# 91W10
# Advanced Individual Training Course

# Clinical Handbook
# Supportive Care 3

Department of the Army
Academy of Health Sciences
Fort Sam Houston, Texas 78234

**TERMINAL LEARNING OBJECTIVE**

Given the necessary medical equipment in a holding or ward setting. You are providing casualty care as part of an integrated team in a Minimal Care Ward.

***Facts about Physical Assessment***

The systematic collection and analysis of subjective and objective data (facts). This information is collected to provide a database.
(1) Subjective data
(2) Objective data
(3) Data Base
Assessment is used to establish a database for the patient. It is the basis on which patient strengths and health problems are identified.

The primary source of patient information is the patient.
Other resources include:
(1) Patient's support persons
(2) Patient record
(3) Information from other health care professionals
The physical assessment is focused primarily on the functional abilities of the patient

***Purposes of a physical assessment:***

(1) To confirm the patient's history or to observe findings not reported in the history
(2) To obtain a physical and mental database on the patient which can be used for nursing intervention
(3) To evaluate or measure the quality of the care (intervention) given to the patient

**Considerations in patient preparation for a physical assessment**

(1) Evaluate all sources of data
    (a) Patient
    (b) Support people
    (c) Patient record
    (d) Other health professionals
(2) Exam should occur in a quiet, well-lit room with consideration for patient privacy and comfort
(3) Explain all procedures to patient to avoid alarming or worrying patient and encourage cooperation
(4) Ask patient to empty bladder prior to exam and assist with gowning/draping as needed
(5) Discuss confidentiality with patient

***Basic techniques used in performing an assessment***

The nursing assessment includes two steps:

(1) Collection and verification of data from a primary source (the patient) and secondary source (the family, health care professionals)

(2) The analysis of that data to establish a baseline

**Inspection**: Observations using visual, auditory, and olfactory senses

**Palpation**: Technique using the sense of touch to gather information about temperature, turgor, texture, moisture, vibrations, and shape

**Auscultation**: The act of listening to sound produced within the body with a stethoscope

**Percussion**: The act of striking one object against another for the purpose of producing sound (tympany, resonance, hyperresonance, dullness, flatness)

***Components of the patient assessment***

**The interview includes:**

(1) Chief Complaint
(2) History of Present Illness
(3) Past Health History
(4) Family Health History
(5) Psychosocial History:
  (a) Age
  (b) Sex/Race
  (c) Marital status
  (d) Number of children
  (e) Occupation
  (f) Education
  (g) Religious affiliation
  (h) Living accommodations

**General appearance and behavior assessment**.

Items to inspect:

(1) Body build (measure height and weight)
(2) Posture
(3) Gait - coordination of movements and pattern of gait.
(4) Hygiene, grooming - note cleanliness, body odors, appropriate dress for age and environment
(5) Signs of illness - note posture, skin color, respirations, nonverbal communications of pain or distress
(6) Affect, attitude, mood - note speech, facial expressions, ability to relax, eye contact, behavior
(7) Cognitive process - note speech content and patterns, appropriate verbal responses

(8) Cognitive function - an intellectual process by which one becomes aware of, perceives, or comprehends ideas. It involves all aspects of perception, thinking, reasoning, and remembering.

**Vital Signs**

(1) Temperature:
- (a) May vary with the time of day
- (b) Oral: 98.6 degrees Fahrenheit is considered normal
- (c) Rectal temperature is most accurate. Temperature of > 100.4 = fever.

(2) Blood Pressure
- (a) Measure the blood pressure in both arms
- (b) Use the correct sized cuff
  - (i) To determine cuff size, the length of the cuff should be 80% of the upper arm circumference and be two-thirds the width of the upper arm.
  - (ii) An improper size will give an inaccurate reading. A higher inaccurate reading will be obtained if too small a cuff is used. conversely, a lower inaccurate reading will be obtained if too large a cuff is used.
- (c) Normal range 95-140 mmHg systolic, 60-90 mmHg diastolic

(3) Pulse
- (a) Palpate pulses for at least 30 seconds
- (b) Normal adult pulse 60-80 beats/minute
- (c) Note the number of irregular beats per minute
- (d) Peripheral pulses are graded on a scale of 0-4 by the following system
  - (i) 0 = Absent, no pulse
  - (ii) +1 = Not easily felt, thready, weak
  - (iii) +2 = Difficult to palpate, stronger than +1
  - (iv) +3 = Normal. Easily felt, not easily obliterated with pressure
  - (v) +4 = Strong, bounding, unable to obliterate with moderate pressure

(4) Respiration
- (a) Count number of respirations taken in 15 seconds and multiply by 4
- (b) Normally 12-20 resp/min

(5) Measure pulse oxygen saturation (See LP C191W059, Cardiac Monitoring)

**Head-To-Toe Assessment**

(1) Integumentary System
- (a) Ask if patient has been exposed to harmful environmental materials or increased sun exposure, has recent skin changes, or is currently taking medications
- (b) Normal skin color
  - (i) Varies among races and individuals

(ii) Ranges from pinkish white to various shades of brown
(iii) Exposed areas may vary in color with unexposed areas
(iv) Healthy dark skin has a reddish undertone; buccal mucosa, tongue, lips, nails, normally appear pink

(c) Skin color assessment:
(i) Cyanosis - dusky bluish color
* Inspect ears, lips, inside of mouth, hands, nailbeds
* Caused by respiratory or cardiac diseases, or cold environment (decreased oxygenation)
(ii) Jaundice - yellowish color
* Inspect skin, mucous membranes, sclera
* Caused by liver disease (increased bilirubin)
(iii) Pallor - paleness
* Inspect face, lips, conjunctival, mucous membranes
* Caused by anemia (decreased hemoglobin) or inadequate blood circulation
(iv) Erythema - redness
* Inspect facial area, localized areas
* Caused by blushing, alcohol intake, fever, injury, infection

(d) Vascularity - bleeding or bruising
(i) Ecchymosis - collection of blood in subcutaneous tissues causing purple discoloration
(ii) Petechiae - small hemorrhagic spots caused by capillary bleeding

(e) Lesions - note presence of wounds, scars, rash, etc.
(f) Note skin temperature and moisture - normally warm and dry
(g) Skin turgor - fullness or elasticity of skin
(h) Edema - excess fluid in tissues characterized by swelling with shiny skin
(i) Edema scale
0 = None
+1 = Trace
+2 = Moderate
+3 = Deep
+4 = Very deep

(2) HEENT - Head, eyes, ears, nose, throat (inspection and palpation)
(a) Head - size, shape, symmetry, tenderness
(b) Eyes

(i) Symmetry, alignment and movement of eyes, eyelashes, eyebrows, eyelids, pupils
(ii) Visual acuity and peripheral vision
(iii) Pupils are normally black, equal in size, round, smooth

(c) Ears
(i) Hearing; shape, size, symmetry of external ear
(ii) Palpate external ear for pain, edema, lesions
(iii) Ear canal should be smooth and pinkish - examine for wax, discharge, foreign bodies

(d) Nose/sinuses
(i) Assess for nasal patency by occluding one nostril at a time
(ii) Examine mucous membranes for color, presence of exudate, growths
(iii) Inspect nasal septum for intactness, deviation
(iv) Palpate frontal and maxillary sinuses for pain, edema

(e) Throat - inspect lips, gums, teeth, tongue, hard and soft palates
(i) Uvula normally centered and freely movable
(ii) Tonsils normally small, pink, symmetrical in size

(3) Nervous System / Neurological Assessment
(a) Mental Status
(i) Orientation level - person, place, time
(ii) Observe patients' appearance, general behavior, response to questions, ability to speak clearly
(iii) Note memory recall - short and long term
(b) Pupillary reaction to light, accommodation, convergence
(c) Motor ability - note abnormal balance, gait, or coordination
(d) Sensory function - response to pain, light touch

(4) Thorax and Lungs (Respiratory)
(a) Inspection
(i) Shape of chest
(ii) Breathing patterns
(iii) Rate of respirations
* Bradypnea: Rate less than 12 respirations per minute
* Tachypnea: Rate greater than 20 respirations per minute
* Dyspnea: Breathlessness or difficult breathing
* Orthopnea: Shortness of breath when lying down
* Kussmaul: Faster and deeper respirations than normal without pauses
* Cheyne-Stokes: Cyclic pattern which progresses from slow and shallow to fast and deep with a gradual return to

slow and shallow respirations, followed by a period of apnea

(b) Palpation - detect areas of sensitivity, chest expansion during respiration

(c) Auscultation - auscultate anterior and posterior fields (upper, middle, and lower lobes)

(i) Rales (crackles): fizzing sound produced by moisture in airways

(ii) Rhonchi: Coarse, gurgling sound in bronchial tubes - low pitched - resulting from air flow across passages which are narrowed by fluids, tumors, swelling

(iii) Wheezes: Type of rhonchi - squeaky sound - high pitched

(iv) Cough: Note whether the cough is productive or non-productive and character of secretions

(5) Cardiovascular System

(a) Inspect the neck and epigastric areas for visible pulsations

(b) Palpate

(i) Pulses

(ii) Edema

(iii) Capillary refill:

* Acceptable - < 3 seconds

* Abnormal or sluggish - > 3 seconds

(c) Auscultate - Heart sounds

(a) Rate - per minute

(b) Rhythm - regular or irregular

(6) Gastrointestinal

**NOTE:** Be sure the patient has an empty bladder and that he/she is lying flat with knees slightly flexed.

(a) Inspect the general contour of abdomen

(i) Flat

(ii) Protuberant

(iii) Concave

(iv) Note local bulges/scars, note color of scars

(b) Auscultate

**NOTE:** This is done before palpation because the latter may alter the character of bowel sounds.

(i) Note character of bowel sounds (clicks and gurgles produced by movement of air and flatus in GI tract)

* Auscultate each of four quadrants in a clockwise systematic manner

* Normal frequency ranges from 5-34 bowel sounds per minute, described

as audible, hyperactive, hypoactive, or inaudible

**NOTE:** Listen for 5 minutes in order to distinguish inaudible from audible bowel sounds.

(c) Palpate all four quadrants and note:
- (i) Muscular resistance
- (ii) Tenderness
- (iii) Enlargement of organs
- (iv) Masses

**NOTE:** Appetite, usual elimination patterns, character of stool, recent changes, artificial orifices, and use of laxatives should be assessed during the interview.

