The Pearls for NCLEX Review Course

The **MOST** important comprehensive resource your students need to assist them in successfully preparing for the **NCLEX** examination.

Educational Concepts, LLC.

Contact us today to schedule your school’s comprehensive 3-Day NCLEX Review Course.

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The Pearls for NCLEX Review is written by a long-term educator and clinician who recognizes the need to teach in ways that enhance the retention of information. The course is designed for both RN and PN students with specific content areas identified. It encompasses their entire nursing program and all the HESI and NCLEX review books and puts it into one manual of over 300 pages and presented with over 1,200 visuals to enhance the retention of the material.

The program is loaded with pathophysiology, pharmacology, lab abnormalities, diagnostics, and clinical correlation pieces. A review of the following is incorporated into this interactive seminar:

* Test taking hints
* Fundamental skills
* Mental health issues
* Pulmonary system
* Infections in acute care
* Acid base overview & review
* Connective tissue disorders
* Gastrointestinal system
* Reproductive system
* Pediatrics
* Laboratory testing, normal and abnormal values for each system

* Professional development
* Principles of nutrition
* Endocrine system
* Cardiovascular system
* Renal & urological systems
* Musculoskeletal system
* Neurological system
* Accessory organs
* Maternity nursing
* Pharmacologic principles of med administration

We invite you to preview our comprehensive review course which prepares students with test taking techniques and the knowledge to pass the NCLEX exam on their first attempt.

The following pages includes excerpts from our program and highlights some of the teaching techniques used including fill-in-the-blank, group work, diagrams, fact-filled tables, “bubble hints”, pneumonics, and memory hints.

We have also included student comments from the countless programs we have conducted to help them successfully pass their NCLEX Exam.

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Answering Priority Setting Questions

Prioritization is a key component of the exam. Students must know the order to assess clients when managing a team and they must be able to prioritize interventions. Areas reviewed include Key words, Maslow, ABCDs, triage, nursing process, and at risk clients. Numerous questions are then presented to enhance the use of these concepts.

**Key Words** are used frequently to make the student think “priority” and what to chose first. These may include:

- Initial
- Essential
- Vital
- Immediate
- Highest
- Best
- Most
- Priority

**Maslow’s Hierarchy** may be used to determine priority. Physiologic and safety needs must be met first.

- Physiologic: Need for food, shelter, water, sleep, oxygen, and sexual expression.
- Safety: Avoiding harm, having security and order, and physical safety.
- Love and belonging: Giving and receiving affection and companionship, identification with a group, respect of others, self esteem, and success in work.
- Self-actualization: Fulfillment of potential.

**ABCD’s** is frequently used to determine assessment and intervention priorities.

- Airway
- Breathing (and oxygen)
- Circulation is assessed by checking:
  - _____________________ and
  - _____________________
- Disability is assessed by checking: ________________

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**Student Comment:** “Excellent instructor. Very knowledgeable with good tips to help remember everything and great clinical examples to reinforce knowledge.”
Triage: Think of a stop light to determine which clients to see and treat first.

* Red: Critical client. Stop and treat them immediately.

* Yellow: Could be seriously ill. Caution in assessment. Treat them in 30-60 minutes.

* Green: Go ahead and move to the next client. See in a few hours.

* Black: Dead or dying.

**“Treat those who are salvageable first”** in triage situations.

Nursing Process to determine what to do first and how to proceed.

* Assessment and data collection are priority unless the client is critical and then an intervention may be needed.

* Establish the nursing problems using Maslow.

* Plan and implement interventions using ABCD.

* Evaluate the response or outcome.

* Notify the physician when:
  ⇒ There is a complication or critical development
  ⇒ They are not progressing like they should be

At Risk Clients to determine priority for assessment and interventions

* Procedures or injuries to vascular organs by determining mechanism of injury, organ location and clinical manifestations demonstrated.

________________   _______________     ______________

* Determining clients who are unstable with the identification of key clinical signs.

_______________________      _________________________
_______________________      _________________________

“Treat those who are salvageable first” in triage situations.

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Diverse Teaching Strategies

Various teaching strategies are used throughout the program to enhance student involvement and comprehension to keep them engaged. All conditions are reviewed using a pathophysiologic approach with more than 1,200 visuals to assist in understanding the disease process. Bullet points and concise definitions allow for quick review and better retention of material covered.

Chronic Renal Failure: A chronic and progressive condition where renal function is lost. Those with end stage renal failure require dialysis to live. Renal failure is a GFR 15% to 29%. End-stage is GFR < 15%.

Uremia or azotemia: High BUN and creatinine levels from protein metabolism. Will be seen in end stage renal failure. Must restrict protein in these clients. GFR is the most reliable indicator of the level of protein consumption.

Lab abnormalities

_____K⁺  _____pH and HCO₃⁻  
_____Phosphorus  _____Sodium  
_____Magnesium  _____Blood sugar  
_____Calcium  _____Albumin levels  
_____RBC  _____Protein in urine  
_____PT, PTT  _____Uric acid

Clinical manifestations of renal failure are related to four pathological processes:

♦ Anemia
♦ Accumulation of waste products
♦ Fluid retention
♦ Suppression of the immune system

Think about these pathological processes and how they will manifest in your clients.

Then review the complete table included for you.

Student Comment:
“The practice questions helped to identify tips to rule out answers. Very helpful acronyms and pneumonics.”

