Unit 9

Problems with excretion
Before we begin:

- You are to understand on your own:
  - A & P of Renal System
  - Common terms of renal system
  - How to perform a focused health history
  - How to perform a Physical Exam on a renal patient
  - Laboratory and diagnostic tests associated with Renal system

We will be building on the knowledge obtained in first and second semester. Overall terminology such as: Dysuria, frequency, oliguria, polyuria, urgency, nocturia, hesitancy, anuria, albuminuria, hematuria, urinary retention, residual urine

Review A & P
We are going to focus on:

- Chronic Renal Failure/Uremia
- ESRD/Dialysis
- Prostate Cancer
- Testicular Cancer
- Renal Cancer
Diagnostic Tests of the Genitourinary system

- Serum Creatinine
- BUN
- Urine tests
  - Creatinine clearance
  - Glomerular filtration rate
- Table 29-2

**Serum creatinine**: By product of muscle breakdown. Produced at a constant rate by the body, secreted by the kidneys. Sensitive indicator of renal function. Elevated in renal impairment.

**Creatinine Clearance**: The amount of blood that can be cleared of creatinine in 1 min. Timed urine sample (12 or 24 hr) with a blood sample the morning of or sometime during the test. Used primarily to determine safe dosing of nephrotoxic drugs.

**Blood Urea Nitrogen (BUN)**: a by product of protein metabolism, excreted by the kidneys therefore reflects kidney function. Can also be elevated in GI bleeding, dehydration, high protein diet and CHF.

**Glomerular Filtration Rate**: the amount of filtrate made by the kidneys per minute, declines over the years due to age related changes affecting the renal system. By age 80, the GFR will be less than half of what it was at age 30. The more decreased the GFR the more reduced the clearance of drugs excreted through the kidneys.
Chronic Renal Failure

- Progressive irreversible kidney injury
- ESRD
  - End Stage Renal Disease
  - Common Terms
    - Azotemia
    - Uremia
    - Uremic Syndrome

When kidney function is too poor to sustain life it is termed end stage renal disease.

**Azotemia** - collection of nitrogenous waste in the blood

**Uremia** - urine in the blood

**Uremic Syndrome** - Uremic syndrome (uremia) is a serious complication of chronic kidney disease and acute renal failure. It occurs when urea and other waste products build up in the body because the kidneys are unable to eliminate them. These substances can become poisonous (toxic) to the body if they reach high levels.

**Uremic syndrome may affect any part of the body and can cause:**

- Nausea, vomiting, loss of appetite, and weight loss.
- Changes in mental status, such as confusion, reduced awareness, agitation, psychosis, seizures, and coma.
- Abnormal bleeding, such as bleeding spontaneously or profusely from a very minor injury.
- Heart problems, such as an irregular heartbeat, inflammation of and excess fluid in the sac that surrounds the heart (pericarditis), and increased pressure on the heart.
- Shortness of breath from fluid buildup in the space between the lungs and the chest wall (pleural effusion).
Three stages of renal failure lead to the progression toward chronic renal failure

**Stage 1 Diminished renal reserve**
- Renal function, no accumulation of metabolic wastes
- Healthier kidney compensates for diseased kidney

**Stage 2 Renal insufficiency**
- Accumulation of metabolic waste in blood because unaffected nephrons cannot keep up
- Responsiveness of diuretics, results in edema and oliguria

**Stage 3 End-Stage Renal Disease**
- Excess amount of waste such as urea and creatinine accumulate in blood
- Kidneys unable to maintain homeostasis
- Treatment is by dialysis or other renal replacement therapy
Urea and Creatinine—since creatinine is partially excreted in the renal tubules, ↓ renal function leads to buildup of serum creatinine. Urea is a product of protein metabolism excreted by the kidneys. BUN varies with protein intake.

Sodium—Changes in sodium are common. The decrease in number of functioning nephrons affects sodium reabsorption so sodium is lost in the urine. Later stages, kidney excretion of sodium is reduced with decrease in urine production thus, sodium retention and hypernatremia can occur with only modest increases in dietary sodium intake. This problem leads to severe fluid and electrolyte imbalances. Sodium retention causes hypertension and edema.

Potassium—The kidney is responsible for potassium excretion. Hyperkalemia will occur when the urine output falls below 500ml in 24hrs. Other factors may lead to hyperkalemia as well such as diet, medications containing potassium, failure to restrict diet, tissue breakdown, blood transfusion and hemorrhage.