(7) Genitourinary
- (a) History of urinary elimination
  - (i) Unusual patterns of elimination
  - (ii) Recent changes
  - (iii) Aids to elimination
  - (iv) Present or past voiding difficulties
- (b) Inspection
  - (i) Urine
    - * Color
    - * Clarity
    - * Odor
  - (ii) Urethral orifice for signs of inflammation/discharge
  - (iii) Always inspect testis if patient presents with abdomen pain or urinary tract symptoms
- (c) Palpate suprapubic areas and note:
  - (i) Tenderness
  - (ii) Distension

(8) Musculoskeletal
- (a) Inspection and palpation
  - (i) Gait
  - (ii) Muscles
    - * Bilateral symmetry
    - * Tenderness
    - * Strength/tone
  - (iii) Joints
    - * Note active/passive range of motion (ROM) - Joint movements include flexion, extension, hyperextension, abduction, adduction, pronation, supination.
    - * Palpate joints and note - Pain, swelling, nodules, crepitation (grating sound heard on movement)

(iv) Bones
* Note normal contour or prominences, symmetry
* Document pain, enlargement, and changes in contour

***Guidelines for documentation of physical assessment***

Each body system is assessed for normal and abnormal findings, and documentation should occur in an organized manner
Data should be recorded legibly using correct grammar
Use only standard approved medical abbreviations
Subjective data should be recorded using patient's own words
Do not record data using nonspecific terms, i.e. adequate, good, normal, poor, large - be specific

**Nursing Documentation**

**TERMINAL LEARNING OBJECTIVE**
Using approved forms, accurately document patient status, vital signs and care rendered using the SOAPE format.

**Purposes**

(1) Primary - Insures that AMEDD personnel have a concise and complete medical history of active-duty personnel
(2) Assists AMEDD officers in advising commanders on personnel use and retention
(3) Appraises Army-wide physical fitness and readiness
(4) Communication - a means of communicating and sharing information on the patient's status throughout the hospitalization with health care team members
(5) Legal documentation - a legal document and admissible in court as evidence
(6) Patient care planning - each professional working with the client has access to the client's baseline and ongoing data. Client responds to the treatment plan from day-to-day is documented. Modifications of the plan of care are then based on this data.
(7) Audit - patient records may be reviewed to evaluate the quality of care received and to improve the quality of care as indicated
(8) Research - patient records may be studied by researchers to learn how best to recognize or treat health problems
(9) Education - clinical manifestations of particular health problems, effective treatment methods, and factors affecting client goal achievement are documented
(10) Historic document - past information may be pertinent concerning a patient's healthcare
(11) Reimbursement record - insurance companies, Medicare, and Medicaid require written record of treatments, equipment, and diagnostic procedures before they pay the agency
(12) Decision - analysis-information from the medical record review can be used to provide information for strategic planners to identify needs and/or resources

**Confidentiality of medical information**

(1) Medical confidentiality of all patients will be protected as fully as possible.
(2) Medical information used for disease
    (a) Diagnosis
    (b) Treatment
    (c) Prevention
(3) Access given to
    (a) The patient
    (b) Patient care personnel
    (c) Medical researchers
    (d) Medical educators

(4) Personnel not involved in a patient's care or in medical research will not have access to patient information unless the following situations apply -
  (a) Access required by law (court order)
  (b) Access needed for hospital accreditation
  (c) Access authorized by patient
(5) Disclosure of medical information
  (a) All requests done in writing except in emergency situations
  (b) Handled by patient administrator
  (c) Not provided by the 91W

***Medical Record Documentation Procedures***

**Required procedures for making entries**

(1) Legibly typed or handwritten
(2) In black or blue black ink
(3) Signed by the individual who made the entry
  (a) Military personnel - Sign with full payroll signature, rank, MOS, branch of service
  (b) Civilians - Sign with full payroll signature, title, GS (paygrade)
(4) Date in day-month-year sequence
(5) Capitalized at the beginning
(6) Written with present or past tense verbs
(7) Recorded ASAP
(8) Abbreviated IAW AR 40-60
(9) Must be clear, concise, and objective
(10) Include patient identification on patient identification block. Use addressograph or write information legibly.
  (a) Name
  (b) Rank
  (c) Social security number
  (d) Ward/clinic
  (e) Admission date/date of visit
  (f) Hospital register number (in patient's only)

**Correction procedures for an entry error**

(1) DO -
  (a) Draw a single line through information
  (b) Write "Error," the date, and your initials above entry or follow local SOP
(2) DO NOT -
  (a) Erase or use correction fluid
  (b) Skip lines
  (c) Write between lines
  (d) Chart for someone else
  (e) Leave blank lines above signature

***Content of Medical Record Entries***

Done by direct patient care providers

**Nursing Entries on the Patient Record**

(1) Concise, comprehensive nursing assessment
(2) Up-to-date care plan individualized to the client
(3) Nursing notes
(4) Flow sheets
(5) Graphic sheets
(6) Medication records
(7) Intake and output record
(8) Physician and nursing discharge summary
(9) Other components of patient record include admission sheet, patient history, physician's orders and progress notes, consultations, and laboratory and x-ray reports

**Types of Nursing Documentation (Chart)**

(1) Source-oriented record
  (a) Separate form for each group of health care (e.g., nursing, medical, laboratory, x-ray department)
  (b) Chronological notes are kept on each form
  (c) Easy to find record and continue CHARTING
  (d) Record of care is fragmented and difficult to trace overall care
  (e) If the Kardex-Care plan is not retained, the care plan must be duplicated in a narrative format
(2) Focus charting
  (a) Patient-centered approach to organizing the narrative portion of the medical record
  (b) Column format to separate topic words or "focus" statements from the body of the note
  (c) Enhances communication among health team members
  (d) Quality improvement auditing more efficient
(3) Charting by exception is a short hand documentation method
  (a) Must have well-defined standards of practice;
  (b) Only significant findings and „exceptions" are documented n narrative notes
  (c) Requires well-established guidelines and clinical experience to identify exceptions
  (d) Advantages: Decreased charting time, greater emphasis on pertinent data, standardized assessment, and enhanced communication within the healthcare team
(4) Flow sheets are used with almost all charting formats for documentation of routine care and repeated monitoring
  (a) Recognized as a useful tool for efficiency
  (b) Data retrieval easier for quality improvement monitoring

(c) Pertinent items from the flow sheet are summarized into the patient care record
(d) Duplicate charting is discouraged

(5) Computer charting
(a) Computer capacities are in operation for the admission assessment tool
(b) Key client data is automatically recorded
(c) Adds to the client data base as new data are identified and modifies the plan of care accordingly
(d) Receives a work list indicating the treatment, procedures, and medications necessary for the client throughout the shift
(e) Documents care immediately using the computer terminal at the client's bedside

(6) Problem-Oriented Medical Record (POMR) emphasizes the patient and his or her health problems
(a) All health professionals record on the same forms
(b) Interdisciplinary team works together in identifying a master list of client problems
(c) Logical way in which to organize information
(d) A "problem" is a condition that requires further observation, diagnosis, assessment, and intervention
(e) A care plan is developed, based on the identified problem

**SOAP/SOAPIE Documentation**

(1) S: Subjective Data
(a) What the patient tells you about his problem
(b) Usually expressed in the patient's own words. For example, "My throat hurts", or "I am in pain from my broken leg." Patient may have many complaints.
(c) Important to record exactly what the patient states is the problem

(2) O: Objective Data
(a) Observations made by the 91W that support or are related to the subjective data
(b) Record what you observe about the patient. For example, the patient in pain may speak with a loud, agitated voice, or his facial expressions (grimace) might indicate pain. He may be guarding the painful area. Or he may be very quiet and not moving much which would aggravate the pain. Vital signs may indicate increased pain such as pulse is elevated or blood pressure is elevated.
(c) Important to record all observations made of the patient to include any physical findings

(3) A: Assessment
(a) This is your interpretation of the patient's problem/condition
(b) Subjective and objective data is carefully analyzed to reach conclusions regarding the patient's complaint or problem

(4) P: Plan
  (a) The plan for dealing with the problem/compliant or situation is recorded here
  (b) This may include comfort measures, pharmacological interventions, notifying the physician, patient education, etc.
  (c) Your plan should be concise and should reflect all the information gathered to this point
(5) Some documentation formats include the I (Intervention) and E (Evaluation) in addition to the SOAP acronym
(6) I: Intervention
  (a) This is your plan of action carried out as described
  (b) For example, patient was medicated with 50 mg of Demerol for his complaint of leg pain rated as 10/10
  (c) Be sure to record all interventions
(7) E: Evaluation
  (a) This is a record of the effectiveness of your plan and intervention
  (b) For example, patient states that his leg pain is now rated 5/10 30 minutes after receiving the Demerol
  (c) Important to record patient's response to the intervention whether the intervention was successful or not
  (d) Unsuccessful intervention requires re-assessment of the problem.
(8) Documentation should be concise, factual, organized and contain pertinent information

**Record special procedures (diagnostics, therapeutic, nursing)**
(1) Time
(2) Name of procedure
(3) Person performing procedure
(4) Instruction to patient
(5) Description of what was done
(6) Lab, x-ray reports
(7) Patient's condition before, during and after procedure. This is extremely important.

**Record all medications and/or treatments**
(1) Record vital signs (TPR/BP) before and after all treatments
(2) Record all medications and/or treatments with responses

**Record discharge note**
(1) Date
(2) Time
(3) Manner (ambulatory, wheelchair, stretcher)
(4) Accompanied (parents, ward personnel)
(5) Medications and/or treatments with schedules
(6) Discharge information instructions
(7) Statement that address patient's understanding of discharge plan
(8) Follow-up visits

**End of Shift Reporting**

(1) Means of communication between the outgoing and incoming staff of each shift
(2) A change of shift report if given by a primary RN or caregiver to the primary RN or caregiver replacing him or her
(3) May be given in written form, orally in a meeting, or may be audiotaped
(4) Information shared during the end of shift report should include:
  (a) Basic identifying information about each patient-name and current diagnosis
  (b) Current health status to include changes in medical condition and patient's response to medical therapy
  (c) Current orders (especially newly changed orders or new medications)
  (d) Diagnostic tests or schedule surgeries
  (e) Summary of each newly admitted patient including his or her diagnosis, age, plan of treatment, and general condition

***Medical Record Forms***

**SF 600 - chronological record of medical care**

**SF 511 - chronological inpatient record of TPR, BP and weight**

**DD Form 792, 24 hour I & O worksheet**

(1) Chronological record of intake (front side of SF 511) -
  (a) Oral intake
  (b) IV intake
  (c) irrigation
  (d) Blood products
(2) Chronological record of output (back side of SF 511) -
  (a) Urine
  (b) Nasogastric
  (c) Chest
  (d) Emesis
  (e) Stools
  (f) Other

**SF 558 - Used instead of SF 600 in emergency rooms**

**SF 510, Nursing notes**

**Other forms**

(1) Lab slips
  (a) Miscellaneous
  (b) Chemistry

(c) Urinalysis
(d) Hematology
(e) Culture

(2) Special procedure forms
(a) SF 519-B x-ray request
(b) SF 520 EKG request
(c) Be sure to write the provider's name as well as the name and phone number of the ward/clinic sending the request on all request forms!

