with Section 7.7.

7.2 Administration of medications.

7.2.1 Self-administration. Upon admission, each individual's ability to self-administer medications will be determined by an assessment of his/her ability or need for assistance, unless the resident/legal representative elects (in writing) to have the facility administer his/her medications. A final decision will be reached between the resident, his/her legal representative, his/her duly authorized licensed practitioner and a facility representative.

7.2.2 Medications administered by facility. For those medications and/or associated treatments for which the facility is responsible, the following apply:

7.2.2.1 Telephone orders shall be accepted only by a registered or licensed nurse or pharmacist. Written dated orders for telephone orders must be signed by the duly authorized licensed practitioner within five (5) working days. *[Class III]*

7.2.2.2 Facsimile orders are acceptable legal orders as long as they are in compliance with the Commission on Pharmacy regulations.

7.2.3 **Unlicensed assistive personnel**. Unlicensed assistive personnel administering medications and/or treatments must successfully complete training approved by the Department. There shall be evidence available in the facility that such training has been successfully completed. Whenever the standards or guidelines of the medication administration course are substantially revised, unlicensed personnel must be re-certified within one (1) year of the revision, by a method approved by the Department. An additional exception will be made on a case-by-case basis for persons who only administer dietary supplements and/or minor medicated treatments, shampoos, lotions and creams that could be obtained over the counter without a physician's order.

A person qualified to administer medications must be on site at the facility whenever a resident(s) have medications prescribed "as needed" (PRN) if this medication is not self-administered.

All unlicensed assistive personnel administering medications and/or treatments must complete a Department-approved eight (8) hour refresher course biennially for re-certification within two (2) years of the original certification. *[Class III]*

7.2.4 **PRN Medications.**

7.2.4.1 **PRN Psychotropic medications.** Psychotropic medications ordered "as needed" by the duly authorized licensed practitioner, shall not be administered unless the duly authorized licensed practitioner has provided detailed behavior-specific written instructions, including symptoms that might require use of medication, exact dosage, exact time frames between dosages and the maximum dosage to be given in a twenty-four (24) hour period. Facility staff shall notify the duly authorized licensed practitioner within twenty-four (24) hours when such a medication has been administered, unless otherwise instructed in writing by the duly authorized licensed practitioner.

7.2.4.2 A person qualified to administer medications must be on site at the assisted living program or residential care facility whenever a resident(s) have medications prescribed "as needed" (PRN) if this medication is not self-administered.

In no event, however, shall antipsychotic-type psychotropic medications be prescribed on a PRN basis only, having no routinely scheduled and administered doses.

7.3 Medication storage.

7.3.1 Residents who self-administer medications and who handle their own medical regime may keep medications in their own room. To ensure the safety of the other residents, the facility will provide a locked area/container, if necessary. *[Class III]*

7.3.2 Medications administered by the assisted living program or residential care facility shall be kept in their original containers in a locked storage cabinet. The cabinet shall be equipped with separate cubicles, plainly labeled, or with other physical separation for the storage of each resident's medications. It shall be locked when not in use and the key carried by the person on duty in charge of medication administration. *[Class III]*

7.3.3 Medications/treatments administered by the assisted living program or residential care facility for external use only shall be kept separate from any medications to be taken internally. *[Class III]*

7.3.4 Medications administered by the assisted living program or residential care facility, which require refrigeration, shall be kept safely stored and separate from food by placement in a special tray or container, except vaccines, which must be stored in a separate refrigeration unit that is not used to store food. Refrigeration shall not exceed forty-one (41) degrees Fahrenheit. A thermometer shall be used to ensure proper refrigeration. *[Class III]*

7.4 Temporary absences. When a temporary absence from the facility is expected to be greater than seventy-two (72) hours, medications leaving the facility (except those by residents who self-administer) must be in a form packaged and labeled by a pharmacist. For medications leaving the facility for seventy-two (72) hours or less, the medication shall be packaged in such a way as to facilitate self-administration or administration by a responsible party of the correct medication at the appropriate time. Properly certified or licensed staff will use acceptable methods and procedures for preparing medications for leaving the facility. Staff will follow the same policies used in the facility for administering medications. The name of the resident and the name and strength of each drug, as well as the directions from the original prescription package, should be conveyed to the resident or their responsible party along with all cautionary information in writing, either directly on an envelope containing the appropriate dose or on a separate instruction sheet. If the medication is sent in original container, pills must be counted and documented upon leaving and returning to the facility. *[Class III]*

7.5 Medication labeling. Each prescription dispensed by a pharmacy shall be clearly labeled in compliance with requirements of the Commission on Pharmacy and shall include at least the following:

7.5.1 Prescription number;

7.5.2 Resident's full name;

7.5.3 Name, strength and dosage of the drug;

7.5.4 Directions for use;

7.5.5 Name of prescribing duly authorized licensed practitioner;

7.5.6 Name and address of issuing pharmacy;

7.5.7 Date of issue of latest refill;

7.5.8 Expiration date; and

7.5.9 Appropriate accessory and cautionary instructions.

7.6 **Improperly labeled medications**. For medications administered by the assisted living program or residential care facility, all pharmaceutical containers having soiled, damaged, incomplete, incorrect, illegible or makeshift labels shall be returned to the original dispensing pharmacy for relabeling within two (2) working days or shall be disposed of in accordance with the requirements contained in Section 7.9. *[Class III]*

7.7 **Expired and discontinued medications**. For medications administered by the assisted living program or residential care facility, medications shall be removed from use and properly destroyed after the expiration date and when discontinued, according to procedures contained in Section 7.9. They shall be taken out of service and locked separately from other medications until reordered or destroyed. *[Class III]*

7.8 **Medication owned by residents**. Prescribed medicines are the property of the resident and shall not be given to or taken by other residents or any other person**.**

7.9 **Destroying medications**. For medications administered by the assisted living program or residential care facility, all discontinued medications, expired medications or medications prescribed for a deceased resident, except controlled substances and individual doses, shall be destroyed by the administrator or the administrator's designee and witnessed by one (1) competent person who is not a resident. The destruction shall be conducted so that no person can use, administer, sell or give away the medication. Individual unit doses may be returned to the pharmacist and a credit or rebate made to the person(s) who originally paid for the medication. Amounts destroyed or returned shall be recorded on the resident's record, with the signature of the administrator or the administrator's designee and witness(es). Destruction or return to the pharmacy shall take place within sixty (60) calendar days of expiration or discontinuation of a medication or following the death of the resident.