Acid Base Balance—As the nephrons are lost, acid excretion is reduced and metabolic acidosis results. Many factors lead to metabolic acidosis: kidneys inability to excrete hydrogen ions (acids), decreased levels of ammonia and bicarb that are needed to assist with hydrogen ion excretion contribute to increases in acid due to the decrease in ammonia production and lack of absorption of bicarbonate.
The kidney produces a hormone that activates vitamin D which enhances absorption of calcium. In renal failure, **Phos is retained and the calcium/phosphate balance is disrupted.**

In chronic renal failure, plasma phosphate levels lead to **chronic stimulation of parathyroid glands**, this increases PTH which causes calcium release from bones. This results in bone demineralization and bone density loss. Uremic pruritis also results from calcium phosphate imbalances and excess PTH production.
Cardiac Changes in CRF

- Hypertension
  - Increased fluid and sodium lead to HTN
- Hyperlipidemia
  - ↑ triglycerides, total cholesterol, and LDL’s
- Heart failure
  - Anemia, HTN and fluid overload
  - Cardiac disease is the leading cause of death in clients with ESRD
- Uremic pericarditis
  - Uremic toxins inflame the pericardial sac

Many clients with CRG also have cardiomyopathy and left ventricular hypertrophy form the prolonged hypertension.

CRF changes fat metabolism leading to increase in ↑ triglycerides, total cholesterol, and LDL’s.

Many clients with renal failure have some form of cardiac problem. Common problems are Left ventricular hypertrophy, and chronic heart failure (CHF).

The pericardial sac can become inflamed by uremic toxins, or infection. Manifestations include severe chest pain, increased pulse rate, low grade fever, and intermittent pericardial friction rub.
Nursing Diagnosis

- #1 PC- Potential for pulmonary edema
- Other Diagnosis
- Imbalanced nutrition: less than body requirements r/t inability to ingest, digest and absorb nutrients
- Excess fluid volume r/t compromised regulatory mechanisms
- Decreased cardiac output r/t altered stroke volume (reduced) as a result of dysrhythmias
Dietary Recommendations

• Control protein intake
  – Clients on dialysis get more protein than pre-dialysis renal patients
• Fluid intake limitations
  – Excess fluids lead to HTN, heart failure and edema
• Restrict potassium, sodium and phosphorous

Protein is lost in dialysis. It is recommended at least 1gm/kg/day but each person needs are calculated individually. Excessive protein intake increases BUN levels in clients with CRF.

Fluid levels for HD patients is limited to 500-700ml/day plus amt of urine output.

Sodium restriction for HD patients that are oliguric is 2-4grams/day

Potassium is restricted to 60-70mEq/day many salt substitutes are made with a potassium salt so strict education needs to be done.

Phosphorus restriction- focuses on preventing osteodystrophy (from poor bone density).
Dialysis

- Hemodialysis
  - Diffusion and ultrafiltration of electrolytes, waste products, and excess water from the body
  - Blood is taken from the body via a vascular access and pumped to the dialyzer
  - Hypotension is the most frequent complication

Peritoneal dialysis: pg 909. The highly vascularized peritoneal membrane serves as the dialyzing surface. Warm dialysate is instilled into the peritoneal cavity through a catheter. Then the metabolic waste products and excess electrolytes diffuse into the dialysate and is then drained by gravity out of the peritoneal cavity into a sterile bag. Example (CBI)

**Homework: pg 908-910 care of the client undergoing hemodialysis/peritoneal dialysis

***Test Hint: Why do we hold BP Meds/Diuretics prior to dialysis

Vascular access: Ash Cath (CCRT) is a double lumen and used temporarily, AV Fistula: surgical anastomosis of an artery and vein. It takes about a month for the fistula to mature so it can be used for dialysis. AV graft is a tube made of gortex and used for Chronic renal patients.

What is the difference between a thrill and a bruit?
Dialysis

Hemodialysis
http://www.youtube.com/watch?v=E8Uj-C1-HyU
http://dpc.convio.net/media/dialysis.htmlp

Vascular access management
http://www.youtube.com/watch?v=mIw_wM2d8h4

Peritoneal
part 1
http://www.youtube.com/watch?v=MDRjh0SpOTA
Part 2
http://www.youtube.com/watch?v=HLUzafic_Ec
Part 3
http://www.youtube.com/watch?v=kgHBCLKWibg

Videos are also available from the skills lab for more information
Dialysis 1- Peritoneal dialysis
2 hemodialysis
Renal Cell Carcinoma

Stage 1—up to 2.5 cm situated in the capsule of the kidney not affecting the renal vein, perinephric fat, and adjacent lymph nodes have no tumor.

Stage 2—Tumors larger than 2.5 cm extend beyond the capsule but are within the gerota’s fascia, the renal vein and lymph nodes are not involved.

Stage 3—Tumors extend into the renal vein, lymph nodes or both.

Stage 4—Tumors include invasion of adjacent organs beyond Gerota’s fascia or metastasize to distant tissues.
Paraneoplastic syndromes

- Symptoms include:
  - Anemia
  - Erythrocytosis
  - Hypercalcemia
  - Liver dysfunction
  - Elevated liver enzymes
  - Hormonal effects
  - Increased sedimentation rate
  - Hypertension

Paraneoplastic syndromes are a result of your body's reaction to the presence of cancer or to substances the tumor produces.