**(3) Sick-Call forms (Refer to LP Perform Medical Screening C191W017)**
(a) DA Form 5181-R Screening of acute medical care
(b) DD Form 689 Individual sick slip

Introduction to Composite Health Care System (CHCS)

**The Composite Health Care System (CHCS) provides world-wide automated medical information system support to all MTFs in providing comprehensive, high quality health care to uniformed service personnel, retirees and dependents.**

**Functions performed by CHCS**

(1) CHCS serves more than 9 million beneficiaries of the U.S. military health care worldwide
(2) CHCS is installed in more than 700 DOD hospitals and clinics providing health care to the men and women of the armed services and their dependents, veterans, and the retired military community
(3) CHCS:
(a) Shorter waits for patients
(b) Faster reporting of diagnostic test results
(c) Improved use of the medical and professional resources
(d) Significant improvements in the quality of patient care
(4) CHCS Functions:
(a) Patient registration, admission, disposition, and transfer
(b) Inpatient activity documentation
(c) Outpatient administration data
(d) Appointment scheduling
(e) Laboratory
(f) Drug/laboratory test interaction
(g) Quality assurance
(h) Radiology
(i) Clinical dietetic administration
(j) Pharmacy
(k) Results reporting and order entry
(l) Ad Hoc reporting
(m) Managed Care
(n) Interfaces to 40 other clinical and administrative systems

**Benefits to Medical Professionals**

(1) For the health care professional, CHCS saves staff time and increases job performance and satisfaction
(2) CHCS offers medical professionals:
  (a) Immediate notification of test results
  (b) Improved drug inventories, allowing pharmacies to monitor shelf life and drug quantities
  (c) Reduced paperwork
  (d) Improved accuracy of laboratory and radiology results
  (e) Easy access to complete patient care information and administrative data
  (f) Better quality control with enhanced capabilities for monitoring productivity and quality assurance data
  (g) Increased productivity and utilization management control
  (h) Improved communication with administrative staff and other health care professionals
  (i) Improved clinic administration
  (j) Improved documentation and accountability for patients' medication orders
  (k) Better utilization of staff resources due to improved scheduling
  (l) Systematic tracking of a patient's treatment course

**Cost Benefits**
(1) CHCS reduces costs by eliminating duplication and tracking of data to assist in determining the most successful medical strategies
(2) CHCS provides:
  (a) Immediate access to information, allowing prompt evaluation of cost effectiveness and resource utilization
  (b) Systematic tracking of a patient's treatment course, thereby reducing duplicative services, tests, and drug orders
  (c) Treatment pattern comparisons, helping providers to determine the most successful and cost-effective clinical protocols
  (d) Improved data collection for outcome studies

**Benefits to Patients**
(1) On the patient level, CHCS increases quality of care by providing complete, accurate, and secure information about patients and their care
(2) CHCS means:
  (a) Authorized users can immediately access private, personal medical records, thus facilitating appropriate patient care and saving lives in emergency situations
  (b) Improved access to health care services due to better scheduling and resource utilization
  (c) Fewer repeated tests and examinations thanks to improved reporting and data management
  (d) More responsive scheduling and handling of appointments

(e) More personal service from MTF staff and health care providers
(f) Improved health care professional/patient relationships
(g) Shorter waits for pharmacy services
(h) Fewer delays in receiving radiology and lab tests and results
(i) Constantly updated and accurate patient registration information
(j) Greater patient satisfaction with service and results
(k) Facilitates enrollment to TRICARE programs

**TERMINAL LEARNING OBJECTIVE**

Give the necessary medical equipment in a holding or ward setting, provide casualty care as part of an integrated team in a Minimal Care Ward by administering medication to a casualty without causing further injury or illness.

**Drug effects-mechanism of action**

(1) Predictable chemical reaction-how the drug works
(2) Changes the physiological activity of the body as the drug bonds chemically at a specific site called a receptor site
(3) Mechanism of actions of drugs include
  (a) Drugs that fit the receptor sites well with a good chemical response are called „agonists“
  (b) Drugs that attach at a receptor site and become chemically inactive with no drug response is called an „antagonist“
  (c) Drugs that attach at a receptor site and produce a slight chemical reaction are called „partial agonists“

**Drug actions**

(1) Therapeutic effects
  (a) Expected positive effect of drug
  (b) Single medication may have many therapeutic effects such as aspirin which is an analgesic, reduces inflammation, reduces fever and reduces clot formation
  (c) Some drugs have very specific effects such as antihypertensive medications have a therapeutic effect of controlling high blood pressure. Antibiotics treat bacterial infections.
(2) Side effects
  (a) Unintended secondary effects
  (b) May or may not be harmful to the patient
  (c) Side effects of a drug may outweigh the benefits
  (d) Patients may stop taking a drug because of unpleasant side effects, i.e. codeine prescribed to control coughing but causes constipation.
(3) Toxic effects
  (a) Caused by intake of high doses of medications, ingestion of drugs not intended to be ingested, such as topical medications, or when a drug accumulates in the system due to impaired metabolism or excretion
  (b) May be lethal, depending on the action of the drug
  (c) Usually seen in accidental poisonings and intentional drug overdoses i.e., intentional ingestion or accidental administration of a large amount of a narcotic may cause severe respiratory depression and death.
(4) Allergic Reactions
  (a) Unpredictable response to a drug
  (b) May be mild or severe

(c) Mild allergic reactions include hives, rash, pruritus (itching of the skin), rhinitis (stuffy, runny nose) and wheezing.
(d) Severe or anaphylactic reactions are characterized by sudden constriction of the bronchiolar muscles, swelling the throat, severe wheezing and shortness of breath. Without immediate life saving measures, this reaction progresses rapidly and death can occur within minutes.
(e) Always ask patient about allergies to medications. Check unconscious patients for a medical alert bracelet or medal indicating a medication allergy prior to administering medications

(5) Drug tolerance and dependence
(a) Occurs when the patient receives the same drug for long periods of time and requires higher doses to produce the same effect.
(b) For example, patients who take pain medications over a long period of time may develop a tolerance for the drug and require higher doses to achieve the same effect.

(6) Drug interactions:
(a) One drug modifies the action of another drug. Drug interactions are common in patients who take many medications
(b) A drug may potentiate or diminish the action of other drugs
(c) May alter the way a drug is absorbed, metabolized or eliminated from the body
(d) Drug interactions may or may not be desirable. For example, combining alcohol with other central nervous system depressants is not desirable. Combining diuretics and vasodilators act together to lower blood pressure in a desirable way.

**Routes of drug administration**

**Non-parenteral medication administration**

(1) Drugs are introduced into the body by different routes, each serving a specific purpose
(2) Oral administration of medications is the most common method
(a) Advantages
(i) Convenience
(ii) Economy
(iii) The drug need not be absolutely pure or sterile
(iv) A wide variety of dosage forms are available
(b) Oral medications include tablets, capsules, liquids, and suspensions
(c) Disadvantages include
(i) Inability of some patients to swallow
(ii) Slow absorption
(iii) Partial or complete destruction by the digestive system
(d) Other routes associated closely with oral administration

(i) Sublingual - under the mouth
(ii) Buccal - The drug is placed between the cheek and gum and is quickly absorbed directly into the blood stream

(3) Inhalation
(a) The introduction of medications through the respiratory system in the form of a gas, vapor, or powder
(b) Divided into three major types:
(i) Vaporization - the drug is changed from a liquid or solid to a gas or vapor by the use of heat, such as steam inhalation
(ii) Gas inhalation- almost entirely restricted to anesthesia
(iii) Nebulization - the drug is nebulized into minute droplets by the use of compressed gas

(4) Topical Ointments
(a) Examples of topical preparations
(i) Creams
(ii) Lotions
(iii) Shampoos
(b) Topical application serves two purposes:
(i) Local effect-the drug is intended to relieve itching, burning, or other skin conditions without being absorbed into the bloodstream and
(ii) Systemic effect-the drug is absorbed through the skin into the bloodstream.
(iii) Example: Nitroglycerin paste

(5) Suppositories
(a) Rectal is preferred to the oral route when patient is
(i) Nauseated or vomiting
(ii) Unconscious, uncooperative, or mentally incapable
(b) Vaginal suppositories, creams, or tablets are examples of vaginal preparations that are inserted into the vagina to produce a local effect

**Parenteral medications are those introduced by injection**

(1) All drugs used by this route must be
(a) Pure
(b) Sterile
(c) Pyrogen-free (pyrogens are products of the growth of microorganisms)
(d) Liquid state

(2) Several types of parenteral administration
(a) Subcutaneous
(i) The agent is injected just below the skin's cutaneous layers
(ii) Example: Insulin
(b) Intradermal

(i) The drug is injected within the dermis
(ii) Example: Purified protein derivative (PPD)

(c) Intramuscular
(i) The drug is injected into the muscle
(ii) Example: Procaine penicillin G

(d) Intravenous
(i) The drug is introduced directly into the vein
(ii) Example: Intravenous fluids / antibiotics

(e) Intrathecal/intraspinal
(i) The drug is introduced into the subarachnoid space of the spinal column

**Bulk and Unit Dose Medications**

**Bulk drugs**

(1) Commonly called floor stock or clinic stock
(2) Description - large quantity of drug from which individual medication dose is removed
(3) Storage guidelines
(a) Once individual dosage is removed, it can NEVER be returned to bulk container
(b) Individual dosage drawn from bulk drug container will be disposed of IAW local SOP
(c) Some medications require controlled temperature storage ranges

**Unit dose**

(1) Description - single dose of a drug in a tablet, capsule, liquid, or injectable form that is prepackaged by the pharmaceutical company or pharmacy
(2) Storage guidelines
(a) Normally found in medication cart
(b) If still in original wrapper/unused condition, can be returned to medication cart/storage

**Internal and topical (external) medications must be stored separately to prevent accidental use of the inappropriate medication**

(1) Injectable
(2) Ointments
(3) Tablets are stored on separate shelves

**Specific medications kept in secured (limited access) area**

(1) All narcotics
(2) All medications with abuse potential, e.g., diazepam (Valium)
(3) All pre-filled hypodermic needles and syringes

**Guidelines and Principles**

**General guidelines**

(1) Check the physician's/PA orders
(2) Wash hands prior to touching any medication
(3) Five patient rights
  (a) Right patient - verify patient's identity by comparing the patient's medical record, provider's orders, and the medical bracelet (hospital) or ask patient to state full name
  (b) Right medication - compare provider's orders, medication sheet, and medication label
  (c) Right dose - ensure amount of medication ordered by the provider is measured correctly (i.e., graduated medicine cup, syringe, number of tablets, number of milligrams, etc.)
  (d) Right time - administer medications at the prescribed time as per provider's orders
  (e) Right route - administer medication via the route specified in the provider's order (i.e., PO, IM, IV, etc.)
(4) Check medical records, allergy bands, medic-alert tags and ask patient for medication allergies

**Principles of Medication Administration**

(1) Only administer medication that you have prepared or received from the pharmacy as unit dose
(2) Be familiar with all potential medication effects, both therapeutic and non-therapeutic. This information can be found in the:
  (a) Manufacturer's medication insert that accompanies prepackaged medications
  (b) Local SOP
  (c) If available, Physicians Desk Reference (PDR) or RN's Drug Book

**CAUTION:** If there is any doubt about administering a medication, check with supervisor, nurse, physician, or pharmacist.

