

Phlebotomy Order of Draw

How blood is drawn is very critical to the care of the patient. The collector actually plays a fundamental and critical role in the accuracy of test results, not only for identifying the patient, but also for the integrity of the sample. We know hemolysis affects testing, and we know that if a tube isn't filled with adequate blood to anticoagulant ratio, that specimen is not suitable for testing. There are some integrity issues that aren't so obvious.

The order the tubes are drawn is recommended by NCCLS to keep us from causing a medical mistake based on inaccurate results. If the tubes are filled in the wrong order, it can cause mistakes that are invisible to the person performing the test. If a physician acts on this inaccurate result, the potential exists for tragedy.

When drawing with a vacutainer, tubes generally fill from top to bottom, thus contaminating the needle that pierced the stopper with the blood/additive mixture. Trace amounts could be carried over to the next tube creating the likelihood of test inaccuracy. These inaccurate results could lead to a mistake in diagnosis or medication. This proves why the person responsible for the collection is so crucial to patient care.

The current recommendation by NCCLS for order of draw are:

Some facilities may have a variation on this order based on internal studies, so it is important to follow the order implemented by your facility.

This order of draw is more than just a minor detail. Accurate test results cannot come to fruition without a blood specimen that has been collected in the most defined and exact fashion. ♦

1. Blood cultures
2. Sodium Citrate tube (blue stopper)
3. Serum tubes with or without clot activator or gel separator (red, gold, or speckled)
4. Heparin tubes with or without gel (green stopper)
5. EDTA tubes (lavender tubes)
6. Glycolytic inhibitor (gray stopper)

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Congestive Heart Failure

- by Raema Neugebauer

Congestive Heart Failure (CHF) is defined as the inability of the myocardium to pump sufficient amounts of blood from the ventricles to meet the metabolic demands of the body. In the US, it is the most common disease of the elderly (>65) years old. CHF affects over 4.8 million Americans, with more than 550,000 new cases diagnosed each year. It is the leading cause of hospital admissions among patients over the age of 65 and accounts for 3% of the total national health care budget, 70% of which comes from hospitalization.

In the face of this growing public health problem, early and accurate diagnosis is critical for improving patient outcome and help to curb the staggering cost associated with their care. However, diagnosing CHF can be clinically challenging. Some symptoms, such as shortness of breath and fluid retention, are non-specific and can be attributed to other conditions. In fact, as many as 50% of CHF patients are originally misdiagnosed.

Laboratory medicine is playing an increasingly important role in the diagnosis of CHF. The measurement of the brain natriuretic peptide (BNP) has become an increasingly important diagnostic aid as a means of identifying patients with systolic and diastolic dysfunctions. ProBNP contains 108 amino acids and is secreted mainly by the left ventricle of the heart. During the process of secretion it is cleaved into physiologically active BNP and N-terminal fragment, NT-proBNP, which is biologically inactive. NT-proBNP increases and therefore can be useful in early detection in patients suspected of having CHF and to help differentiate between heart failure and lung disorders with similar symptoms. The monitoring of the NT-proBNP levels may also be useful in following the therapy of CHF patients being treated with diuretics, ACE inhibitors, Beta blockers, or Digoxin.

The measurement of the NT-proBNP is achieved by the use of specific double antibody immunoassay with electrochemiluminescent detection. NT-proBNP is generally more sensitive but less specific than the BNP assay ♦

PACKAGING REMINDER:

Please expel excess air from transport bags prior to sealing. If bags are sealed with air pockets inside, this creates transport issues for our couriers. Your attention to this matter is greatly appreciated.

UPCOMING CALENDAR OF EVENTS

Watch the mail for more information regarding these ALN Educational Opportunities

August 25 (tentative) 8:30 - noon
Influenza Workshop
Physician presentation, vendor presentations, networking

October 27th (morning workshop)
CLIA Workshop

Avera Laboratory Network *Lab News* is published every other month to provide the latest updates on services from labs of the Avera Laboratory Network.

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Questions may be directed to your Avera Laboratory Network representative or contact Lori Murray at (800) 657-8095, lori.murray@avera.org

Guidelines for Submitting Human Samples for West Nile Virus

SERUM:

Ideal timing of specimens is as follows:

- a. Acute serum should be collected 8-10 days after onset of symptoms.

Acute serum samples collected too early after onset of symptoms may result in false negative results.

- b. Convalescent serum should be collected 2-3 weeks after the acute.

1. Send 2-3 ml serum on cool packs. Serum separated from the red blood cells is preferred to prevent hemolysis.

Standard blood collection tubes without anticoagulant should be used to collect the sample. (Red stopper, red/gray marble stopper, serum gel separator tubes)

CEREBROSPINAL FLUID:

1. Send 2-3 ml of Cerebrospinal fluid if available on cool packs. Do not freeze.

2. Also send serum sample collected at the appropriate time. (see above)

PACKAGING AND SHIPPING:

1. Send specimens properly packaged with absorbent material inside 2 plastic containers on cool packs.
2. Specimens may be shipped by courier or mailed. Areas that do not have next day mail service to destination site should consider alternate shipping method.