7.10 **Schedule II controlled substances**. Schedule II controlled substances listed in the Comprehensive Drug Abuse Act of 1970, Public Law 91-513, Section 202 and as amended pursuant to Section 202 are subject to the following standards. *[Class II]*

7.10.1 For all Schedule II controlled substances, there shall be an individual record in which shall be recorded the name of the resident, prescription number, the date, drug name, dosage, frequency and method of administration, the signature of the person administering it and verification of the balance on hand. *[Class II]*

7.10.2 There shall be a recorded and signed count of all Schedule II controlled substances at least once a day, if such substances have been used in the facility that day. *[Class II]*

7.10.3 All Schedule II controlled substances on hand shall be counted at least weekly and records kept of the inventory in a bound book with numbered pages, from which no pages shall be removed. *[Class II]*

7.10.4 All Schedule II controlled substances shall be stored under double lock in a separate locked box or cabinet within the medication cabinet or in an approved double-locked cabinet attached to the wall. *[Class II]*

7.10.5 All excess and undesired Schedule II controlled substances in the possession of a licensed facility that are no longer required for a resident, shall be disposed of in the following manner. The Administrator or a licensed or registered nurse shall list all such unused substances and keep the same in a securely locked area apart from all other drugs. Disposal shall be in the form of incineration or flushing into the sewage system only in the presence of an authorized representative of the Department, a licensed pharmacist, a member of the Commission on Pharmacy or an authorized representative of the Drug Enforcement Agency. At least one (1) of the persons must be a person who did not dispense the drug or who was the last person to inventory the drug. Documentation of such destruction shall be made on the resident's record and in the inventory record required in Section 7.10.3, signed by the individual authorized to dispose of the drug. *[Class II]*

7.11 **Bulk supplies**. Facilities may stock in bulk supply those items regularly available without prescription at a pharmacy.

7.12 **Medication/treatment administration records (MAR) for medications administered by the assisted living program or residential care facility**.

7.12.1 Individual medication/treatment administration records shall be maintained for each resident and shall include all treatments and medications ordered by the duly authorized licensed practitioner. The name of the medication, dosage, route and time to be given shall be recorded in the medication/treatment administration record. Documentation of treatments ordered and time to be done shall be maintained in the same manner. These rules apply only to treatments ordered by licensed health care professionals. *[Class III]*

7.12.2 Whenever a medication or treatment is started, given, refused or discontinued, including those ordered to be administered as needed (PRN), the medication or treatment shall be documented on the medication/treatment administration record. It shall be initialed by the administering individual, with the full signature of the individual written on the first page of each month's MAR. A medication or treatment shall not be discontinued without evidence of a stop order signed and dated by the duly authorized licensed practitioner. *[Class III]*

7.12.3 Medication errors and reactions shall be recorded in an incident report in the resident's record. Medication errors include errors of omission, as well as errors of commission. Errors in documentation or charting are errors of omission. *[Class II]*

7.12.4 Administration of medications ordered as needed (PRN) shall be documented and shall include date, time given, medication and dosage, route, reason given, results or response and initials or signature of administering individual. Treatments ordered PRN shall be documented in the same manner.

7.13 **Medication containers**. Graduated medicine containers, for the accurate measurement of liquid medications, shall be used. If not disposable, medicine containers shall be returned to the facility's dishwashing unit for sanitization after each use. Only sterile disposable syringes and needles shall be used for insulin injection. Disposable medicine containers shall not be reused. *[Class III]*

7.14 **Breathing apparatus**. When the facility assists a resident with a hand-held bronchodilator, metered dose nebulizers, intermittent positive pressure breathing machine or oxygen machine, there shall be documentation of the following:

7.14.1 The names of staff who are qualified or trained to use the equipment and/or to mix medications, the nature of their training, the date and who provided it;

7.14.2 The name of the distributing agency and the frequency and specific directions for cleaning the equipment; and

7.14.3 The resident's record shall contain a copy of the duly authorized licensed practitioner's order, possible side effects to be monitored, specific instructions as to when the duly authorized licensed practitioner must be notified regarding side effects and instructions to the resident on the use of the breathing apparatus.

7.15 **First aid kit.** A first aid kit containing supplies which may be necessary for the first aid treatment of minor injuries such as cuts, scrapes or first degree burns shall be included and available in the facility. All staff shall be instructed in the use of any item in the kit.

7.16 Whenever a Registered Nurse teaches or provides in-service training to unlicensed personnel on medical issues, treatments and/or medical equipment not specifically outlined in these Regulations, there must be documentation in the employee file.

Vital Signs

Vital signs is the term used for the measurement of temperature, pulse, respiration and blood pressure. These are also called life signs. Since these measurements tell us about the health of the body and how medication may be affecting the body it is important for all CRMA's to be able to take vital signs accurately.

Measuring Respirations

1. Identify the resident.

2. Hold the resident's wrist just as if you were taking the pulse. This way he will not know you are watching his breathing.

3. Count the respirations immediately after counting the pulse.

4. Check the position of the second hand on your watch. You will count for one minute.

5. One rise and fall of the resident's chest counts as one respiration. Each time the chest rises you count it as one.

6. Write down the number you counted in one minute. That is the respiratory rate. Adults 16-20. It is higher in children.

7. You may also count the respiration by just observing the rise and fall of the chest visually. This is harder to do.

8. Accurate respiratory rate is MOST important when residents are receiving narcotic drugs called opium like analgesics. They slow up the respirations.

Measuring the Pulse

1. Identify the resident.

2. Have the resident sit or lie down.

3. Find the radial pulse by placing the tips of your three fingers of the palm side of the resident's wrist in a line with the thumb directly next to the bone. If you press too hard you will not feel it. If you have trouble finding it, use the other wrist.

4. Look at the second hand on your watch and begin to count the beats which you feel with your fingers. Each beat is counted as one.

5. Count for a full minute. Normal adult pulse is 60-100 beats per minute. The pulse rate is higher in children.

6. Record the number you get.

7. Accurate pulse is important because many medications affect the function of the heart. Digitalis will slow the beat.

8. If you cannot find the radial pulse or are requested to do so, you may take an apical pulse. This measures the number of beats of the heart at the heart itself.

A. Clean the earpieces of the stethoscope and warm the bell or flat portion in your hand.
B. Place the bell directly below the left breast and listen for the beats.
C. Count for a full minute and record.