(3) Administration route and time will be followed IAW provider's orders

**WARNING:** NEVER alter medication dosage ordered by physician!

(4) If in doubt about medication dose, time, administration route, or if a medication is missing, check with supervisor, nurse, physician, PA or pharmacist
  (a) MD/PA's order and medication label DO NOT match exactly
  (b) Illegible medication label; return to pharmacy or follow local SOP
(5) Check all medications label 3 times to ensure that the correct medication is being prepared for administration

(a) When removing the medication or container from the storage area
(b) When preparing the medication dose
(c) When returning the container to the storage area

(6) Check the expiration date of the medication
(7) Handle only one medication at a time
(8) While administering medication, do not perform other duties (i.e., obtain vital signs, dressing changes)
(9) Prepare the prescribed dose of medication
(a) Tablet or capsules - transfer the prescribed dose of tablets or capsules to the medicine cup or if unit dose- open the package and give directly to the patient
(b) Liquids - pour the prescribed dose of liquid medication into the medicine cup. Small amounts of liquid medication should be drawn up in a syringe
(c) Powders - pour the correct dose of powdered or granulated medication into the medicine cup
(i) Pour the required amount of water or juice into a paper cup
(ii) Reconstitute the medication at the patient's bedside

**WARNING:** Never directly touch oral medications. Some medications can be absorbed through the skin, also the medication will become contaminated.

(iii) The medic may assist the patient in taking the medication if the patient is physically unable

**WARNING**: DO NOT administer oral medications to patients with a decreased level of consciousness. Check with supervisor for instructions.

**CAUTION:** Positive patient ID required prior to administering medication.

(10) Patient Identification
(a) Patient Identification (Hospital)
(i) Be sure the patient has received and wears an identification band
(ii) Check the information on the band to see that it is correct
(iii) Check the tag on the bed or wall and door, and make sure the patient is properly identified
(iv) Ask the patient to state his/her name
(v) Check patient ID band for medication allergies and other pertinent information
(vi) In a hospital environment, have patients return to their bedside to receive medication
(b) Patient Identification (Clinic)
(i) Have patient state name

(ii) Ask patient if he/she has any allergies to medications

**Dosage**

**Systems of drug measurement** (definitions)

(1) Metric System
- (a) Decimal system, each basic unit of measure is organized into units of 10
- (b) Basic units of measure are the meter (length), the liter (volume), and the gram (weight)
- (c) Small or large letters are used to designate the basic units:
  - (i) Gram = g or GM
  - (ii) Liter = l or L
- (d) Small letters are abbreviations for subdivisions of major units:
  - (i) Milligram = mg
  - (ii) Milliliter = ml

(2) Apothecary System
- (a) One of oldest systems of measurement
- (b) Seldom used, but some companies include apothecary measure in addition to the metric
- (c) Basic units of measure include grains (weight), and minims, drams, and ounces (volume)
- (d) Measurements are approximates and a 10% variance has become acceptable in preparation and administration of most medications
- (e) Uses roman numerals and fractions
  - (i) ss = ½
  - (ii) Abbreviation or symbol for a unit of measure is written before the amount of quantity

(3) Household measurements
- (a) Familiar to most people
- (b) Used when more accurate systems of measure are unnecessary
- (c) Basic units of measure include drops, teaspoons, tablespoons, cups, and glass for volume; and ounces and pounds for weight

**Dosage**

(1) A dose is the amount of medication to be administered

(2) Posology is the study of dosage and the criteria that influence it

(3) United States Pharmacopeia and National Formulary (USP-NF) states the doses given are the average therapeutic doses or "usual adult doses"

(4) The following terms are used in connection with doses:
- (a) Therapeutic dose

(i) Amount needed to produce the desired therapeutic effect
(ii) Also referred to as „usual adult dose„
(iii) Calculated on an average adult about 24 years old, weighing approximately 150 pounds

(b) Dosage range
(i) The range between the MINIMUM amount of drug and the MAXIMUM amount of drug required to produce the desired effect
(ii) Many drugs, such as antibiotics, require large initial doses that are later tapered to smaller amounts
(iii) MINIMUM dose, the least amount of drug required to produce a therapeutic effect
(iv) MAXIMUM dose, the largest amount of drug that can be given without reaching the toxic effect
(v) TOXIC dose, the least amount of drug that will produce symptoms of poisoning
(vi) Minimum lethal dose - The least amount of drug than can produce death

**Factors Affecting Dosage**

(1) Many factors that affect the dose, method of administration, and frequency of the dose
(2) Although a physician prescribes the amount to be given, you need to know how and why these quantities are determined
(3) Two primary factors that determine or influence the dose are age and weight
(4) **Age** is the most common factor that influences the amount of drug to be given
(a) An infant would require much less than an adult
(b) Elderly patients may require more or less than the average dose, depending upon the action of the drug and the condition of the patient
(5) **Weight** has a more direct bearing on the dose than any other factor, especially in the calculation of pediatric doses
(6) Other factors that influence dosage are:
(a) Genetic make-up: The genetic structure of the individual may cause peculiar reactions to medications in some patients
(b) Habitual use: Some patients must take medications chronically, causing their bodies to build up tolerance to the drug. This tolerance may require larger doses than their initial doses to obtain the same therapeutic effect.
(c) Time of administration: Therapeutic effect may be altered depending upon time of administration. Example: Before or after meals.
(d) Mode of administration: This has a definite impact on the dose. Example: Injections

**Principles**

**Patient observation**

(1) Remain with patient until medication is swallowed completely, injected, or applied topically
(2) If patient refuses medication
  (a) Remove medication from the patient's room
  (b) Report the omission to the nurse/supervisor
  (c) Offer the medication again in five minutes
  (d) If refused a second time, record the omission per SOP and document the reason for the omission in the nursing notes

**CAUTION:** DO NOT leave medications at the patient's bedside without a specific physician's order to do so.

(3) Observe for medication effects and/or side effects
  (a) Medical History
    (i) Before administering medications, review the patient’s medical history for possible indications or contraindications for medication therapy
    (ii) Disease or illness may place patient at risk for adverse medication effects
    (iii) Long-term health problems or surgical history may require medications
  (b) History of Allergies
    (i) Allergic to medication
    (ii) Food allergies should be documented
    (iii) If patient is allergic to shellfish, they may be sensitive to any product containing iodine such as Betadine or dyes used in radiological testing
  (c) Medication History
    (i) Length of time drug has been taken
    (ii) Current dosage schedule
    (iii) Any ill effects experienced
    (iv) Drug data: action, purpose, normal dosage, routes, side effects and nursing implications for administration and monitoring
(4) If the patient has an adverse reaction. (Rash, itching, and nausea/vomiting/diarrhea are common examples of adverse reactions.)

**WARNING:** Anaphylaxis is the most severe form of adverse reaction to a medication.
  (a) Stop dosage immediately
  (b) Assess patient's airway, breathing, circulation
  (c) Inform nurse/physician on duty immediately

**Medical documentation**

(1) Record administration of medication IAW SOP. Minimum information needed is
  (a) Name of medication given
  (b) Dosage of medication
  (c) Time given
  (d) Route of administration
  (e) Patient's reaction (effects/side effects)
  (f) Name of person who administered medication

(2) Record the omission of a medication on the appropriate medical forms whenever a scheduled medication is not administered IAW local SOP

**Medication Errors**

**Any event that causes the patient to receive inappropriate drug therapy (medications) or failing to receive appropriate drug therapy (medications)**

**Can be made by anyone involved in the prescribing (MD/PA), transcribing of the order, preparing and dispensing (pharmacist, RN, 91W) or administering the medication (RN, LPN, 91W)**

**Strict adherence to the five „rights“ of medication administration helps to prevent errors**

**Errors should be acknowledged as soon as they are discovered or known to have happened and reported immediately to the appropriate people for patient follow-up**

**Professional and ethical obligations to your patients mandate that you report all medication errors**

**TERMINAL LEARNING OBJECTIVE**

Give the necessary medical equipment in a holding or ward setting. You are providing casualty care as part of an integrated team in a Minimal Care Ward.

***Facts related to the pain experience***
Pain is the body's defense mechanism that indicates the person is experiencing a problem.

Classic definition of pain: Pain is an abstract concept which refers to a personal, private sensation of hurt, a harmful stimulus which signals current or impending tissue damage, and a pattern of responses which operate to protect the organism.

Leading nursing definition: Pain is whatever the experiencing person says it is, existing whenever he/she says it does.