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Clinical Manifestations of Chronic Renal Failure:

<table>
<thead>
<tr>
<th>Skin changes</th>
<th>Gastrointestinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Gray-bronze or yellow skin</td>
<td>* Metallic or ammonia taste and breath odor</td>
</tr>
<tr>
<td>* Pallor related to anemia</td>
<td>* Stomatitis</td>
</tr>
<tr>
<td>* Uremic frost</td>
<td>* Increase dental caries</td>
</tr>
<tr>
<td>* Pruritis</td>
<td>* Anorexia</td>
</tr>
<tr>
<td>* Excoriations</td>
<td>* Increased gastric acid</td>
</tr>
<tr>
<td>* Ecchymosis and purpura</td>
<td>* Diarrhea or constipation</td>
</tr>
<tr>
<td>* Thin, brittle nails</td>
<td>* May develop hepatitis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cardiovascular</th>
<th>Central nervous system</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Hypertension</td>
<td>* Memory problems</td>
</tr>
<tr>
<td>* Acceleration of ASHD</td>
<td>* Mental clouding which may progress to confusion</td>
</tr>
<tr>
<td>* Increased risk of AMI and CVA</td>
<td>* Flat affect</td>
</tr>
<tr>
<td>* Heart failure</td>
<td>* Depression</td>
</tr>
<tr>
<td>* Pericarditis</td>
<td>* Irritability</td>
</tr>
<tr>
<td>* Pericardial effusion</td>
<td>* Stupor and coma</td>
</tr>
<tr>
<td>* Cardiac dysrhythmias</td>
<td>* Seizures</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Respiratory</th>
<th>Peripheral nervous system</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Thick sputum, depressed cough</td>
<td>* Neuropathies</td>
</tr>
<tr>
<td>* Uremic breath odor</td>
<td>* Loss of motor function</td>
</tr>
<tr>
<td>* Kussmaul’s respirations</td>
<td>* Foot drop</td>
</tr>
<tr>
<td>* Pleural effusions</td>
<td>* “Burning feet” syndrome</td>
</tr>
<tr>
<td>* Increased risk of pneumonia</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reproductive</th>
<th>Autonomic nervous system</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Impotence in men</td>
<td>* Poor blood pressure control</td>
</tr>
<tr>
<td>* Decreased libido</td>
<td>* Orthostatic hypotension</td>
</tr>
<tr>
<td>* Amenorrhea</td>
<td></td>
</tr>
<tr>
<td>* Infertility in women</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hematologic</th>
<th>Musculoskeletal</th>
</tr>
</thead>
<tbody>
<tr>
<td>* Anemia</td>
<td>* Impaired mobility</td>
</tr>
<tr>
<td>* Platelet dysfunction</td>
<td>* Loss of muscle mass</td>
</tr>
<tr>
<td>* Suppressed immune system</td>
<td>* Osteomalacia</td>
</tr>
<tr>
<td></td>
<td>* Osteoporosis</td>
</tr>
</tbody>
</table>

Student Comment:
“The course is straight to the point and everything I needed to review is in one resource book.”
Bullet Points & Bubble Hints

Bullet points are used throughout to give students a quick and easy way to remember clinical manifestations and treatments. Bubble hints are used to provide fun ways to remember facts.

Post-Operative Complications:

Work together with a partner and identify which conditions in the box are early and late complications.

<table>
<thead>
<tr>
<th>Early complications</th>
<th>Late complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>__________________</td>
<td>__________________</td>
</tr>
<tr>
<td>__________________</td>
<td>__________________</td>
</tr>
<tr>
<td>__________________</td>
<td>__________________</td>
</tr>
</tbody>
</table>

Atelectasis is complete or partial collapse of the lung. Normal perfusion but decreased ventilation. Stasis of secretions leads to bacterial growth and pneumonia.

* Develops 24-48 hours postoperatively

Possible Complications
- Hypoxia
- Pulmonary embolus
- Atelectasis
- Pneumonia
- Hypovolemic shock
- Problems with the wound
- Ileus

Clinical Manifestations
* Dyspnea
* Tachypnea
* Tachycardia
* Fever
* Decreased breath sounds
* Asymmetrical chest movement
* Increased restlessness

Interventions
* Cough & deep breathe & incentive spirometry
* Suction if necessary
* Medicate for pain
* Ambulate & change positions frequently
* Bronchodilators

Student Comment:
“Fantastic class! It moved along quickly with the material which is well detailed in the book. Loved the fill-in-the-blank areas to keep our attention and spontaneous group activities to change the pace of the class.”
Pneumonia

Clinical Manifestations
- Tachypnea
- Shallow respirations
- Crackles
- Productive cough
- Hypoxia
- Asymmetrical chest movement
- Fever
- Leukocytosis
- Tachycardia

Deep Vein Thrombosis

Clinical Manifestations
- Unilateral swelling
- Pain in the leg
- Possible redness

Hypovolemic Shock

Clinical Manifestations
- Tachypnea
- Tachycardia
- Weak pulse
- Cool, clammy skin
- Restless
- Decreased urine output
- Increased bleeding
- Thirst
- Decreased CVP
- Hypotension

Pulmonary Embolism

Clinical Manifestations
- Tachypnea
- Tachycardia
- Increased anxiety
- Dyspnea
- Chest pain
- Blood tinged sputum
- Diaphoresis
- Decreased orientation
- Hypotension
- ↓ CO2 and ↑ O2 initially on ABGs

Student Comments:
- “This was an awesome class. Very knowledgeable instructor who really brought everything together for me.”
- “Amazing instructor! Easy to listen to and kept our (my) attention throughout the entire time!”
Problems with the Incision

**Wound Dehiscence:** Separation of incision.

Type of incision most likely: ___________________________

**Wound Evisceration:** Evidence of bowel through the incision with increased pain. Those at risk include:

- Elderly
- Diabetic
- Obese
- Malnourished
- Prolonged paralytic ileus

**Wound Infection**

- Incisions will be red due to inflammation.
- Red with purulent drainage means a local infection which is usually staph or strep.
- Elevated WBC and fever indicates a systemic infection.

“Quick-and Dirty” Methods

Students appreciate the easy ways to remember numerous facts and conditions using “Quick & Dirty”. The hints are used for retention of information for the exam and readily transferred into the clinical environment for easy retention and application to practice.