Paraneoplastic syndromes can affect many areas, including your skin, kidneys, blood and joints. But, one of the **most common areas affected is the nervous system.** Most neurological paraneoplastic syndromes are caused by your immune system's response to a cancerous tumor. Signs and symptoms of paraneoplastic syndromes of the nervous system **usually appear when cancer is still in its early stages**, often before you even know you have cancer.

By testing your blood and spinal fluid for certain antibodies, doctors can usually determine if your signs and symptoms are caused by a paraneoplastic syndrome. Once a paraneoplastic syndrome has been identified and the cancerous tumor found, treatment of the cancer may eliminate the cause, and signs and symptoms go away. In some cases, treatment of a paraneoplastic syndrome may also require suppressing your immune system.
Clinical manifestations of renal cancer are very vague

- Flank pain
- Gross hematuria
- Palpable renal mass

Only about 5-10% of clients have flank pain, hematuria or palpable mass. Hematuria is a late common sign.

Most signs are not detected until late in the disease.
Prostate and Testicular cancer
Prostate Cancer

- Prostate cancer is the most common non-skin cancer in America. One in six American men will be diagnosed with prostate cancer, making men 35% more likely to be diagnosed with prostate cancer than women are to be diagnosed with breast cancer.

**Definition**

Prostate cancer is one of the most common types of cancer in men, affecting about one in six men in the United States. A diagnosis of prostate cancer can be scary not only because it can be life-threatening, but also because treatments can cause side effects such as bladder control problems and erectile dysfunction (impotence). But diagnosis and treatment of prostate cancer have gotten much better in recent years. Prostate cancer usually grows slowly and initially remains confined to the prostate gland, where it may not cause serious harm. While some types of prostate cancer grow slowly and may need minimal or no treatment, other types are aggressive and can spread quickly. If prostate cancer is detected early — when it’s still confined to the prostate gland — there is a better chance of successful treatment.
Symptoms

• No noticeable symptoms in early disease

• Early signs and symptoms of prostate cancer can include urinary problems:
  – Trouble urinating
  – Starting and stopping while urinating
  – Decreased force in the stream of urine
More symptoms

• Cancer in your prostate or the area around the prostate can cause:
  – Blood in your urine
  – Blood in your semen

• Prostate cancer that has spread to the lymph nodes in your pelvis may cause:
  – Swelling in your legs
  – Discomfort in the pelvic area

• Advanced prostate cancer that has spread to your bones can cause:
  – Bone pain that doesn't go away
  – Bone fractures
  – Compression of the spine
Risk Factors

- Age.
- Race or ethnicity.
- Family history.
- Diet.
- High testosterone levels.

No Known Cause: Suggests a combination of risk factors

**Age.** After age 50, your chance of having prostate cancer increases.

**Race or ethnicity.** For reasons that aren’t well understood, black men have a higher risk of developing and dying of prostate cancer.

**Family history.** If your father or brother has prostate cancer, your risk of the disease is greater than that of the average man.

**Diet.** A high-fat diet and obesity may increase your risk of prostate cancer. One theory is that fat increases production of the hormone testosterone, which may promote the development of prostate cancer cells.

**High testosterone levels.** Because testosterone naturally stimulates the growth of the prostate gland, men who use testosterone therapy are more likely to develop prostate cancer than are men who have lower levels of testosterone. Also, doctors are concerned that testosterone therapy might fuel the growth of prostate cancer that is already present. Long-term testosterone treatment also may cause prostate gland enlargement (benign prostatic hyperplasia).
Tests and diagnosis

Prostate cancer may not cause any symptoms at first. The first indication of a problem may come during a routine screening test, such as:

- **Digital rectal exam (DRE)**. During a DRE, your doctor inserts a gloved, lubricated finger into your rectum to examine your prostate, which is adjacent to the rectum. If your doctor finds any abnormalities in the texture, shape or size of your gland, you may need more tests.

- **Prostate-specific antigen (PSA) test**. A blood sample is drawn from a vein and analyzed for PSA, a substance that's naturally produced by your prostate gland to help liquefy semen. It's normal for a small amount of PSA to enter your bloodstream. However, if a higher than normal level is found, it may be an indication of prostate infection, inflammation, enlargement or cancer. Studies have not been able to show that routine screening decreases the chance that anyone will die of prostate cancer, but screening with PSA and DRE can help identify cancer at an earlier stage.

- **Transrectal ultrasound**. If other tests raise concerns, your doctor may use transrectal ultrasound to further evaluate your prostate. A small probe, about the size and shape of a cigar, is inserted into your rectum. The probe uses sound waves to get a picture of your prostate gland.

