

# GEISINGER MEDICAL LABORATORIES

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## Highlights

## An Introduction to Off-Site Phlebotomy

### ***An Introduction to Off-Site Phlebotomy***

Geisinger Medical Laboratories (GML) Off-Site Phlebotomy was started in 2008, combining Mobile Phlebotomy and the Geisinger Regional Laboratories (GRL) independent Patient Service Centers in both the Northeast and Central Regions. Twenty-five experienced phlebotomists currently staff this department.

### ***Proper Ordering of Urinalysis Specimens***

Mobile Phlebotomy Services cover a large part of Northeastern, Central and Western Pennsylvania, providing home phlebotomy collections for patients who do not have the ability to get out on their own or without assisted transportation, as well as skilled nursing facility phlebotomy throughout all areas. Since the inception of Mobile Phlebotomy, the department has grown by leaps and bounds. Starting off with a few home patients and GHP patients in skilled nursing facilities, we now serve more than 2,700 patients system-wide. We also serve several contracted skilled nursing facilities, where we collect specimens daily.

### ***The Sweat Test: Diagnosing Cystic Fibrosis***

### ***HIV/AIDS Update***

### ***Testosterone Assay Changes***

Most recently a database was created that has taken the old fashioned filing system, which consisted of a large filing cabinet full of paper requisitions and patient updates, and put all of that information into an electronic system. We now have all of the information we can possibly need at our fingertips.

### ***Helpful Hints***

Along with the database is the process of pre-registering and ordering our homebound patients, making our specimens instrument-ready when they are brought back to the lab. We have also started to pilot this system with our skilled nursing facilities. Our goal is to make all of our specimens instrument-ready within the next 6 months, helping us lower our specimen rejection rates and labeling errors, and ultimately helping our patients.

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Our patient service centers (or PSCs) are spread out through the Northeastern and Central Regions. Dunmore and Mountain Top service the Northeast, with Mountain Top also providing Radiology and EKG services on-site. Central Road and Lows Road service the Bloomsburg area, with Lows Road also performing on-site testing.

Have a suggestion, comment  
or article to submit?

Please email us at  
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About a year and a half ago, we started registering our patients, using a quick registration system. This also helps in making our specimens instrument-ready when they reach the lab doors. Before this system, our staff would just draw the specimens and send them in with the patients' orders. This has helped reduce errors in many ways and also decreases the turnaround time for results.

All in all, it has been a successful two years for this department, with many more exciting things to come.

## Proper Ordering of Urinalysis Specimens

Proper ordering of urinalysis specimens ensures that patients are charged correctly. Please follow these guidelines when choosing a urinalysis test:

### ***UAC: Routine Urinalysis***

Urine dipstick is done and, IF criteria are met (cloudy urine, protein > trace, or positive blood, nitrate or esterase), a microscopic is also done.

### ***UACM - Urinalysis with Microscopic***

Urine dipstick AND a microscopic are done, regardless of criteria being met for the microscopic. If a UACM is ordered in error and the urine dipstick is negative, a microscopic is done anyway, and the patient gets an extra charge.

### ***UAM - Urine Microscopic Only***

Usually ordered only when urine is dipped on site.



## The Sweat Test: Diagnosing Cystic Fibrosis

*This article is dedicated to Veronica, who 'fought the good fight.'*

Cystic Fibrosis (CF) is an inherited chronic disease caused by a mutated gene found on chromosome #7. It affects the lungs and digestive system of nearly 30,000 children and adults in the United States alone. Since CF is a recessive genetic disease, affected persons must inherit a copy of the abnormal gene from each parent. Persons with only one copy of the gene are called "carriers." They do not show symptoms or become ill, but they can pass the defective gene onto their children. Ten million Americans are carriers of this mutated gene – that's about 1 in 31 people!

The abnormal gene affects the production of the cystic fibrosis transmembrane regulator (CFTR), a protein that is responsible for controlling the movement of electrolytes (sodium and chloride) in and out of the body's epithelial cells. People with CF have little or no CFTR present, so not enough salt and water line the outside of the lungs and pancreas. This makes mucous thick and difficult to move. As a result, respiratory infections, obstructed liver and pancreatic ducts, and difficulty in breaking down and absorbing food can occur. Many males with CF are also infertile because they are born without the tubules that transport sperm from the testes.

Common signs and symptoms of CF may include:

- Frequent, persistent cough, sometimes with phlegm
- Frequent lung infections such as bronchitis or pneumonia
- Stomach pain
- Weight loss, even with good appetite
- Chronic diarrhea with foul-smelling, greasy stools
- Salty-tasting skin

Most people are diagnosed with CF at birth by a newborn screening test. If a physician observes signs of CF, he may order a sweat test or a genetic test, among others, to confirm the diagnosis. Geisinger Medical Laboratories performs sweat testing on-site to aid in the diagnosis of CF. This is a simple, pain-free test that measures the concentration of salt (chloride) in a person's sweat. If the chloride level is high, it indicates CF is present, since people with CF produce up to five times as much sodium chloride in their sweat than normal.

In the test, a tiny bit of sweat-stimulating liquid is placed on a patch of skin on the arm or leg. An electrode is then placed on the skin, and a weak electrical current stimulates the area. This may feel warm and tingly. After several minutes, the skin is cleaned and sweat is collected for 30 minutes, either by a piece of gauze or filter paper or a piece of plastic tubing. The level of chloride in the sweat collected is then analyzed in the laboratory.