Vital Signs in Pediatrics: In the pediatric population, respiratory and heart rates must be measured. Document the child’s behavior with vital signs such as crying, febrile, or other distress. Use the table on the right to remember “ballpark” normals for the age groups:

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Resp</th>
<th>Pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-16</td>
<td>16-20</td>
<td>60-90</td>
</tr>
<tr>
<td>5-10</td>
<td>18-22</td>
<td>70-110</td>
</tr>
<tr>
<td>3-5</td>
<td>20-25</td>
<td>80-120</td>
</tr>
<tr>
<td>2-3</td>
<td>20-30</td>
<td>80-130</td>
</tr>
<tr>
<td>1-2</td>
<td>25-35</td>
<td>100-150</td>
</tr>
<tr>
<td>0-1</td>
<td>30-60</td>
<td>100-160</td>
</tr>
</tbody>
</table>

**Quick & Dirty Normal's**

Can also use “Quick & Dirty” normal's. To remember the normal's, think 20, 30, 40. Then remember breaths to heart rate is 1:4.
**Acid Base Imbalances**

Can use R-O-M-E for interpretation

<table>
<thead>
<tr>
<th>R</th>
<th>Respiratory</th>
<th>pH ↑  PCO₂↓</th>
<th>Respiratory Alkalosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>Opposite</td>
<td>pH↓  PCO₂↑</td>
<td>Respiratory Acidosis</td>
</tr>
<tr>
<td>M</td>
<td>Metabolic</td>
<td>pH ↑  HCO₃↑</td>
<td>Metabolic Alkalosis</td>
</tr>
<tr>
<td>E</td>
<td>Equal</td>
<td>pH↓  HCO₃↓</td>
<td>Metabolic Acidosis</td>
</tr>
</tbody>
</table>

**Sample #1:**

pH=7.38  
PaCO₂=40  
HCO₃=24  

Interpretation: ________________________

**Sample #2:**

pH=7.10  
PaCO₂=35  
HCO₃=15  
PaO₂=62  
O₂ Sat=70%  

Interpretation: ________________________

Additional considerations:  
Check the electrolytes.  
Potassium will be ______

Immediate intervention: ________________________

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Student Comment:  
"Presented a lot of easy ways to remember points.  Great layout of information and very much to the point.  I will keep this material for a long time to go back and reference from and study."

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Extensive Lab Review

A comprehensive review of labs and “need to know” values is incorporated throughout the program. Values are given in ‘ball park’ ranges to help the student remember the normals. Lab ‘tid-bits’ are given to understand relationships and how they are affected in disease conditions. Lab abnormalities with disease pathology are reinforced throughout the course.

Labs to evaluate dehydration and renal function

**BUN:** Normal is 10-20. Not a great indicator of renal function. Will be high in renal dysfunction in conjunction with the creatinine.
- Used more often to evaluate dehydration.
- Value decreased in liver dysfunction because the liver can’t make BUN.

**Creatinine** < 1.2

**BUN** 10-20

**BUN : Ct ratio** 20:1

**Hemoglobin:** 12-18 (a dozen to a dozen and a half)

**Hematocrit (Hct):** 36-54. (Three times the normal hemoglobin)

**Specific gravity of urine:** Normal is 1.005-1.030. High values indicate dehydration. >1.020 indicates hypovolemia and need for early intervention.

**Sodium:** Normal is 135-145. Increases with dehydration.

**Lab tid bits and rules**

- Na⁺ and K⁺ exchange for one another
- K⁺ and H⁺ exchange for one another
- Na⁻ and Cl⁻ are buddies
- Ca⁺⁺ and Mg⁺ run together and HPO₄⁻ is opposite in the absence of disease
- K⁺ runs with Ca⁺⁺ and Mg⁺

**Student Comments:**

“Labs were **thoroughly covered** and then reviewed throughout the course. I have a much better understanding of them than ever before.”

“Thank you for the **Lab Review Card** given during the course. Very helpful for remembering the values and diagnostics.”

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Medication Administration

Techniques in the administration of medications are thoroughly reviewed to assist students in answering these questions. General and significant side effects for various classifications are presented along with interventions and nursing assessments.

Vastus Lateralis
* Large muscle in adults.
* Use in kids at any time, even < 3 years.

Ventrogluteal
* Preferred in adults due to sciatic nerve injury with dorsogluteal
* Use in kids > 3 years.

Deltoid
* OK for nonirritating meds in adults.
* Never in kids.

Gluteus Medius or Dorsogluteal
* Need to roll.
* Use in kids > 6 years.
* May cause sciatic nerve injury

Significant Side Effects with Drug Therapy

Neuroleptic malignant syndrome (NLMS)
♦ Potential reaction to medications such as:
  ⇒ Phenothiazines
  ⇒ Cyclic antidepressants
  ⇒ Olanzapine (Zyprexa)
  ⇒ Overdose of haloperidol (Haldol)
♦ Fatal hyperpyrexia with temperature elevation to 108°.
♦ Treatment:
  ⇒ Dantrolene (Dantrium) (Musculoskeletal relaxant)
  ⇒ Bromocriptine (Parlodel) (Anti-Parkinson drug)
Drug Classifications

Each classification of medication includes action, side effects, toxic effects when appropriate, targeted drugs and a complete list of medications for review. Drug therapy can also affect lab values in numerous ways and these are included with each classification. In addition, nursing considerations with administration are reviewed.

Diabetic Agents

* Most frequently used to treat high blood sugars.

* The drugs may prevent the body from absorbing glucose in the gastrointestinal tract, increase the ability of insulin to work, or they may help to lower the blood sugar once it is elevated.

* Many drug interactions with these medications.

* Insulin pens increase accuracy of dose.

* Clumping, frosting, and precipitate is a sign of damage to a vial of insulin.

* Some of the oral drugs can cause gastrointestinal upset such as abdominal bloating, nausea, cramping, and diarrhea.

Types of insulin and times:

<table>
<thead>
<tr>
<th></th>
<th>Short acting</th>
<th>Intermediate acting</th>
<th>Basal insulin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>30 minutes</td>
<td>90 minutes</td>
<td>1-2 hours</td>
</tr>
<tr>
<td>Peak</td>
<td>2-4 hours</td>
<td>4-8 hours</td>
<td>6 hours</td>
</tr>
<tr>
<td>Duration</td>
<td>6 hours</td>
<td>18 hours</td>
<td>24 hours</td>
</tr>
</tbody>
</table>

* Clear insulin includes regular insulin and now Lantus and Detemir. Lantus and Detemir are never mixed with any other type of insulin.

