



**Math, Science & Health Professions
Nursing Program**

**NRS 220
Alterations in Health III**

College Lab Manual

FALL 2015

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NRS 220 students are expected to:

1. Review related class notes, reading assignments and specific lab objectives prior to each college lab. .
2. Participate in discussion topics listed for each lab.
3. Bring required equipment to each lab.
4. Properly perform return demonstration on selected skills.
5. Attend all scheduled college lab sessions.
6. Arrive at the scheduled time for lab (repeated late arrivals will require intervention by NRS 220 Course Coordinator).

References:

Adams, M.L., Holland, L.N. & Urban, C.Q. (2014) *Pharmacology for Nurses A Pathophysiologic Approach*. (4th ed.) Upper Saddle River: Pearson (ISBN-978-0-13-508981-1)

North Carolina Custom Edition, (2011). *Nursing Skills for a Concept-Based Approach to Learning*. New York: Pearson Learning Solutions. (ISBN 13:978-0-558-35687-3)

North Carolina Concept-Based Learning Editorial Board. (2011). *Nursing A Concept-Based Approach to Learning, Volumes One & Two*. Upper Saddle River: Pearson.

Pickar, G.D., Abernethy, A.P. (2013) *Dosage Calculations*. (9th ed.) Clifton Park: Thompson Delmar Learning (9781133707271)

Silvestri, Linda A. (2014). *Comprehensive Review for NCLEX-RN Examination*. (6th ed.). Philadelphia: W.B. Saunders Co. (ISBN: 9781437708257 – Paperback).

www.mynursingkit.com

***** Videos listed in the lab guide may require computer access with audio.**

***** Please watch videos prior to your lab session**

Week 1

Alterations in Metabolism Part 1

Discussion will focus on patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement and safety & informatics of patients who are experiencing alterations in metabolism.

Students will demonstrate competency in assigned skills, discuss case scenarios and review math and NCLEX questions.

Review readings from week 1

Review the following nursing skills regarding medication administration:

Nursing Skills for a Concept-Based Approach to Learning. New York: Pearson Learning Solutions.

Skills:

- 12.26: Preparing for medication administration
- 12.27: Converting Dosage Systems
- 12.28: Calculating Dosages
- 12.29: Using the Narcotic Control Systems
- 12.30: Using an Automated Dispensing System
- 12.31: Administering Medication Protocol
- 12.32: Administering Oral Medications
- 12.43: Preparing Injections
- 12.45: Administering Subcutaneous Injections
- 12.49: Administering Subcutaneous Anticoagulants
- 12.50: Administering Intramuscular Injections
- 12.51: Using Z-Track Method
- 12.52: Adding Medications to Intravenous Fluid Containers
- 12.53: Administering Intermittent Intravenous medication Using a Secondary Set
- 12.56: Administering Blood Transfusions
- 12.57: Administering Blood Components
- 12.60: Working with Implantable Vascular Devices
- 12.66: Home Setting: Administering Medications

Review of the various insulin medications as well as demonstration of correct preparation and administration.

[Skill 12.46](#) Preparing Insulin Injections

[Skill 12.47](#) Teaching Client to Use Insulin Delivery System—Insulin Pen

[Skill 12.48](#) Teaching Use Of Insulin Pump

Identify the measures needed in order to provide adequate nutrition for a patient with alterations in metabolism: TPN, lipids, tube feedings

<http://www.youtube.com/watch?v=iPo8-2zfVDk&list=TLoaRbXVG1Y8A> –TPN administration in the Neonate.