Persons taking the drugs listed below should have a pulse taken at least weekly:

Adalat (Nifedipine)
Betapace (Sotatol)
Blocadren (Timolol)
Brevibloc (Esmolol)
Cardene (Nicardipene)
Cardura (Doxazosin)
Cardizem
Cardioquin
Cartol (Carteolol)
Cordarone
Corgard (Nadolol)
Enkaid
Kerlone (Betaxolol)
Levatol (Penbutolol)
Lopressor (Metzprolol)
Mexitil
Nimotop (Nimodipine)
Normodyne
Norpace
Procainamide (Pronestyl)
Procardia
Procainamide SR
Propranolol (Inderal)
Quinaglute
Quinidine
Sectral (Acebutolol)
Tambocor
Tenormin (Atenolol)
Timoptic
Tonocard
Vascor (Bepridil)
Verapamil (Isoptin, Calan)
Viskin (Pindolol)

Digitoxin
Digoxin (Lanoxin)
DynaCirc (Isradipine)
Zebeta (Biscoprolol)

Measuring Blood Pressure

1. Identify the resident.

2. Have the resident sit or lie down with his arm positioned comfortably on a flat surface.

3. Unroll the cuff and loosen the valve on the bulb. Squeeze the cuff to be sure there is no air in it.

4. Wrap the cuff smoothly and snugly around the resident's arm above the elbow.

5. Be sure the dial is in a position which you can easily read.

6. Clean the earpieces of the stethoscope and put them in your ears.

7. With your fingertips find the pulse in the inner aspect of the arm just above the elbow.

8. Inflate the cuff. First turn the thumbscrew clockwise and pump the bulb until you can no longer feel the pulse. Pump 30 mm higher on the dial.

9. Put the bell of the stethoscope on the place where you felt the pulse.

10. Open thumbscrew counterclockwise - very slowly.

11. Watch the dial carefully. Record the number when you begin to hear the beats and the number when the sound of beats softens or disappears.

12. The first number is written first then draw a line and record the second. Example: 176/88

13. If beats are heard when you begin to turn the thumbscrew initially, it means you must pump the cuff higher - try 260.

14. Once you have heard the beats come and change or disappear, open the screw completely to let out all the air and remove the cuff. The normal adult blood pressure is 120/80 but can vary widely. The range of 108-130/60-90 is considered acceptable for adults.

15. Leaving the cuff inflated will damage the walls of the blood vessels.

17. Accurate blood pressure reading is important because many people take antihypertensive drugs to lower blood pressure. Lowering the blood pressure too much will be fatal - monitoring is vital!

Weekly blood pressure monitoring is important for persons on the medications listed below:

Accupril (Quinapril)
Aldactone(Spironolactone)
Aldactazide
Altace (Ramipril)
Isordil
Kerlone (Betaxolol)
Levatol (Penbutolol)
Lopressor (Metaprolol)

Apresoline (Hydralazine)
Blocadren (Timolol)
Brevibloc (Esmolol)
Bumex
Capoten (Captopril)
Capozide
Cartrol (Carteolol)
Catapres (Clonodine)
Chlorothiazide (Diuril)
Corgard (Nadolol)
Diamox
Diazide
Dynacirc (Isradipine)
Edecrin
Furosemide (Lasix)
Hydrochlorothiazide (HCTZ)
Hylorel (Guanadrel)
Hytrin (Terazosin)
Hygroton
Inderide
Ismelin (Guanethidine)
Lozol
Monopril (Fosinopril)
Maxzide
Methyldopa (Aldomet)
Microx
Minipress (Prazosin)
Normodyne (Labetalol)
Norvasc
Propanolol (Inderal)
Reserpine (Serpasil)
Sectral (Acebutolol)
Tenex (Guanfacine)
Tenormin (Atenolol)
Vasotec (Enaalapril)
Visken
Wytensin (Guanabenz)
Zebeta (Bisoprolol)
Zestril (Prinivil, Lisinopril)
Zaroxolyn

Measuring Temperature

1. Identify the client.
2. Choose the type of equipment you will use and follow the procedure below for that equipment.
3. Use of the “ear” (tympanic/aural) thermometer:
   A. Remove thermometer from case and attach probe cover.
   B. Grasp the outer part of the ear and pull up and back.
   C. Insert probe.
   D. Press digital button and hold for 1 second.
   E. Remove probe and clean thermometer.
   F. Release ear.
   G. Read results on the digital screen.
4. Use of rectal thermometer:
   A. Place digital thermometer in plastic sheath.
   B. Take patient to room. Assist to remove pants.
   C. Have client lie on left side.
   D. Put on gloves. Lubricate tip of thermometer.
   E. Insert bulb end into rectum.
   F. Hold in place until it peeps.
   G. Remove the thermometer.
   H. Remove sheath and wipe thermometer with tissue.
   I. Read results.
   J. Record results and disinfect thermometer with alcohol.

5. Use of digital oral thermometer:
   A. Place digital thermometer in plastic sheath.
   B. Turn it on by pressing button.

C. Place in mouth of person under tongue and next to frenulum.
D. Instruct person to keep mouth closed until thermometer beeps.
E. Remove thermometer.
F. Take reading and record.
G. Remove sheath and clean thermometer.

6. Use of the skin thermometer:
A. Remove thermometer from case.
B. Be sure it is clean.
C. Place strip or use scanner across forehead.
D. Take reading and record.
E. Clean and replace in case.

General Medication Information

Medications are bits of chemical compounds designed to produce a certain effect in the body. They were originally obtained from plants, animals and minerals. .Now we can obtain them from these three sources and, in addition, microorganisms (vaccines) and factories. Medications can only do four things in the body; a medication may:

- Cure disease
- Prevent disease
- Diagnose disease
- Treat symptoms of disease.

Can you name a medication in each of these four categories???

Also, you should be aware that each medication has 4 names associated with it. The first is the scientific name given to it by the discoverer of the medication. The second is the generic given to the medication by the government. It is the name that medication must go by such as acetaminophen or Aspirin to name two. The third name is the official name; it is given to the medication by the government and is composed of the generic name with USP behind it. The last name is the trade or brand name given to the medication by its manufacturer.

Medication Procedures

1. Medications should be prepared in a quiet and well lit area.

2. The label of the medication should be checked three times - when you take it out, when you pour it, and when you put it back.

3. A drug is never used if the label is illegible.

4. Never use one resident's medication for another resident.

5. Hands are washed before you begin to prepare medications and whenever they touch a resident during the process of administration.

6. Your hands never touch the medication.

7. Replace all caps of drug containers immediately after preparing the medication.

8. Before you crush any medication check with the pharmacist.

9. Never give a drug which someone else has prepared.

10. Your drug cart/cabinet should always be locked unless you are with it.

11. Identify the resident before giving medications: look at the picture and ask the resident for their name if you do not know him.