Lab effects:

↑ BUN and creatinine
↑ AST, ALT, ALP, Bilirubin

Quiz Time:

In general, can you take oral drugs when pregnant?  

___________
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Metformin (Glucophage, Fortamet)
- Can cause weight gain.
- Can also cause lactic acidosis which is manifested by an increase in respiratory rate.
- Hold for 48 hours after having a test when a contrast dye was given. Check BUN and creatinine before resuming the drug.

Pioglitazone (Actos) and Rosiglitazone (Avandia)
- Edema of the lower extremities and weight gain.

Glyburide (Micronase)
- Given several times a day to stimulate the pancreas to secrete insulin.
- To remember: “Gladly (Glyberide) take it before all mini (Micronase) meals

Additional medications:

<table>
<thead>
<tr>
<th>Acarbose (Precose)</th>
<th>Saxagliptin (Onglyza)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exenatide (Byetta)</td>
<td>Sitagliptin (Januvia)</td>
</tr>
<tr>
<td>Liraglutide (Victoza)</td>
<td>Glyburide/metformin (Glucovance)</td>
</tr>
<tr>
<td>Miglitol (Glyset)</td>
<td>Metformin/glipizide (Metaglip)</td>
</tr>
<tr>
<td>Glipizide (Glucotrol)</td>
<td>Pioglitazone/metformin (Actoplus Met)</td>
</tr>
<tr>
<td>Glimepiride (Amaryl)</td>
<td>Pioglitazone/glimepiride (Duetact)</td>
</tr>
<tr>
<td>Nateglinide (Starlix)</td>
<td>Rosiglitazone/metformin (Avandamet)</td>
</tr>
<tr>
<td>Pramlintide (Symlin)</td>
<td>Rosiglitazone/glimetiride (Avandaryl)</td>
</tr>
<tr>
<td>Repaglinide (Prandin)</td>
<td>Sitagliptin/Metformin (Janumet)</td>
</tr>
</tbody>
</table>

Student Comment:

“Presented a lot of easy ways to remember points. Great layout of information and very much to the point. I will keep this material for a long time to go back and reference from and study.”

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Adrenal and anti-adrenal agents

* Used to correct abnormalities of secretion of the adrenal gland.

* Systemic steroids can cause adrenal insufficiency if they are not gradually withdrawn.

* Side effects of steroids:

  - Muscle weakness
  - Osteoporosis
  - Immunosuppression
  - Polyuria
  - Polydipsia

<table>
<thead>
<tr>
<th>Muscle weakness</th>
<th>Abnormal fat distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteoporosis</td>
<td>Growth retardation in children</td>
</tr>
<tr>
<td>Immunosuppression</td>
<td>Weight gain</td>
</tr>
<tr>
<td>Polyuria</td>
<td>Mood swings such as depression</td>
</tr>
<tr>
<td>Polydipsia</td>
<td>Edema</td>
</tr>
</tbody>
</table>

  * Lab effects:

  ↓ WBC, ↑ BS, ↑ Na+, ↓ K+

* Medications used in adrenal abnormalities

<table>
<thead>
<tr>
<th>Betamethasone (Celestone)</th>
<th>Methylprednisolone (Solu Medrol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexamethasone (Decadron)</td>
<td>Prednisolone (Pred Forte)</td>
</tr>
<tr>
<td>Cortisone (Cortone)</td>
<td>Prednisone (Deltasone)</td>
</tr>
<tr>
<td>Fludrocortisone (Florinef)</td>
<td>Triamcinolone (Aristacort)</td>
</tr>
<tr>
<td>Hydrocortisone</td>
<td></td>
</tr>
</tbody>
</table>

Student Comments:

“Doing the numerous review questions, made me think of questions in a different way.”

“This course helped me with the process of elimination and prioritization and taught me to find the correct answer.”

“It really helped show some test taking techniques and what words to look for.”

“Thank you! This course was packed full of knowledge and a great review of everything I have learned in my program. Going over the questions with the various strategies was very beneficial.”
**Toxic Effects from Drug Therapy**

**Bronchodilators:** Open up the airways of the respiratory system to allow for air passage into and out of the lungs. Major types include:

- **Anticholinergic agents** are taken around the clock for consistent response. They are one of the most beneficial bronchodilators in COPD.

- **Sympathomimetic agents** stimulate the sympathetic nervous system and cause SNS side effects.

<table>
<thead>
<tr>
<th>Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sympathomimetic agents</strong></td>
</tr>
<tr>
<td>Arformoterol (Brovana)</td>
</tr>
<tr>
<td>Albuterol (Proventil, Ventolin, Volmax)</td>
</tr>
<tr>
<td>Bambuterol (Bambec)</td>
</tr>
<tr>
<td>Epinephrine (Adrenalin, Primatene)</td>
</tr>
<tr>
<td>Formoterol (Foradil)</td>
</tr>
<tr>
<td>Isoproterenol (Isuprel)</td>
</tr>
<tr>
<td>Levalbuterol (Xopenex)</td>
</tr>
<tr>
<td>Metaproterenol (Alupent)</td>
</tr>
<tr>
<td>Pirbuterol acetate (Maxair)</td>
</tr>
<tr>
<td>Salmeterol (Serevent)</td>
</tr>
<tr>
<td>Terbutaline (Brethine)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anticholinergics</strong></td>
</tr>
<tr>
<td>Ipratropium (Atrovent)</td>
</tr>
<tr>
<td>Tiotropium (Spiriva)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Xanthine derivatives</strong></td>
</tr>
<tr>
<td>Aminophylline</td>
</tr>
<tr>
<td>Theophylline (Theo-dur, Slo-bid, Uniphyl)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combination agent</strong></td>
</tr>
<tr>
<td>Ipratropium and albuterol (Combivent)</td>
</tr>
</tbody>
</table>

**Signs of xanthine toxicity:**

- Agitation
- Tremors
- Insomnia
- Confusion
- Vomiting

Quiz time: Do you remember the therapeutic blood level for clients on xanthine derivatives??