***Origins of Pain***
**Physical Origin**
(1) Cutaneous pain
  (a) Superficial, usually involves the skin or subcutaneous tissue
  (b) Example: A paper cut that produces sharp pain with a burning sensation
(2) Somatic pain
  (a) Diffuse or scattered and originates in tendons, ligaments, bones, blood vessels, and nerves
  (b) Example: Strong pressure on a bone or damage to tissue that occurs with a sprain causes deep somatic pain
(3) Visceral pain
  (a) Poorly localized and originates in body organs (thorax, cranium, abdomen)
  (b) Visceral pain usually presents as referred pain, which is perceived in an area distant from the point of origin
  (c) Example: Pain associated with a myocardial infarction is frequently referred to the neck, shoulder, or left arm

**Psychogenic pain**
(1) Physical cause for the pain cannot be identified
(2) Pain can be just as intense as pain that results from a physical origin
Responses to Pain
Physiologic (involuntary)
(1) Sympathetic response- moderate and superficial
  (a) Increased blood pressure, pulse, and respirations
  (b) Pupil dilation
  (c) Muscle tension and rigidity
  (d) Pallor
  (e) Increased adrenaline output
  (f) Increased glucose
(2) Parasympathetic response to severe and deep pain
  (a) Nausea and vomiting
  (b) Fainting and unconsciousness

(c) Decreased blood pressure
(d) Decreased pulse rate
(e) Prostration - a condition of extreme exhaustion and inability to exert oneself further, as in heat prostration or nervous prostration
(f) Rapid and irregular breathing

**Behavioral**

(1) Moving away from painful stimuli
(2) Grimacing, moaning, and crying
(3) Restlessness
(4) Protecting the painful area and refusing to move

**Affective**

(1) Examples - exaggerated weeping and restlessness, withdrawal, anxiety, depression, and fear
(2) Person's past experience with pain and sociocultural background play an important role in emotional responses to pain
(3) Emotions tend to intensify the reactions to pain
(4) Explains why similar circumstances causes a different pain responses in different groups of people

**Acute Versus Chronic Pain**

(1) Acute pain
  (a) Generally rapid onset
  (b) Varies in intensity from mild to severe
  (c) May last for a brief period up to a period of 6 months
  (d) Protective in nature, warns of tissue damage or organic disease
  (e) Once underlying cause is resolved, pain disappears
  (f) Examples: pricked finger, sore throat, post surgical pain
(2) Chronic pain
  (a) Last 6 months or longer and interferes with normal functioning
  (b) May be limited, intermittent or persistent

***Factors Affecting the Pain Experience***

**Culture**

(1) Cultures vary in what is an acceptable response to pain
(2) An assessment of the cultural influences of:
  (a) The meaning of the pain event
  (b) Ways in which patient choose to demonstrate and cope with the pain experience
  (c) Responsibilities in pain relief

**Religion**

(1) Religion can effect patient's views on their pain experience
(2) Some see pain as a purifying experience. This becomes a sense of strength for them. these patients might refuse pain medications.
(3) Pain might be viewed as a punishment from God. These patients might become angry and resentful.

**Anxiety and other stressors**

(1) Anxiety leads to muscle tension and fatigue which can also increase pain intensity
(2) Factors which may increase anxiety:
  (a) Strange environment in the hospital
  (b) Support people not available
  (c) Fear of the unknown

**Past pain experience**

(1) Whether the patient has experienced pain in the past and qualities of that experience profoundly affect new pain experiences
(2) Some patients have never known severe pain and have no fear of pain. Patients who have had severe pain without adequate pain relief may have increase sensitivity to pain

***Components of Pain Assessment***

**Characteristics of pain (PQRST)**

(1) Provokes pain
  (a) Aggravating factors
  (i) Question the patient on what makes the pain increase
  (ii) Example: "Does your pain become worse upon exertion?„
  (b) Alleviating factors
  (i) Ask patient to describe what makes pain go away or lessen.
  (ii) Determine what pain relief methods have worked in the past. For how long these pain relief methods used?
(2) Quality
  (a) Encourage the patient to descriptive words to describe his/her pain
  (b) Examples: sharp, stabbing, pressure, dull, aching
(3) Radiation (Location)
  (a) Instruct the patient to point the area of pain. Patients with chronic or visceral pain might have difficulty localizing specific area.
  (b) Clearly document areas of pain. Utilize a diagram of the body to be more specific if needed.
(4) Severity
  (a) Since pain is subjective, it is very important to have patients rate the pain they are experiencing. This becomes extremely important when assessing the effectiveness of pain medications.
  (b) Various scales may be used. One example is a 0-10 scale:

0 No Pain
1
2 Mild Pain
3
4
5 Moderate Pain
6
7 Severe Pain
8
9

10 As bad as it can be Pain
(c) Ask patient to rate pain at various stages
(i) At its worse
(ii) At its least
(iii) After pain medication

(5) Time
(a) Duration
(i) Ask how long the patient has been experiencing the pain
(ii) If pain is intermittent, ask how long the pain lasts and how often does pain occur
(b) Chronology
(i) Have the patient describe how the pain first began
(ii) Question if the pain has change since the onset
(iii) Identify if the pain is worsening or improving
(iv) Is the pain intermittent or constant?

(6) Associated phenomena
(a) Identify if there were any factors that seem to relate consistently to the pain
(b) Examples: Increased anxiety before pain begins

**Physiological responses**

(1) Sympathetic stimulation – occur with acute pain
(2) Parasympathetic stimulation - with prolonged severe pain
(3) Responses to watch: Vital signs, skin color, perspiration, pupil size, nausea, muscle tension, anxiety

**Behavioral Responses**

(1) Posture, gross motor activities
(a) Assess if the patient guards an area
(b) Does the patient make frequent position changes?
(c) Posture and gross motor activities increased in acute pain, might be absent with chronic pain
(2) Facial features - Does the patient have a pinched look? Are there facial grimaces? Look of fatigue?
(3) Verbal expression - Does patient sigh, moan, scream, cry, repeat same words?

***Methods used in the Relief of Pain***

**Non-pharmocologic relief measures**

(1) Distraction
(a) Techniques for distraction
(i) Visual - Staring at an object or spot and describing it in detail, reading or watching television
(ii) Auditory - listening to music
(iii) Tactile/Kinesthetic – Holding or stroking a loved one, pet, or toy, rocking back and forth, slow breathing

(iv) Project Distraction – Playing a games, creative work, writing in a journal
(b) Requires the patient to focus on something other than the pain
(c) Best used before the pain starts or becomes moderate to severe. Is not to be used as the only intervention for severe pain. Can be used as adjuvant treatment.

(2) Imagery – example of mind-body interaction-concentrates on an image that involves one or all of the senses , gradually becomes less aware of the pain. Does not work as the only intervention for severe pain.

(3) Relaxation - techniques to relieve anxiety and reduce stress. Includes listening to music while taking slow deep breaths and consciously relaxing each muscle group. Should be utilized early in the pain experience. Patient should practice technique.

**Pharmocologic**

(1) Non-narcotic analgesics (aspirin, Tylenol, NSAIDS)
(a) Used for mild to moderate pain
(b) Works best on muscle and joint pain.
(c) Produces analgesia at the peripheral nervous system.
(d) Major Side-effects: Nausea, vomiting, increased bleeding tendencies.

(2) Narcotic analgesic (morphine, codiene, demerol)
(a) Used for severe pain.
(b) In sufficient dose, considered capable of relieving pain, in most cases
(c) Analgesia produced at the central nervous system
(d) Major side-effect: Respiratory depression, sedation and addiction

(3) Adjuvant analgesics (antidepressants, anticonvulsants)
(a) Used usually in combination with opioids especially when there is a neurologic component as one of the causes of the pain.
(b) Mechanism of action not clearly understood, may block pain transmission or may suppress abnormal nerve endings from injury to nerve tissue (anticonvulsant).

**91W Solider Medic' s Role in Pain Management**

**Obtain a thorough baseline pain assessment**

**Assess pt's beliefs and misconceptions regarding pain management**

**Provide patient education regarding pain management regime**

(1) Assure the patient that every step will be taken to treat their pain effectively. Do not let the patient think he/she is being left alone to DEAL with the pain.

(2) Correct any misconceptions regarding pain medication that the patient might have. Reinforce information regarding newly prescribed medication.

In the hospitalized patient, document the patient's response to the pain medication. This is very important for the ongoing accurate assessment of the patient's pain.

When administering narcotic analgesia, monitor for signs and symptoms of overdose, especially respiratory depression and severe sedation. Obtain baseline respirations before administering medication.

Inform health care team if pain management regime is not effective

**TERMINAL LEARNING OBJECTIVE**

Given a patient/casualty with known symptoms the soldier medic will be able to identify and use available drugs.

***Sources of Drugs***

**Plants**
(1) Belladonna
(2) Opium

**Animals**
(1) Heparin
(2) Insulin

**Minerals**
(1) Iodine
(2) Iron (Fe + 2)

**Microorganisms**
(1) Antibiotics--penicillin, tetracycline
(2) Vaccines

**Synthetics**
(1) Aspirin
(2) Acetaminophen

***Use of Drugs***

**Maintain health**
(1) Treatment of disease--antibiotics and chemotherapeutic (anticancer) agents are commonly used in medicine today
(2) To relieve symptoms--drugs which act to relieve symptoms but do not cure the patient. Instead, they help to make the patient more comfortable in order for the patient to work or function.

**Prevent disease**
(1) Immunization--vaccines and toxoids are used to prevent disease
(2) Nutrition--vitamins and minerals

**Diagnose disease-**
Radiopharmaceuticals are used to diagnose many diseases

**Prevent pregnancy**

***Factors that Affect the Desired Effect of a Drug***

**Age-**
As a general rule, the very young and the very old require smaller doses than the average adult

**Size-**

(1) Weight--obese or larger patients may require a higher dose of medication to achieve the same effect than a thin or smaller patient

(2) Surface area--this takes into account both the patients height and weight for the determining of the proper dose of medication. This method is more accurate than using just the patient's weight and is routinely used for antineoplastic (cancer) medications

**Sex-**

Females have more adipose (fat) cells than males, in proportion to their body weight. As a result, females may need higher doses of fat-soluble drugs to achieve the same effects. The utilization and metabolism of various hormones is also effected by gender.

**Time of administration-**

Time of day a medication is administered may alter the amount of drug that is absorbed. For example, many antibiotics are have a higher degree of bioavailability if taken before meals (on an empty stomach), while some actually work better if taken after a meal

**Drug interactions-**

Interaction between two or more drugs may affect the overall effectiveness of each drug

(1) Synergistic--the joint action of drugs. The combined effect is greater then the sum of the individual effects. (1 + 1 = 3)

(2) Additive--the combined effect is equal to the sum of the effects of the individual agents. (1 + 1 = 2) (i.e., 1 Aspirin and 1 Acetaminophen given together for fever.)