<http://www.youtube.com/watch?v=wcwGOIX3tuw> -Enteral Feeding (8min)

<http://www.youtube.com/watch?v=yBzy3tHOps0&feature=related> -Enteral feedings (9min)

Describe how the hydration status may be maintained for a patient ([Skill 3.12](#) Infusing IV Fluids through a Central Line; [Skill 12.58](#) Managing Central Lines; [Skill 12.59](#) Changing a Central Line Dressing))

Discuss the various ways nutrition can be provided to a patient when they are unable to eat ([Skill 5.11](#) Providing Total Parental Nutrition; [Skill 5.12](#) Infusing IV Lipids)

PICC Line Dressing Change

Please review videos at home

<http://www.youtube.com/watch?v=jKGfz1v6hJ4> – Caring for PICC Line (20 mins)

<http://www.youtube.com/watch?v=zCXTjiJdQfQ> -Statlock PICC stabilization dressing (12min)

<http://www.cancerquest.org/central-lines> Central Line Dressing Change (10mins)

Student demonstrates the appropriate method of changing a PICC line dressing, Central line /VAD dressing.

Case scenarios:

1. A 55 year old male with a family history of diabetes is referred to the clinic for a diabetes workup. He reports having to urinate 2-3 times a night, frequent fatigue, and weight gain of 7 lbs. over last month. His A1C level is 7.6%, fasting plasma glucose is 130mg/dl, and BP 144/90mmHg. He also has dyslipidemia and early signs of renal dysfunction confirming the diagnosis of type 2 diabetes.

A. What is your assessment of the laboratory results?

B. What patient education would you include when developing a plan of care?

C. What medications might be included in the treatment plan?

2. You are assigned to 60 year old male patient who weighs 280lbs. He is one day post op for gastric bypass surgery. What would you expect his diet, pain and nutrition orders to be like? He complains to you that he is having extreme pain in his abdomen. After reviewing his chart you notice that his WBC count is 18.0 and his temperature at 0800 is 101.0 degrees Fahrenheit. What do you do?

3. A 52 year old male is admitted to the ER with a diagnosis of acute pancreatitis secondary to alcoholism. He is experiencing severe abdominal pain. On physical assessment, he has decreased bowel sounds in all quadrants, crackles in the bases of his lungs, and signs of dehydration. His vital signs are T, 99° F; P, 104; R, 30; and BP, 102/60.

A. What is the priority for this patient's care at this time?

B. What laboratory findings would you expect this patient to have?

Discussion Questions

1. Identify the measures needed in order to provide adequate nutrition for a patient with alterations in metabolism (TPN, IV lipids, tube feedings)

A. How does the administration of TPN and IV lipids differ from Tube feedings?

B. What safety issues need to be addressed when administering a tube feeding?

REVIEW MATH

1. The doctor has ordered 2000 units of Heparin SC. You have available a 5 mL vial labeled 10,000 units per mL. How many mL will you administer? _____.

2. Calculate the drip rate for 2 liters of IV fluids to be given over 5 hours via a giving set which delivers 10 drops/mL.

3. A diabetic patient is one day postop . The patient is NPO and is receiving IV fluids. The patient's 7am Accu check showed a blood sugar of 322. Medication orders include:

NPH Insulin 22 units subq q am 7a,

Compazine 7.5mg IM q4hours prn nausea (available medication: Compazine 20mg/2ml),

Heparin 7500u subQ q12hours (available med: heparin 5000units/ml),

• Regular Insulin on sliding scale per Accu check:

2 units for Accu check 200-250

4 units for Accu check 251-300

6 units for Accu check 300-325

Call doctor for Accu check above 325

- A. How many ml of each these medications will you give?
 - a. Compazine_____ b. Heparin_____
- B. How will you prepare/draw up the NPH insulin and the Regular Insulin?
- C. How many units of Regular Insulin will you give?
- D. How many total units will be given?
- E. Describe how you would prepare the medications in one syringe

Mixing Insulins:

<http://www.bing.com/videos/search?q=mixing+insulins+video&mid=A05B28FF85FFE4A40844A05B28FF85FFE4A40844&view=detail&FORM=VIRE13#view=detail&mid=63D54B58649A5F7C448363D54B58649A5F7C4483> (about 3 mins)

Insulin Pens:

http://www.youtube.com/watch?v=hue_HklpxKU (about 10min)

Review NCLEX questions

Week 2

Alterations in Metabolism Part 2

Discussion will focus on patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement and safety & informatics patients who are experiencing alterations in metabolism.