- **Prostate biopsy**. If initial test results suggest prostate cancer, your doctor may recommend biopsy. To do a prostate biopsy, your doctor inserts a small ultrasound probe into your rectum. Guided by images from the probe, your doctor uses a fine, spring-propelled needle to retrieve several very thin sections of tissue from your prostate gland. A pathologist who specializes in diagnosing cancer and other tissue abnormalities evaluates the samples. From those, the pathologist can tell if the tissue removed is cancerous and estimate how aggressive your cancer is.

Determine how far the cancer has spread

Once a cancer diagnosis has been made, you may need further tests to help determine if or how far the cancer has spread. Many men don't require additional studies and can directly proceed with treatment based on the characteristics of their tumors and the results of their pre-biopsy PSA tests.

- **Bone scan**. A bone scan takes a picture of your skeleton in order to determine whether cancer has spread to the bone. Prostate cancer can spread to any bones in your body, not just those closest to your prostate, such as your pelvis or lower spine.

- **Ultrasound**. Ultrasound not only can help indicate if cancer is present, but also may reveal whether the disease has spread to nearby tissues.

- **Computerized tomography (CT) scan**. A CT scan produces cross-sectional images of your body. CT scans can identify enlarged lymph nodes or abnormalities in other organs, but they can't determine whether these problems are due to cancer. Therefore, CT scans are most useful when combined with other tests.

- **Magnetic resonance imaging (MRI)**. This type of imaging produces detailed, cross-sectional images of your body using magnets and radio waves. An MRI can help detect evidence of the possible spread of cancer to lymph nodes and bones.

- **Lymph node biopsy**. If enlarged lymph nodes are found by a CT scan or an MRI, a lymph node biopsy can determine whether cancer has spread to nearby lymph nodes. During the procedure, some of the nodes near your prostate are removed and examined under a microscope to determine if cancerous cells are present.

**Grading**

When a biopsy confirms the presence of cancer, the next step, called grading, is to determine how aggressive the cancer is. The tissue samples are studied, and the cancer cells are compared with healthy prostate cells. The more the cancer cells differ from the healthy cells, the more aggressive the cancer and the more likely it is to spread quickly.

Cancer cells may vary in shape and size. Some cells may be aggressive, while others aren't. The pathologist identifies the two most aggressive types of cancer cells when assigning a grade. The most common scale used to evaluate prostate cancer cells is called a Gleason score. Based on the microscopic appearance of cells, individual ratings from 1 to 5 are assigned to the two most common cancer patterns identified. These two numbers are then added together to determine your overall score. Scoring can range from 2 (nonaggressive cancer) to 10 (very aggressive cancer).
Prostate cancer stages indicate how far cancer has spread.

Staging
After the level of aggressiveness of your prostate cancer is known, the next step, called staging, determines if or how far the cancer has spread. Your cancer is assigned one of four stages, based on how far it has spread:

**Stage I.** Signifies very early cancer that's confined to a microscopic area that your doctor can't feel.

**Stage II.** Your cancer can be felt, but it remains confined to your prostate gland.

**Stage III.** Your cancer has spread beyond the prostate to the seminal vesicles or other nearby tissues.

**Stage IV.** Your cancer has spread to lymph nodes, bones, lungs or other organs.
Complications

The typical complications of prostate cancer and its treatments include:

- **Spread of cancer**
- **Pain**
- **Difficulty urinating (urinary incontinence)**
- **Erectile dysfunction (ED)**
- **Depression**

Complications from prostate cancer are related to both the disease and its treatment. One of the biggest fears of many men who have prostate cancer is that treatment may leave them incontinent or unable to maintain an erection firm enough for sex (erectile dysfunction). Fortunately, therapies exist to help cope with or treat these conditions.

The typical complications of prostate cancer and its treatments include:

**Spread of cancer.** Prostate cancer can spread to nearby organs or travel through your bloodstream or lymphatic system, affecting your bones or other organs. Treatments for prostate cancer that has spread can include hormone therapy, radiation therapy and chemotherapy.

**Pain.** Although early-stage prostate cancer typically isn't painful, once it's spread to bones it can be. Not all people with cancer that has spread to bones have pain, but in some cases, pain is intense and doesn't go away. Treatments directed at shrinking the cancer often can produce significant pain relief. Medications ranging from over-the-counter pain relievers to prescription narcotics can alleviate pain. If your pain is severe, you may need to see a pain specialist. While it's not always possible to make all of your pain go away, your doctor will work with you to try to control pain to a point where you're comfortable. If you're in serious pain, tell your doctor. Pain can be controlled, and there's no reason you have to suffer.

**Difficulty urinating (urinary incontinence).** Both prostate cancer and its treatment can cause incontinence. Treatment depends on the type of incontinence you have, how severe it is and the likelihood it will improve over time. Treatments include behavior modifications (such as going to the bathroom at set times rather than just according to urges), exercises to strengthen pelvic muscles (commonly called Kegel exercises), medications and catheters. If incontinence continues for a prolonged period without getting better, your doctor may suggest more aggressive procedures. These may include implanting an artificial urinary sphincter, placement of a sling of synthetic material to compress the urethra, or the injection of bulking agents into the lining of the urethra at the base of the bladder to reduce leakage.