(3) Antagonistic--the combined effect is actually less then the action of either agent (1+1=0)

**Tolerance-**

After taking a medication for some time, a patient may require a larger dose to obtain the desired effect (opiates, cocaine, amphetamines, and barbiturates). This is especially true for narcotic analgesics. Cross-tolerance--the use of one drug can cause tolerance to another--addicts can develop tolerance to sedatives and anesthetics

**Genetic factors-**

Different ethnic groups may metabolize certain drugs at different rates

**Physical condition of patient-**

Weak, ill, or debilitated patients may require less medication. Patients in severe pain may require a higher dose of analgesics to relieve the pain

**Routes of administration-**

Route of administration may determine the rate of absorption, or the amount of drug that is metabolized

**Psychological condition of the patient-**

In some cases, if a patient believes that the medication will work, the patient may obtain a positive clinical response. This is termed the placebo effect

***Routes of Administration***

**Oral**

(1) Tablet; capsule; liquid
(2) Usually taken for systemic effect
(3) Must pass through stomach and be absorbed
(4) Delayed onset of action

**Sublingual**

(1) Dissolved under tongue
(2) Taken for systemic effect
(3) Rapid onset of action
(4) Avoids gut

**Buccal**

(1) Dissolved in pouch of cheek
(2) Taken for systemic effect
(3) More rapid onset of action than oral route, but less than sublingual route
(4) Avoids gut

**Rectal**

(1) Cream, suppository, or liquid
(2) Used for local and systemic effect
(3) Useful in unconscious or pediatric patients

**Vaginal/urethral**

(1) Cream or suppository
(2) Used for local effect
(3) Should not irritate tissue
(4) May be absorbed

**Inhalation**

(1) Sprays, gases, powders
(2) Used for local or systemic effect
(3) May be administered nasally or orally

**Topical**

(1) Sprays, creams, powders, gels, ointments, patches
(2) Used for local or systemic effect

**Parenteral**

(1) Advantages
    (a) By-pass the G.I. tract

(b) Rapid onset of action
(c) Prolonged action, depending on vehicle
(d) Used for local or systemic effects

(2) Disadvantages
(a) Painful to the patient
(b) Inconvenient
(c) Once medication is administered, you can't recover the drug
(d) May expose nursing staff to blood or body fluids

(3) Types of parenteral routes:
(a) Intravenous (I.V.)
(i) Most rapid onset
(ii) Drug injected directly into vein
(b) Intramuscular (I.M.)
(i) Drug injected deep into muscle
(ii) If aqueous base, absorption is rapid, but slower than the intravenous route
(iii) If oil base, absorption is slow
(c) Intradermal (I.D.)
(i) Drug injected into dermal layer of the skin
(ii) Used for diagnostic tests
(d) Subcutaneous (SQ/SC)
(i) Drug injected into the fatty layer below skin, but not into the muscle
(ii) Route is slower than the IM route, because the subcutaneous tissue is less vascular than the muscular tissue
(iii) Must be nonirritating or it may cause tissue necrosis
(e) Spinal (Intrathecal, Epidural, & Caudal) - Drug injected into or near the spinal cord

***Adverse Reactions to Drugs***

**Direct toxicity**

(1) Blood dyscrasias--damaging to the components of the blood (RBCs, WBCs, platelets etc.)
(2) Hepatotoxicity--damaging to the liver (liver is organ which detoxifies drugs)
(3) Nephrotoxicity--damaging to the kidney (kidney eliminates water soluble toxic agents)
(4) Teratogenicity--causes birth defects (drugs can cross the placental barrier. Fetus most

susceptible in first trimester of the female pregnancy. Referred to as teratogenic.)

**Allergic reactions--hypersensitivity**

(1) Caused by prior exposure to agent or similar drug-sensitization

(2) Reaction varies from rash to anaphylaxis

**Side effects**

(1) Most drugs affect more than one system

(2) Some side effects are minor, others are so distressing as to cause the patient to stop taking the drug (i.e. vomiting, diarrhea)

**Drug dependence**

(1) Psychological--patient convinced that he/she has a need for the drug. The mind tells the patient that they must have the drug to function normally

(2) Physiological--body develops a need for the drug, if drug is taken away, patient goes through withdrawal, tremors, nausea, vomiting, and convulsions. The body exhibits physical signs of the need for the drug. The classic example is a narcotic addict

***Medications for use by the Soldier Medic***

**Oral medications**

**For fever and pain**

(a) Acetaminophen-nonnarcotic analgesic and antipyretic

(i) Indications

* Mild pain
* Fever

(ii) Contraindications- patients with hypersensitivity to the drug

(iii) Side effects - rare

* May cause liver damage in high doses or unsupervised long-term use
* Patients should be warned that excessive ingestion of alcohol while using acetaminophen could result in severe liver damage.

(iv) Dosage

* Adults: 325-650 mg P.O. (by mouth) every 4-6 hours or 1 Gram every 6-8 hours as needed for fever or mild pain
* May also be given as a rectal suppository-650 mg every 4-6 hours as needed for mild pain or fever
* Maximum daily dose (24 hours) should not exceed 4 grams.

(v) Considerations
* Use cautiously in patients with history of chronic alcohol use-liver damage has occurred with therapeutic doses
* Many over the counter products contain acetaminophen. Be aware of this when calculating total daily dose

(vi) Common brand name: Tylenol

(b) Ibuprofen-nonsteroidal anti-inflammatory drug (NSAID)
(i) Indications
* Mild to moderate pain relief to include headaches (analgesia)
* fever reduction (antipyretic)

(ii) Contraindications
* Patients with hypersensitivity to the drug
* Patients with known ulcer disease

(iii) Side effects – Increases bleeding time for 8 hours
* Gastrointestinal (GI) pain
* Nausea
* Occult gastrointestinal bleeding

(iv) Dosage
* For mild to moderate pain 400-800 mg P.O. every 6-8 hours
* For fever, 200-800 mg P.O. every 6-8 hours
* Maximum daily dose (24 hours) 3200 mg.

(v) Considerations
* Take with meals or milk to reduce GI side effects
* Do not use with aspirin or alcohol, which may increase risk of GI reactions
* Serious GI bleeding can occur in patients taking NSAIDs despite absence of symptoms
* Patients should be taught the signs and symptoms of GI bleeding (dark, „tarry„ stools, „coffee ground„ or bloody emesis) and instructed to notify the MD/PA immediately if they occur.

(vi) Common brand names
* Motrin
* Advil
* Nuprin

**For cough, colds, and sinus allergies**

(a) **Actifed**- Combination of two drugs-psuedoephedrine HCL (decongestant) 60 mg and Tripolidine HCL (antihistamine) 2.5 mg.
(i) Indications
* Colds
* Nasal congestion
* Seasonal allergy symptoms

(ii) Contraindications
* Patients with hypersensitivity to psuedoephedrine or tripolidine
* Should not be given to patients with hypertension, acute asthma, peptic ulcer disease, severe coronary artery disease, arrhythmias, glaucoma, angina pectoris, severe cardiovascular disease or patients taking MAO (monoamine oxidase) inhibitors.

(iii) Side effects
* Can cause drowsiness, dizziness, dry nose, mouth and throat
* May cause restlessness, anxiety, nervousness or insomnia in some patients
* Some patients may experience photosensitivity skin reactions during prolonged sun exposure.

(iv) Dosage-one tablet p.o. (by mouth) every 8 hours

(v) Considerations
* Should be taken with food or milk to reduce gastrointestinal distress
* Patient should avoid alcohol, driving and other activities that require alertness until the CNS effects are known by the patient
* Dry mouth can be relieved with gum, hard candy or ice chips
* Advise patients to use sunblock for possible photosensitivity.

(vi) Common brand name: Actifed

(b) Pseudoephedrine HCL (decongestant)

(i) Indications-Symptomatic relief of nasal congestion associated with rhinitis and sinusitis and for eustachian tube congestion

(ii) Contraindications
* Hypersensitivity to Sudafed
* Severe hypertension
* Coronary artery disease
* Glaucoma
* Hyperthyroidism or for patients taking MAO inhibitors.

(iii) Side effects
* Transient restlessness
* Stimulation
* Tachycardia
* Nervousness
* Dizziness
* Dry mouth.

(iv) Dosage
* 30 - 60 mg P.O. every 4-6 hours for adults

* Maximum daily dose (24 hours) is 240 mg.

(v) Considerations
* Drug may act as a stimulant
* Avoid taking within 2 hours of bedtime
* Advise patient to stop taking medication if extreme restlessness occurs and consult MD/PA
* Advise patients that many over the counter (OTC) drugs may contain ephedrine or other sympathomimetic amines and might intensify the action of psuedoephedrine if taken together.

(vi) Common brand name: Sudafed

(c) Chlorpheniramine -antihistamine

(i) Indications-Symptomatic relief of rhinitis and seasonal allergy symptoms

(ii) Contraindications
* Hypersensitivity to antihistamines
* Lower respiratory tract symptoms
* Narrow-angle glaucoma
* Severe hypertension
* Severe cardiovascular disease
* Bronchial asthma
* Patients taking MAO inhibitors.

(iii) Side effects-Low incidence of side effects
* Drowsiness
* Dizziness
* Dryness of mouth and nose

(iv) Dosage
* 8 mg P.O. every 8 hours (t.i.d.)
* Maximum daily (24 hours) dose is 24 mg.

(v) Considerations
* Drug may cause drowsiness
* Driving and other potentially hazardous activities should be avoided until the response to the drug is known
* Avoid alcohol use when taking this drug. Antihistamines have additive effects with alcohol.

(vi) Common brand name: Chlor-Trimeton, CTM

(d) Robitussin (guiafenesin)

(i) Indications
* Used to liquefy thick tenacious sputum
* Expectorant

(ii) Contraindications-Contraindicated in patients with known hypersensitivity to the drug

(iii) Side effects-rare
* GI upset

* Nausea
* Drowsiness

(iv) Dosage
* 200-400 mg P.O. every 4 hours
* Maximum daily (24 hours) dose is 2,400 mg.

(v) Considerations
* Take medication with plenty of fluids to help liquefy secretions
* Persistent cough may indicate a more serious problem. Notify MD/PA if cough lasts longer than one week

(vi) Common brand name: Hytuss, Robitussin, Humabid

(e) Robitussin DM (Guaifenesin with Dextromethorphan) Antitussive/Expectorant

(i) Indications-Temporary relief of cough spasms in nonproductive coughs due to colds and flu

(ii) Contraindications
* Hypersensitivity to the drug
* Patients who have asthma
* Persistent or chronic coughs or in patients taking MAO inhibitors.

(iii) Side effects-Rare
* Dizziness
* Drowsiness
* Excitability, especially in children
* GI upset
* Constipation and abdominal discomfort.

(iv) Dosage
* 10-20 mg P.O. every 4 hours or 30 mg P.O. every 6-8 hours.
* Maximum daily (24 hours) dose is 120 mg.

(v) Considerations
* Drug produces no analgesia or addiction and little or no CNS depression
* Dextromethorphan 15-30 mg is equivalent to 8-15 mg codeine as an antitussive
* Patient should understand that a persistent cough might indicate a more serious problems
* Coughs lasting for longer than a week should be evaluated by a MD/PA.

(vi) Common brand names
* Robitussin DM

(f) Diphenhydramine (antihistamine)

(i) Indications

* Temporary symptomatic relief of various allergic conditions and to treat or prevent motion sickness and vertigo
* Used in anaphylaxis as an adjunct to epinephrine
* Used as a sedative

(ii) Contraindications
* Contraindicated in patients who have a known hypersensitivity to the drug
* Do not give if patient has acute asthma or an enlarged prostrate gland

(iii) Side Effects
* Drowsiness
* Dry mouth
* Palpitations
* Some patients may experience nervousness, restlessness and insomnia.

(iv) Dosage
* 25 to 50 mg P.O. three times a day (t.i.d.) or four times a day (q.i.d.)
* Maximum daily dose (24 hours) is 300 mg.