Demonstrate competency in assigned skills, discuss case scenarios and review math and NCLEX questions.

Review readings from week 2

Students will perform a return demonstration of PICC , Central and VAD/Port line dressing change.

Case Scenarios

1. The adult children of the patient with moderate hypothyroidism, who started treatment three weeks ago with levothyroxine sodium (Synthroid), come to her apartment and find her sitting on the couch in her winter coat. When they ask her why she is wearing the coat, she looks at them and says, “Who are you?” They call the emergency squad, and the patient is brought to the ED.
 - A. What vital sign should you assess first ? Provide a rationale for your selection.
 - B. Should this patient receive oxygen? Why or why not ?
 - C. What IV solution should you be preparing to administer as fluid therapy and why?

The patient with severe hypothyroidism is about to be discharged to home.

- D. What are the teaching priorities for this patient?
 - E. Should you include her adult children in the teaching? Why or why not?
2. The patient is a 66-year-old man with chronic respiratory fibrosis who has been treated with antibiotics penicillin (Ampicillin) followed by azithromycin (Zithromax) for a bacterial pneumonia for the past 3 weeks. He was admitted from the ED because his SpO₂ was 85%. In addition to an antibiotic, he also takes losartan (Cozaar) 50 mg daily, prednisone 10 mg daily, and sertraline (Zoloft). When he gets to the unit, he is slow to answer questions although his

answers are correct, and he cannot remember the name of the physician who saw him in the ED. When his blood work comes back, you notice that his serum sodium is 109 mEq/L and his hematocrit is 32%. He is supposed to provide a clean-catch urine specimen but has not urinated since his admission, 3 hours ago.

- A. What is the probable source or sources of his mental slowness?
- B. What risk factors does he have for SIADH?
- C. What other assessment data should you obtain immediately? Provide a rationale for your selection.

His admitting prescription reads that he should receive 500 mL of D5% in Ringer's Lactate IV over next 2 hours.

- D. What should you do about this prescription?

Complete the chart below indicating if the laboratory findings would be increased or decreased.

Clinical Finding	Adrenal Insufficiency (Addison's)	Adrenal Hyperfunction (Cushing's)
Serum sodium level		
Serum potassium level		
Serum glucose level		
Cortisol level		
Blood pressure		

Discussion Questions

1. Discuss /describe Addisonian crisis.
2. How would you treat Addisonian crisis?

Math

1. The order reads clindamycin hydrochloride (Cleocin) 300 mg IV every 6 hours. On hand you have Cleocin 0.6 g per 4 mL.
What will you draw up for 1 dose?
2. The physician orders 1000mL of D5/W IV at 125 mL per hour. The IV tubing is calibrated for a drop factor of 10 gtt/mL.
Calculate the IV flow rate in gtt/ min.
3. Order: Hydromorphone hydrochloride (Dilaudid) 4 mg IV Q 4 hr prn for pain.
Supply: Dilaudid 10 mg/mL
How much would give ?
4. Order reads 250 mL D5W to run over the next 2 hours by infusion pump.
What will you set the infusion pump at?
5. Order: tolbutamide (Orinase) 250 mg po twice a day
Supply: 0.5g tablets
How much will you give ?

Review NCLEX Questions

Week 3

Alterations in Inflammation

Discussion will focus on patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement and safety & informatics patients who are experiencing alterations in metabolism.

Demonstrate competency in assigned skills, discuss case scenarios and review math and NCLEX questions.