**Erectile dysfunction (ED) or impotence.** Like incontinence, ED can be a result of prostate cancer or its treatment, including surgery, radiation or hormone treatments. Medications and vacuum devices that assist in achieving erection are available to treat ED. Medications include sildenafil (Viagra), tadalafil (Cialis) and vardenafil (Levitra). If other treatments fail, penile implants can be inserted surgically to help create an erection.

**Depression.** Many men may feel depressed after a diagnosis of prostate cancer or after trying to cope with the side effects of treatment. These feelings may last for only a short time, they may come and go, or they may linger for weeks or even months. Talk to your doctor if you have depression that interferes with your ability to get things done or enjoy your life. Treatment such as counseling or antidepressant medication can make a big difference.
Treatments and drugs

External beam radiation therapy (EBRT)
- Side effects of EBRT can include:
  - Urinary problems. The most common signs and symptoms are urgency to urinate and frequent urination. These problems usually are temporary and gradually diminish in a few weeks after completing treatment. Long-term problems are uncommon.
  - Loose stools, rectal bleeding, discomfort during bowel movements or a sense of needing to have a bowel movement (rectal urgency). In some cases these problems persist for months after treatment, but they improve on their own in most men. If you develop these symptoms, medications can help. Rarely, men develop persistent bleeding or a rectal ulcer after radiation. Surgery may be necessary to alleviate these problems.
  - Sexual side effects. Radiation therapy doesn't usually cause immediate sexual side effects such as erectile dysfunction, but some men who've had the treatment have sexual problems later in life.

Radioactive seed implants
Radioactive seeds implanted into the prostate have gained popularity in recent years as a treatment for prostate cancer. The implants, also known as brachytherapy, deliver a higher dose of radiation than do external beams, but over a substantially longer period of time. The therapy is generally used in men with smaller or moderate-sized prostates with small and lower grade cancers.

During the procedure, between 40 and 100 rice-sized radioactive seeds are placed in your prostate through ultrasound-guided needles. The implant procedure typically lasts one to two hours and is done under general anesthesia — which means you won't be awake. Most men can go home the day of the procedure. Sometimes, hormone therapy is used for a few months to shrink the size of the prostate before seeds are implanted. The seeds may contain one of several radioactive isotopes — including iodine and palladium. These seeds don't have to be removed after they stop emitting radiation. Iodine and palladium seeds generally emit radiation that extends only a few millimeters beyond their location. This type of radiation isn't likely to escape your body in significant doses. However, doctors recommend that for the first few months you stay at least six feet (1.83 meters) away from children and pregnant women, who are especially sensitive to radiation. All radiation inside the pellets is generally exhausted within a year.

Side effects of radioactive seed implants can include:
- Urinary problems. The procedure causes urinary signs and symptoms such as frequent, slow and painful urination in nearly...
Prevention

Prostate cancer can't be prevented, but you can take measures to reduce your risk or possibly slow the disease's development.

Eat well. High-fat diets have been linked to prostate cancer. Therefore, limiting your intake of high-fat foods and emphasizing fruits, vegetables and whole fibers may help you reduce your risk. Foods rich in lycopene, an antioxidant, also may help lower your prostate cancer risk. These foods include raw or cooked tomatoes, tomato products, grapefruit and watermelon. Garlic and some vegetables such as arugula, bok choy, broccoli, Brussels sprouts, cabbage and cauliflower also may help fight cancer. Vitamin E has shown promise in reducing the risk of prostate cancer among smokers. More research is needed, however, to see whether vitamin E might be effective.

Get regular exercise. Regular exercise can help prevent a heart attack and conditions such as high blood pressure and high cholesterol. When it comes to cancer, the data aren't as clear-cut, but studies do indicate that regular exercise may reduce your cancer risk, including your risk of prostate cancer. Exercise has been shown to strengthen your immune system, improve circulation and speed digestion — all of which may play a role in cancer prevention. Exercise also helps to prevent obesity, another potential risk factor for some cancers. Regular exercise may also minimize your symptoms and reduce your risk of prostate gland enlargement, or benign prostatic hyperplasia (BPH). Men who are physically active usually have less-severe symptoms than do men who get little exercise.

Ask your doctor about taking an NSAID. Nonsteroidal anti-inflammatory drugs (NSAIDs) might prevent prostate cancer. These drugs include ibuprofen (Advil, Motrin, others) and naproxen (Aleve). NSAIDs inhibit an enzyme called COX-2, which is found in prostate cancer cells. More studies are needed to confirm whether NSAID use actually results in lower rates of prostate cancer or reduced deaths from the disease.