Restlessness
Hypertension
Tachycardia
Shaking

- Headache
- Nausea and vomiting
- Pupil dilation

- Headache
- Nausea and vomiting
- Pupil dilation

- Restlessness
- Hypertension
- Tachycardia
- Shaking

**Signs of xanthine toxicity:**

- Agitation
- Tremors
- Insomnia
- Confusion
- Vomiting
**Toxic Effects from Drug Therapy**

**Inotropic agents:** Increases the force of contraction and perfusion to the organs. An increase in urine output would indicate an increased perfusion to the kidneys.

- Side effect is a slow heart rate. Call for heart rate: < _________ OR > _________
- Signs of toxicity
  - Nausea
  - Vomiting
  - Diarrhea
  - Bradycardia
  - Heart block
  - Halos in the visual field

  “Starry Night”
  by Van Gough

  *The theory is Van Gough was toxic on foxglove (the precursor to digitalis) when this picture was painted.*

  *This is what your clients see when they are toxic on digoxin (Lanoxin).*

- Hypokalemia potentiates the effects of digoxin. The client’s level could be high normal in the presence of hypokalemia and toxic rhythms and symptoms may develop.
- Excreted by the kidneys.
- Dosage must be decreased in renal dysfunction.
- Antidote for digoxin toxicity is digoxin immune fab (Digibind).

**Student Comments**

“The **summary of each system** that incorporates pharmacology and the key points will be very beneficial.”

“I so appreciated the **extensive pharmacology review** throughout the entire course. We had several instructors in our program and a lack of consistency. This course put it all together and with each body system which is extremely beneficial.”

“Thanks for all the helpful hints remembering **drug classifications and side effects**. I will use this book well past my exam and as I practice as a nurse.”

---

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**Use of Pneumomics**

Pneumonics are very useful in helping students and practicing nurses remember numerous facts related to disease process, clinical manifestations, and drug therapy.

**Selective Aldosterone Blockers (SABs):** Potassium sparing diuretics that work in the distal tubule of the nephron. For testing, remember the following as being potassium-sparing.....**ALL** the rest, in general, are potassium wasting.

- **Amiloride (Midamor)**
- **Triamterene (Dyrenium)**
- **Spironolactone (Aldactone)**

**Combination medications:**
- **Amiloride + HCTZ (Midamor)**
- **Triamterene + HCTZ (Dyazide)**

**Side effects of spironolactone (Aldactone):**
- Decreased libido
- Gynecomastia in males
- Hirtuism in females

**Hirtuism**

**Calcium Channel Blockers:** Relax the blood vessels reducing blood pressure and improving blood flow. They also slow down the electrical conduction in the heart and can be used to control rapid atrial dysrhythmias.

**Medications:**

- **Very** = Verapamil (Calan, Isoptin, Verelan)
- **Nice** = Nifedipine (Adalat, Procardia)
- **Drugs** = Diltiazem (Cardiazem, Dialcor, Tiazac)

**Other calcium channel blockers:**
- Amlodipine (Norvasc)
- Felodipine (Plendil)
- Nicardipine (Cardene)
- Nisoldipine (Sular)
- Clevidipine (Cleviprex)
- Isradipine (DynaCirc)
- Nimodipine (Nimotop)

**Side Effects include the 5 H’s**
- Hypotension
- Headache
- Hot Flashes
- Heart Block
- Hard Bowel Movement
The Pearls for NCLEX Review Course

♦ Overdose on Anticholinergic or Antihistamine

**Hot as a hare** = Increased temperature  
**Mad as a hatter** = Confusion, delirium, pupil dilation  
**Red as a beet** = Flushed face  
**Dry as a bone** = Decreased secretions, dehydration, thirst

♦ Hypoglycemia

**TIRED**: (Weakness)
- **T** = Tachycardia  
- **I** = Irritability and nervous  
- **R** = Restless  
- **E** = Excessive hunger  
- **D** = Diaphoresis

**Others**:  
- Sweating  
- Tremors  
- Dizziness  
- Headache  
- Confusion  
- Convulsions  
- Hunger  
- Hypothermia  
- Hallucinations  
- Ultimately death

♦ Who needs dialysis?

**A** = Acid Base Problems  
**E** = Electrolyte Imbalances  
**I** = Intoxications & Poisonings  
**O** = Overload of Fluid  
**U** = Uremia & Uremic Symptoms

♦ The P’s of dyspnea

- **P** = Pulmonary asthma  
- **P** = Possible foreign body  
- **P** = Pulmonary embolism  
- **P** = Pneumothorax  
- **P** = Pneumonia  
- **P** = Pump failure  
- **P** = Pericardial tamponade  
- **P** = Peak seekers  
- **P** = Psychogenic  
- **P** = Poisons

“Drunk and in shock”

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Concise Review of Content

In the course of their studies, students are presented with an abundance of information to remember about the various disease states, clinical manifestations and treatments. A concise review of all pertinent content is presented and much appreciated by students.

The Adrenal Gland

Adrenal medulla secretes catecholamines such as epinephrine and norepinephrine. Pheochromocytoma is the tumor which can occur in the medulla resulting in excess secretion of these chemicals.

Adrenal cortex secretes the three “S’s”.
- S___________: Cortisol
- S___________: Aldosterone
- S___________: Estrogen and testosterone

Disorders includes
- **Hyperaldosteronism**: Too much salt
  - Also known as Conn’s disease.
  - Kidneys hold onto sodium (and water) and throw out potassium.
  - Diet: ___________________     ____________________
  - Can be caused by an aldosteronoma which is an aldosterone-secreting adenoma of the adrenal cortex.