(v) Considerations
* May cause GI upset
* Administer with food or milk
* Warn patients about possible additive CNS depressant effects with concurrent use of alcohol
* Patient should not engage in activities that require alertness and coordination until response to the drug is known
* Drowsiness is most prominent during the first few days of therapy and often disappears with continued therapy
* The drug has an atropine-like drying effect, which makes it a popular drug for use with the common cold
* Antihistamines have no therapeutic effects on the common cold and may make expectoration more difficult because it thickens bronchial secretions
* Increase fluid intake while taking this drug.

(vi) Common brand name: Benadryl

**Emetics**

(a) Syrup of Ipecac

(i) Indications-To induce vomiting in poisoning or overdose by ingestion in a conscious patient

(ii) Contraindications
* Stupor or coma
* Absent gag reflex

* Seizures
* Pregnancy
* Children under 6, or if the following is ingested: corrosives, hydrocarbons, strychnine or iodides

(iii) Side effects
* The risk of aspiration from vomiting is present.
* If the drug is not vomited, it may cause GI upset, diarrhea or slight CNS depression
* May cause persistent vomiting. Syrup of ipecac can be cardiotoxic if not vomited

(iv) Dosage - only given under orders of MD/PA
* Children 3-5 teaspoons, Adults 1-2 tablespoons P.O.
* Follow administration of the drug with 1-2 glasses of tepid water. Do not give milk products
* May repeat the dose in 20 minutes if no results

(v) Considerations
* Drug should be recovered by gastric lavage and activated charcoal if vomiting does not occur following the second dose
* Notify MD/PA immediately if vomiting does not occur. If poisoning has occurred, call a poison control center or emergency room or contact an MD/PA before using ipecac syrup
* Do not exceed the recommended dosage.

(vi) Common brand name: Syrup of Ipecac

**Antidiarrheal**

(a) Kaopectate Tabs
(i) Indications-Acute nonspecific diarrhea
(ii) Contraindications - Patients with known hypersensitivity to the drug and in patients with dysentery or suspected bowel obstruction
(iii) Side effects-constipation
(iv) Dosage
* 1.2 to 1.5 grams P.O. after each loose bowel movement
* Not to exceed 9 grams in 24 hours

(v) Considerations
* Use cautiously in patients with dehydration
* Encourage adequate fluid intake to compensate for fluid loss from diarrhea
* Do not use if diarrhea is accompanied by fever or blood or mucous in the stool.

(vi) Common brand names: Kaopectate, Donnagel

(b) Immodium
  (i) Indications-Acute nonspecific diarrhea
  (ii) Side effects-constipation
  (iii) Dosage
    * 2 - 2mg tabs, followed by 1 tab after each loose stool
    * Not to exceed 8 tablets a day
    * Do NOT give for bloody diarrhea

**Antacids**

(a) Calcium Carbonate Tabs
  (i) Indications
    * Used for relief of transient symptoms of hyperacidity as in acid indigestion and heartburn
    * Also used as a calcium supplement.
  (ii) Contraindications
    * Patients with hypercalcemia and hypercalciuria
    * Should also not be used in patients with calcium loss due to immobilization, severe renal disease, renal calculi, and GI hemorrhage or obstruction or cardiac disease.
  (iii) Side effects
    * Constipation or laxative effect
    * Acid rebound
    * Nausea
    * Flatulence.
  (iv) Dosage
    * 0.5-2 grams P.O. 4-6 times/day when used as an antacid
    * For use as calcium supplement 1-2 grams P.O. every 8 or every 12 hours
  (v) Considerations
    * When used as an antacid, take one hour after meals and at bedtime
    * Acid rebound, which generally occurs after repeated use of antacids for one or two weeks, can lead to chronic use
    * Caution patient not to use antacids for more than two weeks without medical supervision
  (vi) Common brand names: Tums, Caltrate, Os-Cal

***Injectable medications***

**For pain**
(a) Morphine (analgesic, narcotic (opiate) agonist)
  (i) Indications

* Symptomatic relief of severe acute pain after nonnarcotic analgesics has failed
* Also used to relieve pulmonary edema and the pain of myocardial infarction

(ii) Contraindications
* Patients with known hypersensitivity to the drug or to opiates
* Patients with increased intracranial pressure(head injuries), severe respiratory depression, acute bronchial asthma, convulsive disorders, chronic pulmonary diseases and undiagnosed acute abdominal conditions

(iii) Side effects
* Drowsiness
* Pruritus (itching)
* Respiratory depression
* Euphoria
* Disorientation
* Nausea
* Vomiting
* Constipation
* Occasionally patients will experience nervousness, restlessness, or insomnia
* Urinary retention may occur

(iv) Dosage
* 2.5-15 mg intravenous (IV) every 4 hours
* 1 –2 mg IV doses titrated to pain relief
* May also be given intramuscularly (IM) or P.O. (by mouth). IM dosage is 5-20 mg IM every 4 hours
* Oral dosage is 10-30 mg every 4 hours

(v) Considerations
* Monitor for respiratory depression
* Evaluate patient frequently for pain relief
* Patients who are ambulatory may experience nausea and orthostatic hypotension when moving from a supine to an upright position.
* Note: Morphine sulfate is a Schedule II Controlled Substance

(vi) Common brand name: Duramorph, MS Contin(oral)

**For chemical agent poisoning**

(a) Atropine INJ 0.7 ml

(i) Indications- used to treat a chemical agent poisoning

(ii) Contraindications-None when used for life threatening emergencies

(iii) Side effects

* Blurred vision
* Headache
* Pupillary dilatation
* Dry mouth
* Thirst
* Flushing of the skin
* Difficulty in urination

(iv) Dosage-0.5 to 1.0 mg

(b) Diazepam –Anticonvulsant (CANA)

(i) Indications
* Used to treat status epilepticus
* Used for short term relief of anxiety symptoms, to allay anxiety and tension prior to surgery, dental procedures and endoscopic procedures
* Used alleviate acute withdrawal symptoms of alcoholism

(vii) Contraindications
* Patients with known hypersensitivity to the drug
* Should not be given to patients in profound shock, coma, acute alcohol intoxication, or with depressed vital signs

(viii) Side effects
* Drowsiness and sedation
* Possible hypotension
* Depressed level of consciousness
* Some patients may become restless or agitated after administration of the drug.

(ix) Dosage
* For seizures/status epilepticus-5 to 10 mg IV (preferred), or IM if IV route not available
* May repeat every 10-15 minutes as needed up to a maximum of 30 mg
* For anxiety, the oral route is preferred and the dose is 2-10 mg P.O. anywhere from 2- 4 times a day depending on response.

(x) Considerations
* Don't mix diazepam with other drugs and don't store in plastic syringes
* IV route is the most reliable parenteral route
* IM administration is not recommended because absorption is variable and injection is painful
* Give IV not to exceed 5 mg a minute. Avoid the use of small veins, as this drug is very irritating and can cause phlebitis.

(xi) Common brand name: Valium

(c) Ativan (Lorazepam)
    (i) Indications
        * Anxiety disturbances or anxiety states: general anxiety disturbances panic disturbances phobic anxiety disturbances
        * Adjustment disturbances with anxiety or stress reaction
    (ii) Contraindications
        * Assess patient periodically
        * Safety and efficacy in children under the age of 12 has not been established
    (iii) Dosages
        * ADULT dose for anxiety is: 2mg - 3mg daily in 3 - 4 divided doses
        * RANGE: 1mg - 6mg daily in divided doses
        * ELDERLY/DEBILITATED PATIENTS: Initial dose of 1mg - 2mg/day in divided doses. Adjust as needed and tolerated.
        * In elderly and/or debilitated patients and in those with serious respiratory or cardiovascular disease, a reduction in dosage is recommended
        * In the case of local anaesthesia and diagnostic procedures requiring patient co-operation, concomitant use of an analgesic is recommended.
        * Ativan sl: Dosage of ativan sublingual should be individualized for maximum effect.
    (iv) Pre medication
        * The night before the procedure: The recommended dose is 1 - 2 mg
        * Pre-procedure: The recommended average adult dose is 2mg administered 1 - 2 hours before the procedure
        * If a heightened sedative effect is desired, a dose of 0.05mg/kg to a maximum of 4mg may be used
(d) 2-PAM Cl
    (i) Indications
        * Relieves the symptom of skeletal neuromuscular blockade
        * Simultaneous administration of atropine is required
    (ii) Contraindications
        * Can produce drowisness, headache, disturbance of vision, nausea, dizzziness, tachycardi and anincrase in blood pressure, hyperventilation and muscular weakness

**For anaphylaxis**

(a) Epinephrine 1:1000(1 mg/1cc) -bronchodilator

(i) Indications-Used for bronchospasm, hypersensitivity (allergic) reactions and anaphylaxis
(ii) Contraindications
* Patients with known hypersensitivity to the drug
* Patients with narrow-angle glaucoma, hemorrhagic, traumatic or cardiogenic shock, cardiac arrhythmias or coronary insufficiency.
(iii) Side effects
* Nervousness
* Restlessness
* Palpitations
* Tremors
* Fear
* Anxiety
* Headache
* Hypertension
* Nausea and vomiting
(iv) Dosage-0.1-0.5cc SC (subcutaneous) every 15 minutes as needed to treat acute symptoms
(v) Considerations
* Drug of choice for acute anaphylactic reactions
* Patients allergic to insect stings should be taught to self administer epinephrine
* Closely monitor vital signs after administration of the drug.
(vi) Common brand names: Adrenalin Chloride, Epi-Pen

**Topical medications**

(a) Bacitracin Ointment-Local Anti-infective
(i) Indications-Used topically in the treatment of superficial infections of the skin.
(ii) Contraindications
* Contraindicated in patients with known hypersensitivity to the drug
* Patients allergic to neomycin may also be allergic to bacitracin
(iii) Side effects
* Itching and burning have also been reported with topical use.
(iv) Dosage-Apply a thin layer of ointment twice a day or three times a day.
(v) Consideration
* Watch for signs of local allergic manifestations such as redness, itching and burning
* Clean skin before applying the drug

(vi) Common brand names: Bacitracin

(b) Hydrocortisone 1% cream-topical anti-inflammatory
- (i) Indications-For relief of inflammation and pruritus associated contact dermatitis
- (ii) Contraindications-Patients with known hypersensitivity to the drug or its components
- (iii) Side effects
  - * Maceration of the skin
  - * Secondary infection
- (iv) Dosage - Apply ointment to affected area sparingly daily to four times a day until acute phase is controlled, then reduce dosage to one to three times weekly, as needed.
- (v) Considerations
  - * Gently wash skin before applying ointment
  - * Avoid applying near eyes or mucous membranes
  - * May be safely used on the face, groin, armpits and under breasts.
- (vi) Common brand names
  - * Cortizone-5
  - * Bactine Hydrocortisone
  - * Acticort 100

(c) Miconozole 2% cream-anti-fungal
- (i) Indications-Used to treat tinea pedis (athlete's foot), tinea cruris and tinea corporis
- (ii) Contraindications-Contraindicated in patients with known hypersensitivity to the drug.
- (iii) Side effects
  - * Skin irritation
  - * Burning
  - * Maceration
  - * Allergic contact dermatitis.
- (iv) Dosage-Apply sparingly twice a day to the affected area for 2-4 weeks.
- (v) Considerations
  - * Instruct patient how to cleanse area prior to application of cream
  - * Apply sparingly in skin-fold areas and massage in well to prevent maceration.
- (vi) Common brand names: Micatin

(d) Clortrimozole Cream- Anti-fungal
- (i) Indications-Used to treat dermal fungal infections, tinea pedis, tinea cruris and tinea corporis
- (ii) Contraindications-Patients with known hypersensitivity to the drug or its components
- (iii) Side effects

* Stinging
* Erythema
* Edema vesication
* Pruritis and urticaria

(iv) Dosage-Apply small amount to affected area twice a day, A.M. and P.M., or as directed by the physician.