Research on prostate cancer prevention has shown that the drug finasteride (Proscar, Propecia) may prevent or delay the onset of prostate cancer in men 55 years and older. This drug is currently used to control prostate gland enlargement and hair loss in men. However, finasteride has also been shown to contribute to increasing sexual side effects and to slightly raise the risk of developing higher grade prostate cancer. At this time, this drug isn't routinely recommended to prevent prostate cancer.
Risk Factors & Symptoms

- African American men are 56% more likely to be diagnosed with prostate cancer than Caucasian men and are nearly 2.5 times as likely to die from the disease.

- The only well-established risk factors for prostate cancer are age, ethnicity and family history of the disease; however, high dietary fat intake may also be a significant risk factor.

- The chance of being diagnosed with prostate cancer increases rapidly after age 50. More than 65% of all prostate cancers are diagnosed in men over the age of 65.

- Early prostate cancer usually has no symptoms and is most commonly detected through prostate cancer screening tests such as the PSA blood test and digital rectal exam.
Treatments and Survival Rates

• Prostate cancer can be eliminated from the body by surgery or radiation – if diagnosed at an early stage. However, every year, 70,000 men require additional treatment due to a recurrence of prostate cancer.

• Because approximately 90% of all prostate cancers are detected in the local and regional stages, the cure rate for prostate cancer is very high—nearly 100% of men diagnosed at this stage will be disease-free after five years.
Cancer-Related Deaths

• In 2008, more than 28,000 American men will lose their lives to prostate cancer.
• Every 19 minutes, a man dies from prostate cancer in the United States.
Projections

• The number of new cases and deaths of prostate cancer is expected to increase dramatically over the next decade as baby boomer men age into the target zone for prostate cancer.
• If there is no change in prevention or treatment strategies, by 2015, there will be approximately 3 million men battling prostate cancer.
• If there are no better treatments or a cure for prostate cancer, by 2015, 45,000 men will die from the disease each year.
Testicular cancer
• Compared with other types of cancer, testicular cancer is rare. But testicular cancer is the most common cancer in American males between the ages of 15 and 34. The cause of testicular cancer is unknown.

• Testicular cancer is highly treatable, even when cancer has spread beyond the testicle. Depending on the type and stage of testicular cancer, the client may receive one of several treatments, or a combination.

• Regular testicular self-examinations can help identify growths early, when the chance for successful treatment of testicular cancer is highest.

Lance Armstrong
Signs and Symptoms

- A lump or enlargement in either testicle
- A feeling of heaviness in the scrotum
- A dull ache in the abdomen or groin
- A sudden collection of fluid in the scrotum
- Pain or discomfort in a testicle or the scrotum
- Enlargement or tenderness of the breasts
- Unexplained fatigue or a general feeling of not being well
- Cancer usually affects only one testicle.
Causes of Testicular Cancer

- Nearly all testicular cancers begin in the germ cells — the cells in the testicles that produce immature sperm. What causes germ cells to become abnormal and develop into cancer isn't known.
Risk factors

• An undescended testicle (cryptorchidism).
• Abnormal testicle development.
• Family history.
• Age.
• Race.

An undescended testicle (cryptorchidism). The testes form in the abdominal area during fetal development and usually descend into the scrotum before birth. Men who have a testicle that never descended are at greater risk of testicular cancer than are other men are. The risk remains, even if the testicle has been surgically relocated to the scrotum. Still, the majority of men who develop testicular cancer don't have a history of undescended testicles.

Abnormal testicle development. Conditions that cause testicles to develop abnormally, such as Klinefelter's syndrome, may increase your risk of testicular cancer.

Family history. If other family members have had testicular cancer, you may have an increased risk.

Age. Testicular cancer affects teens and younger men, particularly those between ages 15 and 34. However, it can occur at any age.

Race. Testicular cancer is more common in white men than in black men. The reason for racial differences in the incidence of testicular cancer is unknown.
What to tell the physician

• If your client detects any pain, swelling or lumps in the testicles or groin area, especially if these signs and symptoms last longer than two weeks.

• Only a small percentage of testicular cancers are painful from the outset.
Tests and diagnosis

Most men discover testicular cancer themselves, either unintentionally or while doing a testicular self-examination to check for lumps. In other cases, your doctor may detect a lump during a routine physical exam.

To determine whether a lump is testicular cancer, your doctor may recommend:

**Ultrasound.** A testicular ultrasound test uses sound waves to create a picture of the scrotum. During an ultrasound you lie on your back with your legs spread. Your doctor then applies a clear gel to your scrotum. A hand-held probe is moved over your scrotum to make the ultrasound image.

An ultrasound test can help your doctor determine the nature of any testicular lumps, such as if the lumps are solid or fluid filled. Ultrasound also tells your doctor whether lumps are inside or outside of the testicle. Your doctor uses this information to determine whether a lump is likely to be testicular cancer.