**Lab effects**:  
↑ Na+, ↓ K+

**Hyperaldosteronism** = Secretion of too much aldosterone.

The “AC” of the adrenal glands are Addison’s and Cushing’s
- Addison’s: “Too little”  * * *  Cushing’s: “Too much”

“You have too little before you have too much”
Addison’s Disease

♦ Not enough sugar, salt, and sex.
♦ Most commonly caused by an autoimmune process, failure to withdraw steroids, hemorrhage, and drugs such as ketoconazole (Nizoral), phenytoin (Dilantin), and rifampin (Rifadin).
♦ Adrenal crisis can occur and is triggered by stress or sudden withdrawal of steroids. Lose the ability to hold onto sodium and water, become hypovolemic and can go into shock and die with the crisis.

Clinical Manifestations:

<table>
<thead>
<tr>
<th>Addison’s Disease</th>
<th>Adrenal Crisis</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hypoglycemia</td>
<td>• Profound fatigue</td>
</tr>
<tr>
<td>• Postural hypotension</td>
<td>• Dehydration</td>
</tr>
<tr>
<td>• Weight loss</td>
<td>• Vascular collapse</td>
</tr>
<tr>
<td>• GI disturbances</td>
<td>• Hypotension</td>
</tr>
<tr>
<td>• Diarrhea due to hyperkalemia</td>
<td>• Renal shut down</td>
</tr>
<tr>
<td>• Weakness from hyperkalemia</td>
<td></td>
</tr>
<tr>
<td>• Bronze pigmentation of skin</td>
<td></td>
</tr>
<tr>
<td>• Changes in distribution of body hair</td>
<td></td>
</tr>
</tbody>
</table>

Treatment:

• Life-long hormone replacement therapy
• Hydrocortisone IV to reverse a crisis.
• Steroid therapy such as prednisone (Deltasone)
• Aldosterone replacement if a sodium deficit with
  * Fludrocortisones (Florinef) orally
  * Normal saline intravenously

Helpful Hint: Any total adrenalectomy questions, treat like Addison’s Disease

Lab effects in Addison’s
↓ Na⁺, ↑ K⁺, ↓ BS, ↑ Mg

Student Comments:

♦ “Great refresher course! Gave me easier ways to study, great hints, and areas to focus on.”
♦ “I liked all the pneumonics to help me remember facts.”
♦ “This course ‘took out all the fluff’ and gave me ‘just the facts’ so I could remember them for my exam.”
♦ “One of the best lectures I have ever had. Very thorough and easy to understand. The power point was really good in helping to understand pathophysiology and disease process. I gained so much through this course!”
Cushing’s Syndrome is too much sugar, salt, and sex, especially cortisol. Condition may be due to overproduction of hormones or long term use of steroids.

Clinical Manifestations:
- Hyperglycemia
- ↑ risk of infection
- Fat deposits on back
- Personality changes, irritability
- Osteoporosis
- Thin extremities
- GI distress - ↑ acid
- Thin skin
- Hypertension
- Moon face
- Na⁺ and fluid retention
- Profound weakness due to hypokalemia
- Bruises and petechiae
- Purple striae
- Males: Gynecomastia
- Females: Amenorrhea and hirsutism

Lab effects in Cushing’s
↑ BS, ↑ Na⁺, ↓ K⁺, ↓ WBC

Sample Slide from the Program
Thyroid Disorders

**Hyperthyroidism**
- Intolerance to heat
- Insomnia
- Irritability
- Fine, straight hair
- Exophthalmos
- Facial flushing
- Enlarged thyroid
- Tachycardia
- Increased systolic BP
- Breast enlargement
- Weight loss
- Muscle wasting
- Localized edema
- Finger clubbing
- Tremors
- Diarrhea
- Amenorrhea

**Hypothyroidism**
- Intolerance to cold
- Lethargy
- Apathy
- Dry skin
- Brittle nails and hair
- Receding hairline and hair loss
- Facial and eyelid edema
- Thick tongue, slow speech
- Blank expression
- Muscle aches and weakness
- Extreme fatigue
- Anorexia with weight gain
- Constipation
- Menstrual disturbances

**Late Clinical Manifestations**
- Subnormal temperature
- Bradycardia
- ↓ LOC
- Thickened skin
- Cardiac complications

---

**Student Comments:**

“This review has been great and very helpful in piecing together all the information. I love the fact that we were walked through the **pathophysiology** so the signs and symptoms clicked and made sense.”
Clinical Manifestations of Diabetes

<table>
<thead>
<tr>
<th>Both</th>
<th>Type I</th>
<th>Type II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Early onset before 15 yr,</td>
<td>• Late onset usually after 40 yr</td>
</tr>
<tr>
<td></td>
<td>• Rapid onset</td>
<td>• Slow onset</td>
</tr>
<tr>
<td></td>
<td>• Insulin dependent</td>
<td>• Meds, exercise, diet</td>
</tr>
<tr>
<td></td>
<td>• DKA may occur</td>
<td>• DKA not common</td>
</tr>
<tr>
<td></td>
<td>• Weight loss</td>
<td>• HHNK may occur</td>
</tr>
<tr>
<td></td>
<td>• Fatigue</td>
<td>• Weight gain prior to diagnosis</td>
</tr>
<tr>
<td></td>
<td>• ↑ frequency of infections</td>
<td>• Eye problems</td>
</tr>
<tr>
<td></td>
<td>• Bed wetting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Headache</td>
<td></td>
</tr>
</tbody>
</table>

 Loose weight and muscle mass when blood sugar not regulated.