Review readings from week 3

Care of the patient receiving a blood product

<http://www.redcrossblood.org/learn-about-blood/blood-components> American Red Cross Review whole blood, red cells & platelets

Case Scenarios

1. You are the primary nurse assigned to a 65-year-old patient who is going for a colonoscopy. It is 7:30am and he is “on call” to go for his colonoscopy. When you access his MAR you notice that he is due for metoprolol tartrate (Lopressor) 25mg PO and esomeprazole magnesium (Nexium) 30mg PO at 8am. When you walk into your patient’s room he says to you, “I am so hungry and I did not sleep at all. What time am I going for my test and when can I eat? I also need my blood pressure medications.”

What do you do?

2. A 56 year old male has been admitted with the diagnosis of a peptic ulcer. Upon admission his hemoglobin is 7.6 g/dL and hematocrit is 30%. He is typed and cross matched for 2 units of blood at this time. You are the nurse administering the blood product. (Transfusion Skill)

Student will be able to safely administer blood transfusion as dictated by hospital policy and procedure.

Student will perform the following:

- Review hospital/facility policy and procedure
- Check chart for physician order and patient’s H&H values.
- Check patient identification with blood product as per protocol [Skill 12.56](#) Administering Blood Transfusions; [Skill 12.57](#) Administering Blood Components)
- prepare appropriate tubing and solution
- educate patient regarding transfusion
- infusion blood product
- document vital signs
- monitor patient for adverse reaction
- discontinue infusion
- document patient’s response

-Utilize SBAR for hand off communication

** review IVPB set up also**

Math

1. A doctor orders 200 mg of ceftriaxone sodium (Rocephin) to be taken by a 15.4 lb infant every 8 hours. The medication label shows that 75-150 mg/kg per day is the appropriate dosage range. On Hand: 400 mg/2mL Vial.

A. Is this doctor's order within the desired range? Yes _____ No _____

B. Calculate the dose.

2. Heparin 8,000 units subcutaneous every 8 hours.

Supply: A vial of heparin sodium injection 10,000 units/mL

How much you give for EACH dose? _____

3. The patient is to receive 1800 ml of D5/W over 24 hours. You have to manually regulate the drip rate. The tubing you have is 15gtts./ml.

How many drops/ min will you give?

4. The pt. has an order for levetiracetam (keppra) oral solution 3 g daily. The pt. has a bottle of keppra oral solution 100 mg/mL.

How many mL will you administer to the pt.?

5. The Physician orders IV morphine sulfate 2-5 mg / hr. for pain management. The pharmacy sends an IV of 250 mg of morphine sulfate in 500 mL D5W. What rate will you set on the IV pump to give 3 mg/ hr.?

Breast & Testicular Exams: Review / Practice

Student will demonstrate breast and testicular examinations using correct assessment skills and document findings.

Review NCLEX Questions

Week 4

Alterations in Cellular Regulation

Discussion will focus on patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement and safety & informatics patients who are experiencing alterations in metabolism.

Demonstrate competency in assigned skills, discuss case scenarios and review math and NCLEX questions.

Review readings from week 4 and 5

Review the following nursing skills:

Nursing Skills for a Concept-Based Approach to Learning.

Skills:

7.25: Assisting with Chest Tube Insertion

7.26: Maintaining Chest Tube Drainage

7.27: Chest Tube Removal

14.2: Assisting with Thoracentesis

14.3: Assisting with Paracentesis

14.4: Assisting with Lumbar Puncture

14.5: Assisting with Bone Marrow Aspiration

14.6: Assisting with Chest Tube Insertion

14.7: Assisting with Chest Tube Removal

Chest tube care: <http://youtu.be/mRcTOpYRPPA> (about 14min)

Chest tube insertion: <https://youtu.be/ctLwNIeWWnI> (about 10min)

PleurX Drainage system: <https://youtu.be/bsbGwRlpz7o> (about 12min)

Breast & Testicular Exams: Review

Student will demonstrate breast and testicular examinations using correct assessment skills and document findings.