12. Be sure to look to see if resident has any allergies to medications.
Do not give a medication which the resident is allergic to.

13. Never leave a medication at the bedside.

Specific Oral Medication Procedures

1. Give a full glass of water, juice or milk.

2. Make sure the resident is sitting up.

3. Have the resident take a few sips of liquid first.

4. Instruct the resident to place the pill at the back of the tongue.

5. Have resident tilt head backward to swallow a tablet and forward to swallow capsule.

6. Give resident the rest of the glass of water.

7. When preparing liquid medications you should do so on a flat surface at eye level. Also, you should measure from the center of the cup which is the lowest point of the meniscus. Keep label in your hand to avoid spills on it during pouring. Giving water after the medication will remove any unpleasant taste from the mouth.

Specific Procedures for Topical Medication

1. Remove any old medication before starting.

2. Aerosol: Shake the container. Point the arrow at the skin and spray 6-12 inches from the skin. Read and follow the manufacturer's directions.

3. Cream, Lotion, Ointment: Put 2 teaspoons of medication in your hands and rub it between hands to warm. Spread evenly over the skin following direction of hair growth. Repeat until area is covered. If necessary, use gloves.

4. Powder: Shake powder into a towel and apply to dry skin in a thin film. Avoid inhaling the powder.

Specific Procedures for Transdermal Administration

1. These are patches – similar to band aids. It is a gauze soaked with medication. There is an adhesive around the edge.

2. Be sure the skin is clean and dry.

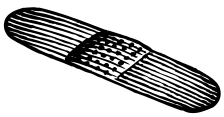
3. Remove the old patch if present.

4. Put date, time, and your initials on the new patch.

5. Tear off the backing of the new patch.

6. Avoid touching the medicated area.

7. Press patch onto skin and check to see that edges are sticking to the skin.



Specific Procedures for Optical Medication Administration

1. If there is eye drainage wear gloves. Otherwise they are optional unless your facility has a policy regarding this. Then, follow that procedure.

2. Have resident tilt head back.

3. Be sure that the eye area is clean.

4. Gently pull down lower lid with cotton, tissue, or gauze using thumb.

5. Instruct client to look up.

6. If you are giving eye drops: do not touch any part of the eye with dropper. Place medication in the center of the lower lid and have resident close eye and blink. Dry the eye or give resident a tissue to do so. Replace dropper.

7. If you are giving an eye ointment: Place a thin line of ointment along inside of lower lid. Make the line smooth and even. Do not touch tube to the eye. Ask resident to close eye and move eyeball around. Wipe up excess or give resident a tissue to do so.

8. If the resident has 2 types of eye medication, they should never be given together. They should be scheduled 15-30 minutes apart at the least!

Specific Procedures for Administration of Ear Drops

1. Have the client lay on his back with head turned to the side.

2. Grasp upper part of the outer ear and pull up and back. For children, pull down and back on the earlobe

3. Place measured amount of medication into ear without touching the dropper to the ear.

4. With cotton ball or tissue press on the forward part of the ear (tragus) to help medication go down ear canal.

5. Place a piece of cotton in the ear for 15-20 minutes. Remove at the end of that time.

Specific Procedures for Nasal Sprays and Drops

1. For nose drops: Have the resident lie down with a pillow under the neck. Measure the correct amount on the dropper. Hold the dropper above the nostril and drop the medication into it. Do not put the dropper in the nose. Keep the resident lying down for 5 minutes. Provide tissue for excess flow.

2. For nasal spray: Have the resident sit up. Tell the resident to breathe through the nose. Place the tip of the spray at the opening of the nose. Tell client to take deep breath through the nose on the count of three; at the same time spray the medication into nose with 2-3 squeezes. Use tissue to wipe excess .

Specific Procedures for Use of Inhalers

1. Sit the resident up.

2. Shake the inhaler.

3. Have resident take 2-3 breaths.

4. Place the opening of the inhaler 1-2 inches away from the mouth unless the directions state otherwise. If a spacer is used the end of the spacer goes into the mouth

5. Tell resident to breathe in through the mouth on the count of three and hold it. On the count of three, press down to activate inhaler.

6. Have resident hold breath as long as comfortable. Then exhale slowly through pursed lips.

7. Offer water to get rid of “unpleasant “ taste.

8. Wait one minute and repeat if so ordered.

9. When finished wash all plastic parts with soap and water, rinse well and air dry on paper towel. Once per week, plastic parts should be soaked in a weak solution of vinegar and water. Then, rinsed and air dried.

Specific Procedures for Suppository Administration

1. Use gloves.

2. Place resident on left side with upper leg bent.

3. Remove suppository from wrapper.

4. Lubricate the tip of the suppository and your finger of gloved hand.

5. Spread buttocks apart and locate anus.

6. Instruct resident to breathe through mouth.

7. With gloved hand insert suppository the length of your index finger.

8. Close buttocks and press together for a moment.

9. Instruct resident to try not to have a bowel movement for 20 minutes.

10. Remove glove turning inside out.

11. Wash hands

Specific Procedures for Vaginal Administration

1. Wear gloves.

2. Position client on her back. Have another staff member present to assist you.

3. Unwrap medication and place on paper towel.

4. After clothes have been removed from lower body, instruct client to bend knees and open legs. Spread labia to visualize vaginal opening.

5. With other hand insert suppository or applicator. When using the applicator, press plunger all the way down to administer the cream.

6. Ask client to remain lying down for 10 minutes.

7. Cover client.

8. Remove gloves inside out and wash hands.

Documentation (The Eighth Right)

Once the medication is given, you have one more task to manage. The last task is proper documentation. Remember that the client record is a legal document. Each month it is your responsibility to gather all of the clients' M.A.R.'s and put your name, title and initials on the bottom of each sheet. Your initials with your signature is the way you will be identified on the M.A.R. above. Your initials must contain, at least, 2 letters; one letter is not sufficient. This must be done every month.

There are two acceptable ways to document the medication administration. The first method is the put your initials in the appropriate box after the client has taken the medication. The second method (which is the one I encourage you to use) works as follows: as you are preparing your medications, put a dot with your pen in the corner of the box for your initials on the M.A.R. After the client has taken the medications, go back to the M.A.R. and put your

initials in each box with a dot.

What happens if the resident refuses the medication? You would put a circle in the box or around your initials depending on your charting system. Then, you would turn the sheet over and on the back put the date, time, and the refusal. it is also a good idea to chart that you explained to the client the implications of not taking the medication. If this medication is discarded, make a note on the back of the MAR with a signature from you and a witness.