Embolic Conditions

- Emboli from various origins
  * Deep vein thrombosis
  * Long bone or pelvic fracture
  * Atria in atrial fibrillation or atrial flutter.
- Recognition of predisposition with Virchow’s triad.
- Treatment includes activity restrictions, anticoagulants, and in some situations thrombolytics or surgical embolectomy.
- Clinical manifestations include:

Lab effects: 
↑ pH, ↓ pO\(_2\), ↓ pCO\(_2\)

Pulmonary embolus
- Chest pain
- Dyspnea
- Hemoptysis
- Tachycardia
- Fever

Fat embolus
- Hypoxemia
- Confusion
- Fever
- Upper chest petechiae

Embolic stroke
- Sudden onset
- Hemiparesis
- Visual field deficits
- Behavior changes

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Definition and Clinical Manifestations of Heart Failure

**Heart failure:** Failure of the heart to act as a pump in relation to the body’s needs. Left sided heart failure precedes right sided except in the case of pulmonary hypertension. Avoid sodium to decrease the work load of the heart.

### Left-sided
- Paroxysmal nocturnal dyspnea
- Orthopnea
- Dyspnea on exertion
- Cough
- Blood tinged sputum
- Crackles
- Wheezes
- Restlessness
- Confusion
- Cyanosis
- ↑ HR, ↑ BP, ↑ CVP, ↑ PCWP

### Right-sided
- Fatigue
- Distended jugular veins
- Swelling in hands and fingers
- Dependent edema
- Enlarged liver and spleen from increased pulmonary pressure due to long term respiratory acidosis
- Ascites
- Anorexia and complaints of GI distress

### Lab effects:
- ↑ BNP and ↑ LFT in right heart failure

---

**Sample Slides from the Program**

---

**Disorders**
- Heart failure
  - Left-sided
  - Right-sided

---

**Disorders**
- Heart failure
  - Treatment
  - U-N-L-O-A-D
  - F-A-S-T

---

**Lanoxin**

---

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Assessment Findings & Techniques

Important assessment techniques and findings are reinforced for each body system and important pathological conditions. This assists the student in formulating nursing diagnoses and interventions for the questions they will be given.

Assessment of Lung Sounds

Listen with the diaphragm of the stethoscope.

**Bronchial:** Heard over the trachea. If over the periphery means consolidation and pneumonia.

**Bronchovesicular:** Heard over the main bronchi.

**Vesicular:** Normal breath sounds heard over the periphery.

**Crackles:** Hear with heart failure.

**Rhonchi or gurgles:** Moist sounds that clear with coughing.

**Stridor:** Assess by listening over the trachea.

**Wheezeing:** Indicates air moving through narrow air passages.

**Pleural friction rub:** Heard early in pleurisy.

Breath sounds stop at T-10 with end expiration

Student Comment:
“This has thoroughly helped me pull everything together! Very informative and very helpful! I learned so many additional facts and ways to remember and correlate information.”

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Assessment of Heart Tones

Aortic valve: 2nd ICS, RSB
Pulmonic valve: 2nd ICS, LSB
Tricuspid valve: 4th ICS, LSB
Mitral valve and PMI: 5th ICS, MCL

To remember:
All (Aortic) Physicians (Pulmonic)
Take (Tricuspid) Money (Mitral)

Erb’s point: 3rd ICS, LSB.
Aortic and pulmonic murmurs

S1: Mitral and tricuspid valves close
S2: Aortic and pulmonic valves close
S3: Increased filling pressure (Heart failure)
S4: Resistance to ventricular filling (Acute MI)

Clinical Manifestations in Pericardial Effusion

Signs & Symptoms
Hypotension
Jugular Vein Distention
Muffled Heart Tones
Tachycardia
Paradoxical Pulse

Helpful Hint:
Fluid and pressure around the heart preventing right atrial filling, leading to ↓ venous return, and ↓ cardiac output

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Rhythm Strips & Waveforms

The cardiac cycle is presented with an understanding of the various waveforms and important rhythm strips which can be tested. Important aspects of assessment and treatment of the rhythms are included.

**Rhythm Strip Interpretation**

**P wave** is the first part of the beat. It signifies the atria have contracted. If there are no P waves, the problem is with the SA node.

The **PR interval** is from the beginning of the P wave to the beginning of the QRS complex. If they talk about heart blocks, the problem is in the AV node.

- PR interval = 0.14-0.20
- PR interval > 0.20 is first degree block

The **QRS complex** is the tallest part and signifies the ventricles have contracted. Wide QRS complexes are associated with hyperkalemia.

- QRS = 0.08-0.12

The **ST segment** is the point where the end of the QRS and the T wave join. ST segment elevation signifies ischemia over the area of the infarction.

The **T wave** signifies return to resting for the heart. Tall and peaked T waves can mean hyperkalemia. If you defibrillate on the T wave, ventricular fibrillation can result.

**QT interval** is from the beginning of the QRS complex until the end of the T wave. It is prolonged in bradycardia and with some medications and conditions.
ECG Changes Reinforced with Electrolyte Imbalances

**Hypokalemia**
- Flattened T-wave
- S-T segment depression

**Hyperkalemia**
- Tall peaked T wave
- Widened QRS with tall T wave
- Loss of P wave

**Rhythm Strip Interpretation: Asystole**
- Lack of rhythm with no QRS complexes. It may also be called cardiac standstill.
- Clients will die within 8 minutes if not corrected.
- Give epinephrine and atropine to treat the rhythm.
- May give sodium bicarbonate if prolonged.
Rhythm Strip Interpretation: Atrial Flutter

- Saw tooth pattern of the P waves.
- Can be associated with strokes due to turbulent blood flow through the chambers and valves.
- Clients need to be on warfarin (Coumadin).
- Must use heparin when pregnant.

Rhythm Strip Interpretation: Atrial Fibrillation

- Chaotic P waves are seen. Atria quiver leading to clot formation.
- Can be associated with strokes and/or pulmonary emboli due to turbulent blood flow through the chambers and valves.
- Clients need to be on warfarin (Coumadin).
- Must use heparin when pregnant.

Rhythm Strip Interpretation: Sinus rhythm with third degree AV block

- No relationship between P waves and QRS complexes
- Treatment for heart blocks and bradycardia includes:
  - Atropine, dopamine, epinephrine
  - Temporary transvenous pacemaker
  - Stop offending drugs
  - Transcutaneous pacemaker
  - CPR until pacing initiated
  - Permanent pacemaker in some
Rhythm Strip Interpretation: Ventricular Fibrillation

- Chaotic QRS complexes.
- Lethal rhythm. Die within 8 minutes if not corrected.
- Need to defibrillate the client.
- Implantable cardioverter defibrillator for recurrent episodes.
- Most common cause of death immediately after an acute myocardial infarction (AMI) is a dysrhythmia such as ventricular fibrillation or ventricular tachycardia.