In the 1950s, few children with CF lived to attend elementary school. The severity of the disease and age of diagnosis both affect how long a person may live, but many of today's advances in research and medicine have enhanced and extended the lives of those diagnosed with CF. According to the Cystic Fibrosis Foundation, "...more than 45 percent of all people with CF in this country are 18 years or older." Also, "In 2008, the median predicted age of survival rose to 37.4 years, up from 32 in 2000." With more than 25 drugs currently in clinical trials, there is hope in the future to find a cure for this disease.

# HIV/AIDS Update

HIV stands for the Human Immunodeficiency Virus. At the end of 2004, it was estimated that 1.0 million people in North America had been infected with the virus. HIV infection plus immune system breakdown results in Acquired Immune Deficiency Syndrome (AIDS). The immune system breakdown can be a CD4 count (T-cells that fight infection) of less than 200 or an AIDS-defining illness such as pneumocystis pneumonia, toxoplasmosis, Kaposi's sarcoma, mycobacterium avium complex, etc.

The number of AIDS diagnoses has increased annually by approximately 2% between 2001 and 2008. However, the rates of HIV infection have not changed. Pennsylvania is ranked 8<sup>th</sup> in the nation for cumulative reported AIDS cases (per 2007 CDC report). Northeastern Pennsylvania has seen a 4.1% increase of AIDS cases over the past 9 months of 2010 (per PA Department of Health).

The fastest growing groups of new infections are seen in teens age 13-19. They are followed by women of color age 19-44, and then by people over 50. HIV/AIDS is spread by unprotected sex, including oral sex, sharing needles, blood to blood, and mother to child. No one should share needles. Recent concern is that elderly diabetics have been found sharing needles, even in nursing homes. Blood to blood contact can occur if healthcare workers do not use universal precautions, or if first responders at accident scenes do not wear gloves or take other precautions to protect themselves. Mother-to-child transmission can occur during pregnancy (in utero), during birth (intra-partum), or while breast feeding (post-partum). Without treatment, 25% of babies born to HIV-positive mothers will be infected. Prenatal care, HIV treatment, and C-section delivery can lower the risk of transmission to 1%. Children of HIV-infected mothers should be tested for viral load at birth, treated prophylactically, and retested at 18 months of age.

The good news is that the number of AIDS deaths has been falling. AIDS is not fatal in itself. The infections that the patient develops can be fatal. Antiretroviral therapy is available, but there are drawbacks. There are difficult drug regimens to which the patient must adhere, side effects (it can cause liver damage), and it can be very expensive. Costs are estimated at over \$3,800 per month for the medications for AIDS alone. If the patient has other sexually transmitted diseases (STDs) or other conditions, costs are even higher.

Factors affecting treatment include viral load, CD4 cell counts (treatment is usually started at counts less than 500), and HIV genotyping, which helps determine the strain and drug sensitivity. Post exposure prophylaxis is available and should be started within 72 hours and continued for one month. This has resulted in an 80% reduction in HIV infections for occupational exposures.

HIV testing consists of screening tests either by enzyme-linked immunosorbent assay (ELISA) or enzyme immunoassay (EIA). Confirmatory testing is through a Western blot assay or indirect immunofluorescence assay (IFA). Per the PA Department of Health, a negative HIV antibody test is over 99% accurate if it has been at least three months since the HIV exposure. A positive HIV antibody test is also considered 99% accurate per the PA Department of Health.

Additional information about HIV and AIDS can be obtained from the CDC National AIDS Hotline at 1-800-342-AIDS (2437) or from the PA Department of Health.

## Helpful Hints

### 1.

All patient samples and specimens submitted to Geisinger Medical Laboratories must include two forms of identification:

Patient's first and last name  
AND  
Patient's date of birth (month, day and year) OR GHS medical record number.

### 2.

If you are unsure about how to collect or submit a specimen for a specific test, please refer to our online test catalog:

[www.geisingermedicallabs.com/catalog](http://www.geisingermedicallabs.com/catalog)

In addition to providing collection and transport instructions, it also pictures the device that should be used for specimen collection.

### 3.

GML uses color-coded bags for transporting specimens at different temperatures: Yellow for Room Temperature; Green for Refrigerated; Blue for Frozen.



Contact your Customer Care Rep or Client Services (1-800-695-6491) to obtain a supply.

## Testosterone Assay Changes

Due to its discontinuation by the manufacturer, we will soon be replacing our current free testosterone assay with a calculated bioavailable testosterone assay derived from measurement of total testosterone, sex hormone binding globulin and serum albumin. In the interim, samples will be sent to Quest Diagnostics for a similar bioavailable testosterone measurement. Both the Quest send-out and the GMC in-house assay also include a calculated free testosterone estimate.

In recent years, it has become apparent that many serum testosterone assays lack the accuracy, specificity, sensitivity, and precision required for reliable clinical use. As a result, a number of manufacturers have ceased production of antibody-based, direct free testosterone assays.

An important issue is knowing when to use free testosterone (FT) vs. bioavailable testosterone (BioT) vs. total testosterone (TT) for diagnosis. The FT and BioT parameters are calculated from the values of TT, SHBG, and albumin. In general, the sum of free and albumin-bound testosterone represents the bioavailable fraction of testosterone. Testosterone binds to albumin with weak affinity and is, therefore, considered as bioavailable as unbound (free) testosterone. However, testosterone binds to sex-hormone binding globulin (SHBG) with high affinity and is not considered bioavailable.

BioT and FT are well correlated in most cases; however, FT measured by direct immunoassay has been shown to be less reliable than the calculated FT for clinical use. Evaluation of hypogonadism in men can be done using most assays (TT, calculated BioT or calculated FT), though calculated FT or BioT may be more useful when testosterone concentration is low. Calculated FT is most useful in the evaluation of hyperandrogenemia in women.