Charting "as needed" or prn medications also requires the use of the back of the M.A.R. When these medications are used, you will put your initials on the front of the M.A.R. under the date. There are no designated times on the front of the medication sheet. On the back of the medication sheet, you will put the date, time, reason for the medication, the medication, and you initials or name. Later. you will go back and chart whether this prn medication was effective in taking care of the problem.

No matter what kind of charting you are doing there are some basic charting rules to keep in mind. First, use ballpoint ink. Pencil, flair tip pens, and crayons do not belong here. Ink will make this a permanent record; the other items mentioned do not. Second, when an error is made, draw one line through it write the word "error" and initial. Then write what you want to write. Never scribble, white-out, erase or the like. Remember, completing the record is an important part of finishing the task of administering medications.

The Eight Rights

The Right Person

The Right Drug **The Right Route**

The Right Time

The Right Dose **The Right to Refuse**

The Right to Know **The Right Documentation**

Avoid Errors - Use the Eight Rights

FIND THE 7 RIGHTS

R	N	Y	L	J	U
W	O	N	K	D	L
O	S	U	C	O	E
R	R	R	T	S	S
T	E	G	I	E	U
H	P	O	M	E	F
K	G	F	E	A	E
D	R	U	G	G	R

Which right is missing in the above puzzle??

_____

Common Types of Medication Errors

Wrong Person

Wrong Medication

Wrong Time

Wrong Documentation

Wrong Dose

Refusals

Wrong Route

Transcription

Medication Omitted

Preventing Errors

For the situations below, decide what kind of error it is, what danger it presents and how it could have been prevented;

1. Rita Booth is given the 4 pills which belong to her roommate , Ruth.
   A. Type of Error: _____
   B. Danger to client is: _____
   C. Prevent this by:_____

2. John received his 8 PM Lunesta at 8 AM.
   A. Type of Error:_____
   B. Danger to client is:_____
   C. Prevent this by:_____

3. Staff gave Mike 20 cc of liquid Phenobarbital. Order read " give 2.0 cc".
   A. Type of Error: _____
   B. Danger to client is:_____
   C. Prevent this by:_____

4. Zantac given instead of Zyrtec.
   A. Type of Error:_____
   B. Danger to the client is:_____
   C. Prevent this by:_____

5. The medication is ordered "q12h" and is scheduled to be given at 8 am and 5 pm.
   A. Type of Error:_____
   B. Danger to client is:_____
   C. Prevent this by:_____

6. Mary gave 5 cc of Morphine. Order read Morphine 0.5 ml
   A. Type of Error:_____
   B. Danger to the client is:_____
   C. Prevent this by:_____

7. Seroquel order changed from 2 pills of 300 mg to 3 pills of 300 mg on January 3. On February 1, it is noted that client has been receiving 2 pills.
   A. Type of Error:_____
   B. Danger to the client is:_____
   C. Prevent this by:_____

8. Mary, the new CRMA, asks Bob (the client) which one of the ladies is Rita Burke, because she does not know her.
   A. Type of Error:_____
   B. Danger to the client is:_____
   C. Prevent this by:_____

Medication Error Report

In spite of all we do to prevent errors. Occasionally a medication error will occur. When a medication error occurs it is extremely important that you follow your agency's protocol for this situation. Most agencies will require you to make out a medication error report. There is a sample enclosed. Basically, they all require the same information: name of the client, medications, what happened and who was notified.

The medication error report will become part of the client record. Therefore, all the rules of documentation apply. They are always done in ink, never erase, etc.

Before you come to class you may wish to review your agency's procedure and bring a sample form to share. A sample form is shown below. Using an example from the above exercise, "Preventing Errors", fill out this form for practice.

KENNETH'S ASSISTED LIVING FACILITY
MEDICATION ERROR REPORT

CLIENT NAME: _____

DATE OF INCIDENT:_____ TIME:_____ AM/PM

PERSON MAKING ERROR:_____

MEDICATION(S) INVOLVED:_____

DESCRIPTION OF INCIDENT: _____

_____

_____.

TYPE OF ERROR: _____

PERSONS NOTIFIED (NOTE ALL THAT APPLY):

TITLE	NAME	DATE	TIME	BY WHOM

Administrator_____
Doctor_____
Guardian_____
Family Member_____
Other_____
_____

Was medical treatment necessary? No _____ Yes_____
If yes, what was the medical treatment? _____ _
_____
_____
PERSON MAKING OUT REPORT: _____ Date:_____

Transcribing the Medication Order

Transcription of the medication order means ordering the drug from the pharmacy (if needed) and writing the medication on the resident's M.A.R. It is a most important task and must be done accurately. Other staff members who give medications are counting on you to do it right.

In some facilities only the Resident Care Director or nurse may transcribe orders. You should ask your administrator what the policy is at your facility and follow it. If you must transcribe an order, the procedure below will assure you do it safely. Learn this procedure. In class, we will practice this skill.

First, find yourself a quiet place to work. You cannot be answering questions or talking to residents or answering the phone while you are doing this task. Check to see if the medication has already been obtained from the pharmacy. The resident's family or another worker may have stopped by the pharmacy to pick it up for you. If you do not have the medication, call the pharmacy and ask if the physician's office has already ordered it. Frequently, the doctor's office will fax the order to the pharmacy. If this has been done, then thank them - they have completed part of your job! If the order has not gone to the pharmacy, you may fax the order to the pharmacy or send a staff member to the pharmacy to get it. Remember that you need a copy of the original doctor order for the chart - so be sure that if you send someone to get it that they bring the prescription back to the facility. You CANNOT give a medication without a doctor's order!!!!

Look at the medication order. Can you read it?? Some doctors have illegible handwriting. If you cannot read it, see the nurse consultant, Resident Care Director or Administrator for help. If needed, call the doctor for clarification. Never guess!! Copy the name of the drug, dosage, frequency and route on to the M.A.R. in the space provided. Be very careful with abbreviations and decimal

points. Moving the decimal point will change Digoxin .125 mg from a normal dose to 12.5 mg. which is a deadly overdose. Writing cg instead of mg means the resident will get 100 times what was ordered. You also need to look at the pharmacy label because the pharmacist will have calculated the number of pills or amount of liquid you must give for a dose. That number should be written on the M.A.R. For example. the doctor may order 40 mg of Lasix. They come in 20 mg tablets. On the Pharmacy label, the pharmacist will write " give 2 tablets". This should be written on the M.A.R. It is not the CRMA's responsibility to calculate doses. If you have any questions call the pharmacist. You should also include with order on the MAR the reason the medication is being given. As a CRMA you are expected to know why the client is taking the medications you are giving him. It helps everyone if the reason for the medication is put on the MAR with the order. Lastly, some agencies put the date of the order and the doctor's name in the box as well.