ADDITIONAL INFORMATION TO SEND WITH SPECIMENS:

1. Travel history (0-4 weeks before onset of symptoms).
2. Vaccination history (Yellow fever, Dengue, Japanese Encephalitis)
3. Date of symptom onset.
4. Collection date.
5. Physician contact information. ♦

Laboratory Professionals - What does Certification Mean?

by Mona Gleysteen

Not only is the general public confused about who we, "the laboratory professionals are", but also about all the initials that we use. One patient asked a laboratory worker if she was married to a male co-worker. When the laboratorian asked why the patient was asking, the patient replied that both laboratorians had the same last name (MT-ASCP). Others in the lab have been asked what nationality their name, CLS, was.

Recently a laboratory manager asked about an older certification designation. As I told her, I have been "around" long enough to discuss the evolution of the terms. Here is a stroll down memory lane for some and a history lesson for others. I will focus on two certification agencies, the American Society for Clinical Pathology (ASCP) and the National Credentialing Agency for Laboratory Personnel (NCA) as they are the two most common to our region.

When I started in the LATI CLT/MLT program in 1982, my students finished the program in one year and took a NCA

test to be certified as a Clinical Laboratory Technician (CLT). This was because in 1982, ASCP discontinued offering the CLA certification to one-year graduates. Prior to that decision, ASCP was certifying graduates of one-year laboratory programs as CLAs (clinical laboratory assistants). Even though the students at that time were certified as CLAs, the program was called the MLT-C program. The C stood for certificate (meaning that it was a certificate program). When ASCP began testing only graduates of two-year program (Associate of Applied Science or Associate of Arts degrees) and awarding the MLT certificate, many educational programs changed to the two year format and were called MLT-AD programs for associate degree. The AD has been dropped since all programs available are now associate degree programs. A bit later, NCA also decided to test only graduates of two year programs still giving the successful completer a CLT credential.

Also between 1975 and 1987, the then department of Health, Education, and Welfare of the federal government gave

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written tests to high school graduates with a minimum of four years of laboratory experience. If you passed the test you could use the initials, MT(HEW) behind your name. These tests are no longer being given.

The other certification levels, MT(ASCP) and CLS are used for graduates of four year programs or those who have gotten a bachelor's degree and then completed a clinical year of training in an approved laboratory. There should be no difference in acceptance of either of the two certifications (CLS or MT) as equivalent, especially now that ASCP is going to require renewal of certification either by retesting or through continuing education credits. NCA has advocated

renewal of certification from its inception. ASCP has begun requiring renewal of anyone certifying from January 2004 on. The certificate holder will be asked to renew every three years and when they do they will receive the designation of MT(ASCP)CM. Individuals certifying prior to January 2004 will be grandfathered in, i.e. you won't be required to participate in renewal if you don't want to.

I hope that this recollection has been informative. I had to "fry" a few brain cells to remember back twenty plus years ago and it helps if you are prone to being a collector, as I am. Signing off: Mona Gleysteen, MS, CLS, MT(ASCP). ♦

Case Study - by Michelle Sedlacek

A 41-year-old woman complained of increased sweating over the last three months. She also stated that she felt nervous and had lost 12 pounds over the last three weeks. She had also been experiencing non-cramping diarrhea and heat intolerance. Her skin was warm and moist, she had a prominent stare, and her heart rate was 140 beats per minute. Her thyroid gland was diffusely enlarged.

Her lab results follow:

	Reference range
T4= 273 nmol/L	58-167 nmol/L
RT3U ratio= 2.0%	25-30%
TSH IRMA= none detected	5-10
FT4I= 42.4 ng/dl	4.5-12

The most probable cause of these symptoms is hyperthyroidism caused by Graves' disease. Graves' disease is the most common cause of thyrotoxicosis. Thyrotoxicosis is a condition in which a patient is experiencing the metabolic consequences of excessive thyroid hormones.

Symptoms of thyrotoxicosis can be broken down into two separate categories: those caused by catabolic-hypermetabolic effects, and those caused by an increased sensitivity to catecholamines. Hypermetabolic symptoms include weight loss, decreased muscle mass, lower fat stores, decreased serum cholesterol, fatigue, and exercise intolerance. Symptoms that are related to catecholamine sensitivity are nervousness, irritability, insomnia, tremors, sweating, heat intolerance, pruritis, tachycardia, and palpitations.

Graves' disease is six times more common in women, and occurs in about 0.4% of the population. Graves' disease is an autoimmune disorder, the frequency of the HLA-B8 and HLA-Dr3 are more common in patients with Graves' disease than the general population. It also shows familial history, it is 20 times more common in sisters.

In Graves' disease there is a production of abnormal thyroid-stimulating immunoglobulins which interact with the TSH receptors in the follicular cell membrane. Iodine uptake, synthesis of thyroid hormones, and hormone release are stimulated. The production of thyroid hormones occurs without regard to the body's actual need. TSH production is inhibited, and the response of TSH to TRH is also decreased.

The classical clinical features in Graves' disease consists of a triad: thyrotoxic goiter, bulging eyes, and pretibial myxedema (skin lesions) however they don't always occur together. Other symptoms which can occur are those mentioned previously for thyrotoxicosis.

Graves' disease can eventually cause hypothyroidism due to autoimmune destruction of the thyroid gland if it goes untreated. Treatment options include anti-thyroid medications, radioactive iodine procedures, and partial removal of the thyroid. ♦