(v) Considerations
* Apply to dry skin
* Cleanse skin thoroughly before applying the medication
* Signs of clinical improvement should be anticipated within one week of use. Report signs of condition worsening, skin irritation or no improvement after 4 weeks of therapy

(vi) Common brand names: Lotrimin, Mycelex

(e) Dibucaine Ointment-local anesthetic

(i) Indications-Used for temporary relief of pain and itching due to hemorrhoids and other anorectal disorders, nonpoisonous insect bites, sunburn, minor burns, cuts and scratches.

(ii) Contraindications-Patients with known hypersensitivity to the drug or its components.

(iii) Side effects
* Skin irritation
* Contact dermatitis
* Rectal bleeding (suppository use)

(iv) Dosage
* Apply skin cream or ointment to affected areas, as needed (max 1 oz in 24 hours)
* Insert rectal ointment morning and evening and after each bowel movement.

(v) Considerations
* The cream preparation is water soluble and therefore should be applied after bathing or swimming
* Caution patient to use medication only as directed
* Medication is intended only for temporary relief of mild to moderate itching or pain

(vi) Common brand names: Nupercainal

***Antibiotics***

**Penicillin**

(a) Indications

(i) Penicillin administered intravenously is a primary drug of choice for bacterial meningitis if this disease is caused by sensitive strains of

meningococci or pneumococci. Further important indications for an intravenous penicillin treatment are an endocarditis caused by streptococcus viridans, other streptococcal infections (severe pneumonia, arthiritis), neurosyphilis, actinomycosis, anthrax, and clostridium infections.

(ii) Smaller doses are administered intramuscularly. A streptococcal pharyngitis can be treated with a single injection of a benzylpenicillin slow release preparation (if available). Erysipelas, diphtheria, pneumococcal pneumonia, and primary syphilis infections can also be treated intramuscularly. Secondary prophylaxis of rheumatic fever has become very rare.

(iii) Orally administered Penicillin VK is a "painless" alternative for streptoccal infections. It can be considered in the early stages of Lyme disease if doxycycline is contraindicated.

(b) Contraindications: None except hypersensitivity to penicillin

(c) Cautions: If a meningococcal infection is suspected, parenteral penicillin therapy ought to be started as quickly as possible.

(d) Adverse Reactions

(i) Severe penicillin hypersensitivity with anaphylactic shock is very rare and occurs mostly in connexion with parenteral administration (5 to 10 cases on 10000 treated subjects). The emergency treatment is based primarily on epinephrine (and, in addition, maybe intravenous corticosteroids).

(ii) Hypersensitive skin reactions (skin rashes, urticaria) are frequent (1 to 7% of the treated subjects). A sterile abscess can occur at the area of the i.m. injection. Hemolytic anemia, nephritis, and liver granuloma are very rare complications. Massive i.v. doses are associated to a risk of an electrolyte and volume overload.

(iii) Oral preparations occasionally cause nausea, vomiting, or diarrhea.

(e) Risk groups

(i) Pregnant women: Can be given. Penicillin is considered the safest antibiotic during pregnancy.

(ii) Nursing mothers: Can be given. Concentrations in breast milk are relatively low. The risk of an alteration of the child's intestinal flora or of a hypersensitivation cannot be excluded.

(iii) Children: Intravenously for severe infections: 0.2 to 0.5 million I.U./kg/day in 4 to 6 doses. Oral (penicillin V): 100,000 I.U./kg/day in two doses (a maximum of 1.5 million I.U./day).

(iv) Elderly people: No dose reduction is necessary if renal functions are normal.
(v) Renal failure: Creatinine clearance less than 50 ml/min: reduce dose by 25 to 50%; clearance less than 10 ml/min: reduce dose by 50-75%.
(vi) Liver insufficiency: No dose adjustment necessary

**Doxycycline (Oral)**

(a) Indications
  (i) Doxycycline is effective for selected infections of the upper respiratory tract or of the (genito-) urinary tract
  (ii) Particularly well suited for atypical pneumonia (as long as a legionella infection can be excluded), for disease following chlamydia trachomatis (non-gonorrheal urethritis, acute urethral syndrome, venereal lymphogranuloma, etc.), for rickettsial diseases (Rocky Mountatin spotted fever, Q fever), for cholera, and for anthrax. Doxycycline can be applied in stage I of Lyme disease. The efficacy for papulopustular acne is also well documented.
  (iii) Doxycycline is considered an alternative drug for syphilis when there is e.g. a hypersensitivity to penicillin.
  (iv) Recommended as a follow-up treatment to a single dose of ceftriaxone for the treatment of possible chlamydia infections in context with gonorrhea
  (v) Used in combination with other antibiotics for acute adnexites caused by mixed infections
  (vi) Used for the prophylaxis of traveler's diarrhea
  (vii) Also considered for the prevention or treatment of multiresistant malaria (e.g. in Thailand)
(b) Contraindications
  (i) Pregnant women: Disturbances in the development of the teeth and bones of the fetus. Can be hepatotoxic for the mother in isolated cases.
  (ii) Nursing mothers: Most specialists allow breast-feeding: it appears only in small amounts in breast milk; risks for child and mother are probably minimal.
  (iii) Children: Contraindicated before the age of eight! (Staining of the teeth and possibly disturbed bone growth.) Older children: 2 to 4 mg/kg/day, may be divided into two doses.
  (iv) Renal failure: Some authors recommend a dose reduction when there is severe insufficiency
(c) Adverse Reactions

(i) Approximately 3 to 4% of the treated subjects complain about nausea
(ii) Abdominal pains and diarrhea are less common
(iii) Esophageal ulcerations have been observed after the administration of doxycycline capsules (do not take before retiring to bed!)
(iv) Like other tetracyclines, doxycycline can lead to staining of the teeth and bone problems in the developing age. Allergic skin reactions occur in about 2%
(v) Doxycycline can cause a cutaneous photosensitivity - inform patient increase risk of sunburn, sensitive to sun and to wear sunscreen

(d) Interactions
(i) Concomitant administration of antacids, calcium-, magnesium-, and iron-salts has a chelating effect and therefore causes a reduced absorption of the antibiotic
(e) Caution: Doxycycline can also be injected intravenously

**Cefazolin (Injection)**

(a) Indications
(i) Respiratory infections caused by S.pneumoniae, Klebsiella, H.influenzae S.aureus, group A beta-haemolytic streptococci
(ii) Genito-urinary infections caused by E.coli, P.mirabilis, Klebsiella, some strains of enterococci and Enterobacter
(iii) Skin and soft tissue infections due to S.aureus, and group A beta- haemolytic streptococci and other strains of streptococci
(iv) Biliary tract infections due to E.coli and Klebsiella species
(v) Bone and joint infections due to S.aureus.
(vi) Septicaemia due to S.pneumoniae, S.aureus, P.mirabilis, E.coli and Klebsiella species
(vii) Endocarditis due to S.aureus and group A beta-haemolytic streptococci. Appropriate culture and susceptibility studies should be performed to determine susceptibility of the causative organism to cefazolin.
(viii) Peri-operative prophylaxis: Cefazolin is useful in pre-operative, intra-operative and post-operative prophylaxis in various surgical procedures.This is especially effective in reducing the post-operative infections due to contaminated or potentially contaminated surgical procedures. The preoperative use of cefazolin may also be effective in surgical patients in whom infection at the operative site would present a serious risk. The prophylactic administration of cefazolin should

usually be discontinued within a 24-hour period after surgical procedure. NOTE: Susceptibility studies should be performed.

(ix) Bacteriology

* Staphylococcus Aureus (penicillin sensitive and resistant)
* Group A beta-haemolytic streptococci and other strains of streptococci (many strains of enterococci are resistant)
* Escherichia coli
* Proteus mirabilis
* Klebsiella species
* Enterobacter aerogenes
* Haemophilus influenzae

(b) Contra-Indications

(i) Cross sensitivity to Penicillin. About 10% of people allergic to penicillin will also be allergic to Cefozolin

(ii) Hypersensitivity to cephalosporins

(iii) Safety in pregnancy, lactation and infants under one month of age has not been established and as such is not recommended

(c) Dosage: Management of overdose

(i) Rx: Symptomatic and supportive

(d) Side-Effects

(i) Drug fever
(ii) Skin rash
(iii) Vulvar pruritis
(iv) Nausea
(v) Vomiting
(vi) Anorexia
(vii) Diarrhea
(ix) Genital and anal pruritis
(x) Genital moniliasis and vaginitis
(xi) Phlebitis at the site of injection and after I/M administration, pain at site of injection

(e) Precautions:

(i) Allergic reaction warrants immediate withdrawal of the drug with appropriate treatment.

(ii) Caution in patients with penicillin sensitivities as cross sensitivity has been noted.

(iii) Prolonged use may cause overgrowth of non-susceptible organisms.

(iv) Caution in patients with low urinary output because of impaired renal function. A lower daily dose is required.

(v) Pseudomembranous colitis has been reported with broad spectrum antibiotics including cefazolin, therefore it is important to consider it's diagnosis in patients who develop diarrhea in association with

it's use. Such colitis may be life threatening and appropriate measure should be taken, including discontinuation of the anti-biotic

(vi) Pregnancy:

* Safety in pregnancy, lactation, premature infants and infants under one month has not been established.
* Many cephalosporins have been used in pregnancy without any apparent ill effect to the mother or fetus.

(f) Brand Name

(i) Ancef®

(ii) Kefzol