Next, you will assign the times for the medication to be given. The times for medication should be determined by looking at what will work best for the client. The times are listed in the hour column starting with the first scheduled dose after midnight and proceeding through the day.

When you have completed this task, you will write your name, title and date on the doctor's order sheet next to the order and on the prescription. This indicates who was responsible for transcribing the order if a question should arise in the future.

Your agency may have other rules about transcription such as the use of colored ink, highlighting, indicating when a medication is to be started or when it ends. It is your responsibility to know such policies and follow them. They change depending on the agency.

What is missing from the 5 orders below:

Altace 20 mg 1 tab for hypertension
Richard Davison MD 1/5/08

Digoxin 2 tablets qd po for bad heart
Richard Davison MD 1/5/08

Methicillin 500mg q6h for bronchitis
Richard Davison MD 1/5/08

Liquid Antacid 30cc q4h prn for heartburn
Rcihard Davison MD 1/5/08

Tylenol 325 mg 1-2 tablets po prn q4h for fever, headache, pain
Richard Davison MD 1/5/08

Transcription Orders for Exercise

Using the orders below and an MAR supplied by your agency, transcribe these orders and Have your supervisor or co-worker check them as a practice.

Name: Mary Mary Quite Contrary
Address: 3 Candy Lane
StoryBook Village, Dreamland

Ativan 0.5 mg give 1 tab po q6h prn for mild anxiety demonstrated by whining, crying or consumer request up to 4 doses in 24 hours

Xanax 1.0 mg 3 tab. TID po for anxiety disorder

Prozac 30 mg 1 tab po qam for depression

Multivitamins 1 tab. po qam for general health

Fosamax 1 tab po q7 days for osteoporosis

Phenobarbital 5 mg per ml 10 ml BID for seizures po

Milk of Magnesia 30 cc po every third day without BM prn for constipation

Estrace 2.5 mg patch On for 12 hours per day for hormonal replacement. Rotate site.

Controlled Medications

Controlled substances are medications, which can produce physical or psychological dependence. Because of their addictive and psychotropic qualities, these drugs are frequently sold on the street. Hence, the Drug Enforcement Agency (DEA) regulates them. Law created this agency in 1970. Before that time, these drugs were regulated by the Harrison Narcotic Act, which had been around since the 1930's. The DEA regulates the manufacturing and dispensing of dangerous and potentially abused drugs.

The regulation divides these drugs or medications into five categories called schedules; hence the common name of "scheduled medications" for these drugs. The categories are based on the addictive quality of the drugs:

Schedule I: high potential for abuse , research use only, not to be prescribed
Examples: Mescaline, LSD, peyote, heroin, Angel Dust, Ecstasy

Schedule II: high potential for abuse, psychological/ physical dependency, acceptable medical uses, dispensed with prescription, new prescription for each refill, must be renewed every 30 days; used to be called narcotics
Examples: amphetamines, Codeine, Morphine, Demerol, Methadone, Ritalin, Pentobarbital, Percodan, Dexadrine, Secobarbital, Oxycodone, Oxy Contin, Duragesic

Schedule III: moderate potential for abuse, minimal physical dependence, psychological dependence, acceptable medical uses, dispensed

with prescription, refill 5 times in 6 months maximum
Examples: Tylenol with Codeine, Butisol, Tussionex, Vicodin, Paregoric, Fiorinal with codeine

Schedule IV: lower potential for abuse than Schedule III, little physical/ psychological dependence, acceptable medical uses, dispense with prescription, refill 5 times in 6 months maximum
Examples: Librium, Valium, Dalmane, Serax, Talwin, Ativan, Tranxene, Equanil, Xanax, Darvon, Darvocet, ProSom, Miltown

Schedule V: very low potential for abuse, acceptable medical uses, over the counter drugs, must be sold by pharmacist, purchaser must be over 18, no prescription needed
Examples: Guiatuss AC, Tussi-Organidin, Lomotil, Novehistine, Donnagel, Terpin Hydrate with codeine

Obviously, the most potentially dangerous in this group are the Schedule II drugs. These medications are highly regulated by the DEA (federal government) and also by the state. The regulations reprinted in your manual contain special provisions for the use of the drugs under section 5090. If you use Schedule II drugs in your agency, you must abide by those regulations, which include:

1. medication must be ordered by a physician
2. medication must be kept under double lock
3. the doctor must issue a new prescription every 30 days
4. each dose must be accounted for on an individual record
5. medications must be counted weekly if not used and daily if used
6. all unused medication will be stored and disposed of as outlined in 5090.5
7. a bound book of medication checks will be kept

Although a special individualized record is required by Federal regulation for all Schedule II medications, some agencies use these special sheets for all controlled medications. You must follow the policy of your agency. A new individual record-keeping sheet must be used for each prescription. An example of the sheet most commonly in use is on the next page for your reference.

Schedule II Exercise

The following medication bottle was received from the pharmacy. Please put it on the control sheet below:

Goldman's Pharmacy
66 Imaginary Lane **C II/N**
Dreamtown, USA
RX: 54321 **Date: 1/3/08**

Sprat, Jack

Ritalin CR 60 mg tabs 1 tab po qd for ADHD

#32 **Dr. Theresa Davison**

No Refills **Discard after: XXXXXX**

Now record the following doses:

1/4/08 10 am one dose given
1/5/08 10 am one dose dropped and flushed and one dose given.

Have your supervisor check your work.