Case Scenarios

1. You are caring for a 55-year-old female Hispanic patient who has been admitted for pneumonia. She has been recently been diagnosed with right breast cancer but has not yet started her treatment plan at the cancer center. Her medical team has included a chest tube placement as part of her treatment plan. She is very anxious about the chest tube.
Provide an example of a therapeutic statement in regards to the patients anxiety

Care of the patient with a chest tube:

Student will describe critical clinical skills needed to care for patients with a chest tube.

- Check physician order for chest tube
- Review assisting with a chest tube insertion([Skill 7.25](#) Assisting with Chest Tube Insertion; [Skill 14.6](#) Assisting with Chest Tube Insertion)
- Assess chest tube insertion site and document assessment findings
- Verbalize and describe understanding of water seal used in a chest tube
- Review maintaining chest tube drainage([Skill 7.26](#) Maintaining Chest Tube Drainage)
- Describe what patient education would need to be incorporated in a plan of care for a patient with a chest tube
- Describe care of the patient in removal of a chest tube([Skill 7.27](#) Chest Tube Removal; [Skill 14.7](#) Assisting with Chest Tube Removal)

2. A 40-year-old male is admitted with cirrhosis and esophageal varicies. He admits to drinking a pint of vodka a day and a few beers. He is jaundiced and has abdominal ascites. He has a history of cirrhosis and alcohol abuse

A. Describe the plan of care you would expect to provide to your patient

B. What are your priority concerns?

(Utilize the SBAR format/sheet when you are giving end of shift report)

3.An 8-year-old African American boy is admitted for sickle cell crisis. He is crying and tells you he is in pain.

What interventions would you expect for this patient?

Math

1. Morphine sulfate (Roxinal) oral solution 30 mg p.o. every 4 hours prn for pain.

Supply on hand: Roxinal oral solution 20 mg per 5 mL

How much would you give?

2.Patient is on a heparin drip with 10,000 U heparin to infuse at 900 U/hr.

What will you set the flow rate on the pump at?

3.Epoetin Alfa (Epogen) 75 units per kg subcutaneously to an adult weighing 140 lbs.

The label reads Epogen 2,000 U /mL.

Calculate the dose

4.The physician orders granisetron (granisol) 2,000 mcg IVP 30 mins. Prior to chemotherapy. Pharmacy sends a multi dose vial containing 4mg/4mL.

How many mLs will you give?

NCLEX Review Questions

Week 5

Simulation Exercise

Case Scenario

Concept: Post-op care of a diabetic patient, insulin drip and insulin administration, chest tube care, and blood transfusion

Name: Mr. Fred Graham

Gender: Male

Religion: Seventh Day Adventist

Age: 44

Weight: 155 lbs

Height: 5'5''

Medications:

Regular insulin 100 units in 250ml NS infusing at 4 units/ hr

Accuchecks every hour, continue insulin drip until three consecutive stable BS then accuchecks q 2 hours

IV NS running at 75 ml/hr

Ceftoxin 2 mg IVPB q 6hr

PCA pump: Morphine 1 mg IV q 1hr basal rate and bolus 1 mg q 15 min

After sq insulin initiated:

Accu-check tid ac meals and q hs

The regular insulin sliding/correction scale per Accu-check is the following:

- > 2 units sq for BS 150-200
- > 4 units sq for BS 201-250
- > 6 units sq for BS 250-300
- > Call doctor for BS greater than 300

NPH insulin 22 units sq bid, Renal caps one capsule PO qd, Lasix 20 mg PO qd, KCL 20 meq PO qd, Metoprolol XL 25 mg PO qd, Nexium 20 mg PO qd, Lipitor 40 mg PO qd and Lexapro 20 mg PO qd

Medical history:

Mr. Graham is a 44 year old male patient with metastatic lung cancer. Mr. Graham is admitted to the hospital for a right lobectomy. He has a history of type I diabetes, renal insufficiency, HTN, depression, and hyperlipidemia.