**Blood tests.** Your doctor may order tests to determine the levels of tumor markers in your blood. Tumor markers are substances that occur normally in your blood, but the levels of these substances may be elevated in certain situations, including testicular cancer. A high level of a tumor marker in your blood doesn't mean you have cancer, but it may help your doctor in determining your diagnosis.

**Surgery to remove a testicle (radical inguinal orchiectomy).** If your doctor determines the lump on your testicle may be cancerous, he or she may recommend surgery to remove the testicle. Your testicle will be analyzed in a laboratory to determine if the lump is cancerous and, if so, what type of cancer.

In general, a biopsy or removal of the lump alone isn’t used when testicular cancer is suspected. However, a biopsy may be an option in certain situations, for instance, if you have only one testicle.

**Determining the type of cancer**

Your doctor will have your extracted testicle analyzed to determine the type of the testicular cancer. The type of testicular cancer you have determines your treatment and your prognosis. In general, there are two types of testicular cancer:

- **Seminoma.** Seminomas occur in all age groups, but if an older man develops testicular cancer it is more likely to be seminoma. Seminomas, in general, aren’t as aggressive as nonsemionomas, and are particularly sensitive to radiation therapy.

- **Nonseminoma.** Nonseminoma tumors tend to develop earlier in life and grow and spread rapidly. Several different types of nonsemionomatous tumors exist, including choriocarcinoma, embryonal carcinoma, teratoma and yolk sac tumor. Nonsemionomatous tumors are sensitive to radiation therapy, but not as sensitive as seminomas. Chemotherapy is often very effective for nonsemionomas, even if the cancer has spread.

Sometimes both types of cancer are present in a tumor. In that case, the cancer is treated as though it is nonseminoma.

**Staging the cancer**

Once your doctor confirms your diagnosis, the next step is to determine the extent (stage) of the cancer. To determine whether cancer has spread outside of your testicle, you may undergo:

**Computerized tomography (CT).** CT scans take a series of X-ray images of your abdomen. Your doctor uses CT scans to look for signs of cancer in your abdominal lymph nodes.

**X-ray.** An X-ray of your chest may determine whether cancer has spread to your lungs.

**Blood tests.** Blood tests to look for elevated tumor markers can help your doctor understand whether cancer likely remains in your body after your testicle is removed.

After these tests, your doctor assigns your testicular cancer a stage. The stage helps determine what treatments are best for you. The stages of testicular cancer are:

- **Stage I.** Cancer is limited to the testis.
- **Stage II.** Cancer has spread to the lymph nodes in the abdomen.
- **Stage III.** Cancer has spread to other parts of the body. Testicular cancer most commonly spreads to the lungs, liver, bones and brain.
**Treatments and drugs**

- Surgery (Orchiectomy)
- Radiation therapy
- Chemotherapy
- Treatment for advanced or recurrent testicular cancer

**The options you have for treating your testicular cancer depend on several factors, including the type and stage of your cancer, your overall health and your own preferences. Treatment options may include:**

**Surgery**

**Surgery to remove your testicle (radical inguinal orchiectomy) is the primary treatment for nearly all stages and types of testicular cancer.** To remove your testicle, your surgeon makes an incision in your groin and extracts the entire testicle through the opening. A prosthetic, saline-filled testicle can be inserted if you choose. You'll receive anesthesia during surgery. All surgical procedures carry a risk of pain, bleeding and infection.

You may also have surgery to remove the lymph nodes in your groin (retroperitoneal lymph node dissection). Sometimes this is done at the same time as surgery to remove your testicle. In other cases it can be done later. Your lymph nodes are removed through a large incision in your abdomen. Your surgeon takes care to avoid severing nerves surrounding the lymph nodes, but in some cases severing the nerves may be unavoidable. Severed nerves can cause difficulty ejaculating, but won't prevent you from having an erection. A newer technique called nerve-sparing surgery may be an option.

In cases of early-stage testicular cancer, surgery may be the only treatment needed. Your doctor will give you a recommended schedule for follow-up appointments. At these appointments — typically every few months for the first few years and then less frequently after that — you'll undergo blood tests, CT scans and other procedures to check for signs that your cancer has returned. If you have a more advanced testicular cancer or if you're unable to adhere closely to the recommended follow-up schedule, your doctor may recommend other treatments after surgery.

**Radiation therapy**

Radiation therapy uses high-powered energy beams, such as X-rays, to kill cancer cells. During radiation therapy, you're positioned on a table and a large machine moves around you, aiming the energy beams at precise points on your body. Side effects may include fatigue, as well as skin redness and irritation in your abdominal and groin areas. You may experience infertility as a result of radiation therapy. However, as the treated area heals you may regain your fertility.