Davison Assisted Living Facility
SCHEDULE II DRUG RECORD

NAME:						
Date Received:	**Signature of Staff Member Receiving Medication:**				**Doctor:**	
Medication:		**Dosage:**	**Frequency:**		**Method of Administration:**	
Amount Received:		**Prescription #:**			**Pharmacy:**	
Signature:	**Date**	**Time**	**Amount On Hand**		**Amount Given**	**Amount Remaining**

MEDICAL ABBREVIATIONS

COMMON MEDICAL ABBREVIATIONS/SYMBOLS			
Abbreviation/ Symbol	**Meaning**	**Abbreviation/ Symbol**	**Meaning**
BP	Blood Pressure	N & V	Nausea & Vomiting
BM	Bowel Movement	noc*	Night
BR	Bathroom	NPO	Nothing by Mouth
BRP	Bathroom Privileges	OTC	Over the Counter
C	Centigrade	PER	By or With
$\overline{c}$	With	PO or p	By Mouth
CBC	Complete Blood Count	PR	Per Rectal
CHF	Congestive Heart Failure	qs	Quantity Sufficient
CNS	Central Nervous System	R	Rectal or Respiration
Dr.	Doctor	R	Right
DSD	Dry Sterile Dressing	RBC	Red Blood Count
Dx	Diagnosis	ROM	Range of Motion
EENT	Ear, Eye, Nose, Throat	Rx	Treatment

F	Fahrenheit	$\overline{S}$	Without
GI	Gastrointestinal	Spec	Specimen
GU	Genitourinary	SS	Soap Suds
Hct	Hematocrit	TPR	Temperature, Pulse & Respiration
Hgb	Hemoglobin	UV	Ultraviolet
Hx	History	VS	Vital Signs
I & O	Intake & Output		
L	Left	WBC	White Blood Count
LAB	Laboratory	W/C	Wheel Chair
MAR	Medication Administration Record	Wgt or wt	Weight

May see these abbreviations a "line" over them.

DRUG ADMINISTRATION ABBREVIATIONS/SYMBOLS			
Abbreviation/ Symbol	**Meaning**	**Abbreviation/ Symbol**	**Meaning**
@	At		
a*	Before	p*	After
aa	Of each	pc*	After Meals
ac*	Before Meals	prn	As Needed
AD or ad	Right Ear	q	Every
AS or as	Left Ear	qd	Once a Day
AU or au	Both Ears	qh	Every Hour
ad lib	As Patient Desires	q2H, q4H, q8H	Every 2, 4 8 Hours
bid	Two Times Per Day	qhs	Every Night at Bedtime
cap	Capsule	qid	Four Times a Day
cc	Cubic Centimeter	qod	Every Other Day
c/o	Complaint Of	qw	Every week
d/c	Discontinue	sc or suq	Subcutaneous
dr	Dram	SL	Sublingual
Gm	Gram	sol	Solution
gr	grain	ss	One Half
gtt	A Drop	stat	At Once
HS	Hour of Sleep	supp	Suppository
IM	Intramuscularly	susp	Suspension
IV	Intravenous	tab	Tablet
Kg	Kilogram	tid	Three Times a Day
LLQ	Lower Left Quadrant	tinct or tr	Tincture
L	Liter	T or Tbs	Tablespoon
mg	Milligrams		
OD or od	Right Eye	t or tsp	Teaspoon
OS or os	Left Eye	U	Unit
OU or ou	Both Eyes	ung	Ointment
oz	Ounce	↑	Increase, Upper, Elevate(d)
Δ	Change	↓	Decrease, Lower
$\bar{I}$, $\bar{II}$, $\bar{III}$, $\bar{IV}$, $\bar{V}$ **	1 tab, 2 tabs, 3 tabs, etc. (May also be used for tsps or ozs.		

*May see these abbreviations a “line” over them.
**May see these abbreviations with dots over them as well as the line.

Measurement Systems

There are three basic measurement systems used in the world today. The oldest of the systems is the ***apothecary*** system. This was the original system for measuring drugs. The measure of weight in this system is the grain (gr.), dram, ounce and pound. To measure liquids, the drop (gt), minim (m), fluid dram, and fluid ounce were used. This system lacked standards. In other words, a grain was an approximate measure. When this system was used the dosage was written in Roman numerals either before or after the dosage. ASA gr. X is an order for 2 aspirin tablets or 650 mg. of aspirin. This system with the use of Roman numerals, which are foreign to most of us and complicated to use, coupled with the fact it is approximate measure made this system less than ideal.

The second oldest system is the **household** system. This is the one, which is used for cooking. It includes the use of the teaspoon (tsp.), tablespoon (Tbs.), and cup for measuring weight and the cup, pint, and quart for liquids. These amounts are far too large to measure the small amounts of medication that are used. Occasionally, a doctor may tell a patient to take a certain amount of teaspoons or tablespoons of medication, because this system of measurement is familiar to the general public and easier for them to use. However, beyond that, the household system is not used by medicine.

The newest and most frequently used system of weights and measures is the **metric** system. It is also called “Systemique Internationale” or “SI”. The metric system is the system used universally by all sciences including chemistry from which pharmacy originates. Almost exclusively the medical field uses it. The French developed this system in the 1700’s for exactly the purpose of creating uniformity in weights and measures. By use of this system, it was believed that every one everywhere would measure things the same way. By doing that, a kilogram of wool in Scotland would mean the same thing as a kilogram of wool in Africa, the United States, China or any other nation. This would permit scientific experiments to be duplicated in laboratories all over the world; this allows one scientist to build on the work of others. By use of this system, one is assured that 650 mg of aspirin will be exactly 650 mg. no matter where in the world you purchase it. Because this system is precise and has universal meaning, medicine has embraced this system for use.

The metric system is based on three standards for measurement. The first standard is the **meter**. The meter measures length. It is approximately 39 inches. The second standard is the **liter**, which is used to measure volume. Volume measures how much space something takes up. For example, how much soda is in a bottle or how many crackers are in a box are measured in volume. The third standard is the measure for weight, which is the **gram**.
Since we do not measure length when administering medication, we will not focus on that unit of measurement.

How do we know that a gram is a gram everywhere in the world or that the liter is the same in China and in Greece? In France, the standards are kept.

There is a meter rod, a liter container, and a piece of metal weighing one gram. All scales and other measuring devices are set to these standards.
One can be assured of accuracy when everyone is using the same standard.

Obviously, using the gram and the liter to measure medications is a good idea; however, we would never give anyone a gram of medication. It is far too large an amount. We could use fractions like 1/2, 1/4 or 1/16. However fractions are clumsy and mistakes are easy. Anyway, the metric system has accounted for this need. Although the gram and liter are the standards, there are smaller and larger units possible. The standard may be divided into smaller units. For example, if we divide the gram into 1000 parts, we call each parts a milligram (mg). This is the unit used most frequently to measure drug dosages. We could also divide the liter into 1000 parts; each part would be a milliliter (ml). Each milliliter is 1/1000 of a liter. The milliliter is used frequently in medicine for liquid dosages. Is it possible to divide the gram and liter into parts other than 1000? The answer is yes. A gram or liter can be divided into 100 parts (centi) or 10 parts (deci). We can also combine grams or liters to form larger amounts like kilograms; however, large amounts are rarely used in medicine. The chart below will give you a reference of these other units:

Unit	Number of grams (liters)	Abbreviation
Kilogram(Kiloliter)	1000 grams or liters	kg (kl)
Hectogram (Hectoliter)	100 grams (liters)	hg (hl)
Dekagram (Dekaliter)	10 grams (liters)	dkg (dkl)
Gram (Liter)	1 gram (liter)	g (l)
Decigram (Deciliter)	1/10 gram (liter)	dg (dl)
Centigram (Centiliter)	1/100 gram (liter)	cg (cl)
Milligram (Milliliter)	1/1000 gram (liter)	mg (ml)

Prefix Abbreviations and Meanings	
k	Kilo
h	Hecto
dk	Deka
d	Deci
c	Centi
m	Milli

The use of these other options and decimal points gives health care people all of the options needed to precisely determine dosages.