Formulas & Diagrams

Important formulas and diagrams to assist in calculation are included along with many examples of how they are used in questions.

Math Formulas and Sample Problem

- C to F = C x 1.8 + 32
- 1 tsp = 5 mL
- 1 tbl = 15 mL
- 1 oz. = 30 mL
- 1 cup = 8 oz.
- 2 cup = 1 pint
- 4 cup = 1 quart = 1 liter
- 2.2 lb = 1 kilogram
- 1 inch = 2.5 cm

Math question:
Penicillin 250 mg PO every 8 hours is prescribed for a child with a respiratory infection. The child weighs 45 pounds. The safe pediatric dose is 25-50 mg/kg/day. The nurse determines that
A. The dose is too low.
B. The dose is too high.
C. The dose is within the safe range.
D. There is not enough information to determine safe dose.

IV Formula = Volume x drop factor divided by time in minutes for the infusion

Math question:
A physician prescribes heparin 25,000 units in 250 mL of normal saline to infuse at 600 units per hour. After 6 hours of heparin therapy, the client’s aPTT is sub therapeutic. The physician orders an increase in the infusion to 800 units/hour. The nurse should set the infusion pump to deliver how many mL per hour?
Care of Burns: Determining surface area

- Rule of Nines (Most commonly tested)
- Lund Browder in children but more complex
- Rule of hands using the client’s hand

* IV fluids calculated with the Parkland (Baxter) formula

* One half of the total amount of fluid should be administered in the first 8 hours. Calculate from the time of the burn.

**Example:**
75 kg male with burns over 40% of his body
75 kg x 4 ml x 40 = 12,000 ml
6,000 ml in the first eight hours
750 ml per hour

* Calculation: Weight x 4 mL/kg x % of burned area.

* Not uncommon to give over 500-1000 ml per hour during various phases of burn care.

Glasgow Coma Scale

Does not include pupil response and vital signs.

**Maximum of 15**
< 7 reflects coma state
< 5 organ donation

To calculate: (Maximum of:)
Eye = 4
Verbal = 5
Motor = 6

<table>
<thead>
<tr>
<th>Assessed Behaviors</th>
<th>Criteria for Scoring</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye opening</td>
<td>Spontaneous</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>To verbal stimulus</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>To pain</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>Most appropriate verbal response</td>
<td>Oriented</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Confused</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Inappropriate words</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Incoherent</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>Most integrated motor response</td>
<td>Obeys commands</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Localizes pain</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Withdraws from pain</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Flexion (Decorticate)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Extension (Cerebrate)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1</td>
</tr>
</tbody>
</table>
Cohorting & Isolation Precautions

A thorough review of isolation precautions is needed prior to the exam. Knowledge of cohorting is also expected of the student. Bullet points are reviewed along with numerous hints on answering these frequent questions.

Isolation Precautions

**Contact precautions:**
- Gloves only unless the health care worker is leaning over the client or when any type of drainage could come in contact with the nurse’s uniform, then a gown required.

**Primarily seen:**
- Major draining abscess, decubitus, or cellulitis
- C difficile
- Congenital rubella
- Acute viral conjunctivitis
- Diapered or incontinent E coli or rotavirus, shigella, hepatitis A
- Neonatal herpes simplex
- Mucocutaneous disease disseminated or primary
- Impetigo
- Pediculosis (lice)
- Acute RSV in infants, children and immunocompromised
- Scabies
- Major staph or group A strep infection

**Droplet precautions:**
- Use a mask within 3 feet of the client.

**Primarily seen:**
- H influenzae epiglottitis, meningitis, pneumonia
- Meningococcal meningitis, pneumonia, or sepsis
- Mumps and Rubella (German measles)
- Mycoplasma pneumonia and Pertussis
- Pharyngitis, pneumonia, or scarlet fever in infants and young children

**Airborne precautions:**
- Negative pressure room and N-95 mask
- Pulmonary tuberculosis
- Rubeola (Measles)

**Airborn and contact precautions:**
- Chickenpox (in the hospital). (Staff not immune should not care for the client)
- Herpes zoster in immunocompromised client or disseminated
- Adenovirus pneumonia
- Possibly SARS per CDC

Student Comment

“This is a really concise overview of the most important information presented in a way that was easy to understand and to remember. Many helpful hints presented.”
About the Author

Cynthia M. Liette
MS, APRN, ACNS-BC, CCRN

Ms. Liette has been a nurse for more than 30 years. She has worked in a variety of clinical settings including intensive/coronary care, emergency room, medical-surgical units, and supervision. She currently works as a Clinical Nurse Specialist in a rural health care system. She has been an educator for practicing nurses, nursing students, and paramedics for more than 25 years while still maintaining a clinical practice. Her numerous seminars consistently receive excellent reviews from all levels of health professionals.

She holds a Master’s Degree from Wright State University in the Clinical Nurse Specialist Adult Health track and is Board Certified as a Clinical Nurse Specialist. She is also an ACLS instructor and is certified in both critical care and trauma nursing.

She is owner and president of Educational Concepts, LLC. She has authored a successful pharmacology series and has taught a wide variety of subjects including Nurse Refresher and Nurse Internship programs, Critical Care courses, 12-Lead ECG and Rhythm interpretation, IV therapy, and Lab and ABG interpretation courses. She is also the author of The Pearls for Medical-Surgical Nursing Certification Review course.

She is a member of Sigma Theta Tau—National Nursing Honor Society, National Association of Clinical Nurse Specialists and the American Association of Critical Care Nurses.

Contact us today to schedule your school’s comprehensive 3-Day NCLEX Review Course.

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