**Chemotherapy**

Chemotherapy treatment uses drugs to kill cancer cells. Chemotherapy drugs travel throughout your body to kill cancer cells that may have migrated from the original tumor. Your doctor might recommend chemotherapy after surgery. Chemotherapy may be used before or after lymph node removal. Side effects of chemotherapy depend on the drugs being used. Ask your doctor what to expect. Common side effects include fatigue, nausea, hair loss, infertility and an increased risk of infection.

**Treatment for advanced or recurrent testicular cancer**

If your cancer hasn't responded to other treatments or if your cancer has returned, you and your doctor may consider other treatments. You may consider enrolling in a clinical trial. These research studies give you a chance to try experimental treatments and procedures that are being developed for future use. Clinical trials aren't guaranteed to bring a cure, and side effects of new medications may not be known. Ask your doctor about clinical trials that are open to people with testicular cancer, as well as the possible risks and benefits of experimental treatments.
Stem Cell

- One treatment being studied for use in advanced testicular cancer is stem cell transplant. Before a stem cell transplant, you're given drugs that coax your body's bone marrow stem cells out of your bones and into your bloodstream. Then the stem cells are filtered from your blood and frozen for later use. You then undergo high doses of chemotherapy to kill any cancer cells in your body, which may also kill bone marrow cells. Your stored stem cells are thawed and put back into your body to replenish your bone marrow cells.
Complications of treatment

• Complications
  – Surgery
  – Radiation therapy.
  – Chemotherapy.

• Since infertility is so common, you may educate the client to consider storing sperm in a sperm bank before he will begin treatment — even if he has yet to consider having children. In most cases, storing sperm now for later use is more successful than trying to restore fertility.

Complications
Testicular cancer treatment can cause infertility. Whether you'll experience infertility after cancer treatment depends on the extent of your cancer and what treatments you undergo. Many men with testicular cancer have decreased sperm production even before cancer treatment begins. Treatments that can cause infertility include:

**Surgery.** Surgery to remove one testicle (orchiectomy) won't cause infertility, and it won't affect your ability to have an erection. If your surgery involves removal of lymph nodes (retroperitoneal lymph node dissection) you may experience difficulty ejaculating if nerves are severed during surgery. Lymph node dissection won't affect your ability to get an erection. Surgery using a nerve-sparing technique reduces the chance that you'll have trouble ejaculating after treatment. Ask your surgeon whether this procedure may be appropriate for you.

Surgery to remove both testicles will leave you infertile. Also, your body will no longer be able to make testosterone, so your doctor will recommend testosterone replacement treatments.

**Radiation therapy.** Radiation therapy can interfere with sperm production, causing infertility. For some men, sperm production may be limited for a year or two, eventually returning as the treated area heals. For other men, infertility may be permanent after radiation therapy.

**Chemotherapy.** Certain chemotherapy drugs can cause infertility, while others won't. Ask your doctor about your particular chemotherapy drugs. In some cases, sperm production may come back with time. In other cases, infertility is permanent after chemotherapy.

Consider storing sperm in a sperm bank before you begin treatment — even if you’ve yet to consider having children or you think you won’t want more children. In most cases, storing sperm now for later use is more successful than trying to restore fertility later if you decide you’d like to start a family. Sperm can be frozen (cryopreserved) for years in case you experience infertility after cancer treatment.
Prevention

- A regular self-examination of the testicles can identify growths early. Grasp and roll the testicle between your thumbs and forefingers, feeling for lumps, swelling, hardness or other changes.

There's no sure way to prevent testicular cancer. However, regularly self-examination may improve your chances of finding a tumor at its earliest stage. Beginning in your midteenage years, and continuing throughout your life, examine your testicles at least once a month.

A good time to examine your testicles is after a warm bath or shower. The heat from the water relaxes your scrotum, making it easier for you to find anything unusual.

To do this examination, follow these steps:

**Stand in front of a mirror.** Look for any swelling on the skin of the scrotum.

**Examine each testicle with both hands.** Place the index and middle fingers under the testicle while placing your thumbs on the top.

**Gently roll the testicle between the thumbs and the fingers.** Remember that the testicles are usually smooth, oval shaped and somewhat firm. It's normal for one testicle to be slightly larger than the other. Also, the cord leading upward from the top of the testicle (epididymis) is a normal part of the scrotum. By regularly performing this exam, you will become more familiar with your testicles and aware of any changes that might be of concern.

**If you find a lump, call your doctor as soon as possible.** Testicular cancer is highly treatable, especially when identified early.

Your doctor should also examine your testicles whenever you have a physical. If you have an undescended testicle, be sure to tell your doctor, who may refer you to a urologist for treatment or a more specialized exam.
Priority Nursing Diagnosis

• Anxiety related to a threat or change in health status and treatment options
• Acute pain or chronic pain related to effects of metastasis, bone pain, and spinal cord compression
• Impaired urinary elimination related to altered body structure or function (secondary to disease process and treatment)