Occasionally, it is necessary to convert from the apothecary system to the metric system or to the household system. This is especially true, as mentioned earlier, when the doctor is ordering liquid medication for someone to take at home. This conversion is the responsibility of the doctor, nurse and pharmacist.

It should never be done by the CRMA. However, the chart below is a reference for you on liquid equivalents:

Metric	Apothecary	Household
1 ml	15 gtts	
5 ml	1 dr	1 tsp
15 ml	3 dr	1 tbs.
30 ml	1 oz	2 tbs.

Generally, solid medications do not present these problems, because the pharmacists should put on the label the number of pills or capsules you are to give in each dose. It is not the responsibility of the CRMA to calculate drugs dosages. However, to give you an understanding of how the apothecary and metric system relate, the examples below have been included:

1 gram = 1000 mg = gr xv (15)
.5 gram = 500 mg = gr viiss (7 1/2)
.06 gram = 60 mg = gr i (1)
.03 gram = 30 mg = gr ss (1/2)

The Measurement Game

Answer each of the questions below about the measurement systems. Use those answers to solve the word search.

1. A measurement for weight in the apothecary system is the _____.
2. A prefix meaning one thousand times as large is the _____.
3. The term "dl" stands for _____.
4. The term, ounce, is abbreviated as_____.
5. A volume measurement in the metric system is the _____.
6. One ml is equal to one_____.
7. If you use the abbreviation "mm", you are measuring _____.
8. Thirty-nine inches is about one _____.
9. The term meaning 10 times heavier than a decigram and 1/10 the weight of a dekagram is _____.
10. The "SI" was invented by the _____.

Find the answers to the above questions in the word search:

R	E	T	I	L	I	C	E	D	D
A	E	B	C	D	X	Y	Z	E	Z
I	H	T	G	G	F	K	I	L	O
K	F	R	E	N	C	H	J	L	M
T	A	S	R	M	C	U	Q	N	P
M	L	E	F	H	J	M	U	I	N
U	I	D	G	I	K	I	F	A	O
H	T	G	N	E	L	W	A	R	P
V	E	Y	Z	C	H	A	N	G	E
W	R	X	A	B	R	I	G	H	N

Put the amounts in the box in order of size:

Smallest =
1=
2 =
3 =
4 =
Largest =

5cc	1 ounce
1 L.	1 TBSP
0.5 L.	10 ml

Preventing Errors: Answers

1. Rita Booth is given the 4 pills which belong to her roommate , Ruth.
   A. Type of Error: *wrong person*
   B. Danger to client is: *Ruth did not get needed med; Rita could have bad reaction*
   C. Prevent this by: *clearly identify client*

2. John received his 8 PM Lunesta at 8 AM.
   A. Type of Error: *wrong time*
   B. Danger to client is: *will be sleepy all day and awake at night*
   C. Prevent this *by: reading and checking MAR 3 times*

3. Staff gave Mike 20 cc of liquid Phenobarbital. Order read " give 2.0 cc".
   A. Type of Error: *wrong dose*
   B. Danger to client is: *received 10 times the dose he should; overdose*
   C. Prevent this by: *paying careful attention to amounts/ decimals*

4. Zantac given instead of Zyrtec.
   A. Type of Error: *wrong medication*
   B. Danger to the client is: *overdose and medical problem is not treated*
   C. Prevent this by: *reviewing names letter by letter*

5. The medication is ordered "q12h" and is scheduled to be given at 8 am and 5 pm.
   A. Type of Error: *wrong time- should be given at 12 hour intervals*
   B. Danger to client is: *not an even amount of med. In blood; will not work properly*
   C. Prevent this by: *knowing abbreviations and their meanings*

6. Mary gave 5cc of Morphine. Order read: "Morphine 0.5 ml"
   A. Type of Error: *wrong medication*
   B. Danger to the client is: *medical condition not treated*
   C. Prevent this by: *compare names by letter to letter*

7. Seroquel order changed from 2 pills of 300 mg to 3 pills of 300 mg on January 3. On February 1, it is noted that client has been receiving 2 pills.
   A. Type of Error: *wrong dose*
   B. Danger to the client is: *seizures are not well managed*
   C. Prevent this by: *verifying any new order by looking at MD order*

8. Mary, the new CRMA, asks Bob (the client) which one of the ladies is Rita Burke, because she does not know her.
   A. Type of Error: *possible wrong person*
   B. Danger to the client is: *may get the wrong medication*
   C. Prevent this by: *never ask client for assistance with medications unless it is their own*

What is missing from the 5 orders below:

Altace 20 mg 1 tab for hypertension
Rcihard Davison MD 1/5/08

Digoxin 2 tablets qd po for bad heart
Rcihard Davison MD 1/5/08

Methicillin 500mg q6h for bronchitis
Richard Davison MD 1/5/08

Liquid Antacid 30cc q4h prn for heartburn
Richard Davison MD 1/5/08

Tylenol 325 mg 1-2 tablets po prn q4h for fever, Headache Richard Davison MD 1/5/08

No route

No strength

No dose

No medication name

No specific dose (1-2)

1. A measurement for weight in the apothecary system is the GRAIN
2. A prefix meaning one thousand times as large is the KILO
3. The term "dl" stands for DECILITER
4. The term, ounce, is abbreviated as OZ
5. A volume measurement in the metric system is the LITER
6. One ml is equal to one cc.
7. If you use the abbreviation "mm", you are measuring LENGTH
8. Thirty-nine inches is about one METER.
9. The term meaning 10 times heavier than a decigram and 1/10 the weight of a dekagram is GRAM.
10. The "SI" was invented by the FRENCH

Put the amounts in the box in order of size:

Smallest = 5cc
1= 10 ml
2 = 1TBSP
3 = 1 ounce
4 = .5 L
Largest = 1 L.

Good Luck