Morning report:

Mr. Graham presents on your unit as a one day post-op lobectomy. He is alert and oriented and denies distress. Oxygen is being delivered by nasal cannula at 2 lpm. Auscultation of Mr. Graham's bilateral lungs reveal a small amount of fluid in the bases of the lungs bilaterally. Chest tube is placed and functioning normally with a good seal. Patient has a PICC line placed in his left brachial vein that is patent. His insulin drip is infusing along with his hydrating fluids. A 16 fr foley catheter was placed during surgery. His foley is patent and his output for the last shift was 600cc.

Patient assessment:

You go into Mr. Graham's room. He is alert, oriented but tearful. He states that he feels fearful of his future and doesn't know if he can go on. The food trays have come up on the unit. Mr. B. states to you that he is hungry and wants to try to eat a little breakfast. You perform an accucheck at 7:00 am and determine his BS is 208. Mr. Graham's IV fluids and IV insulin are infusing normally. The PICC line dressing is intact and the site has no signs of infection. A skin assessment reveals that he has a small reddened area on his tail bone. He says that he is too weak to get out of bed and cannot walk to the bathroom. His foley catheter is draining straw colored clear urine. The incentive spirometer is at the bedside. His surgical site bandage is clean, dry, and intact.

Vital signs:

BP: 122/88 P: 98 RR: 20 Temp: 98.3 Pulse ox: 95% Pain level: 5 out of 10

Section 1

1. List three nursing priorities for this patient.

- A.
- B.
- C.

2. Write a statement that would be therapeutic to this patient?

3. How would you manage this patient's type I diabetes after surgery?

5. What rate should the pump be set for the IV insulin drip to infuse at 4 u/ hr ?

6. What is the normal maintenance of a patient with a chest tube?

What special dietary requirements might this patient have?

*****Demonstrate your care of the chest tube**

Section 2: Mr. Graham has received his insulin and has tolerated his breakfast. It is 11:00 am and you receive Mr. Graham's blood work. The physician feels that Mr. Graham diabetes is more stable and D/C the insulin drip. The patient is converted to sq insulin also now as a correction or sliding scale.

Sodium	144	mEq./L.	135-147
Potassium	4.6	mEq./L.	3.30-5.50
Chloride	110	mEq./L.	98-112
Co2	31	mEq./L.	21-31
Calcium	9.1	mEq./L.	8.0 – 10.2
Glucose	210	mg./dl	70-115
Creatinine	2.0	mEq./L.	0.6 -1.5
PO4	2.7	mg./dl	2.4-4.5
HCT	28	%	34 - 47
MCV	83	fl	80 - 95
Platelet	241	K/cmm	140 - 450
WBC	11	K/cmm	4.5 - 11
RBC	3.0	M/cmm	3.4 – 5.4

HBG	6.4	Gm/dl	11.5-16
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1. What do you do **first** about this lab report?

Mr. Graham's accucheck is 188 at 5 pm prior to dinner.

2. What dose of insulin should he receive?

3. What steps would you take to draw up both types of insulin in one syringe without contaminating either one?

****Demonstrate drawing up and administering this patient's insulin**

You report the critical lab values to the attending physician and a blood transfusion is ordered.

4. What steps are necessary prior to starting a blood transfusion?

5. What nursing measures are necessary during and after the blood transfusion?

6. Mr. Graham is ordered one unit of blood (250ml) to be infused over 90 minutes, at what rate do set the pump?

.Demonstrate the steps in giving a blood transfusion**

It is 13:30 and Mr. Graham has had one pint of blood and has tolerated the procedure well. However, you notice Mr. Graham putting his call bell on three hours later. When you enter the room and Mr. Graham appears to be in acute distress. He is having difficulty breathing and states he is having chest pain. You notice that the chest tube has a continuous bubbling sound that coming from the drainage tube.

1. What do you suspect is happening to Mr. Graham?

2. List three nursing interventions you would perform in priority.

A.

B.

C.

- **Demonstrate the care that you would give Mr. G**

Review NCLEX Questions

Revised Fall 2015