

PATIENT SAFETY: THE OHIP LABORATORY REQUISITION

The properly completed laboratory requisition serves a number of important functions, including:

- The precise ordering of laboratory tests
- Provision of clinical or other information required to properly interpret test results, e.g. time of last dose of a medication or time of correction of a microbiology sample
- Unique identification of the patient by provision of full name, health card number, date of birth, gender and address
- Unique identification of requesting physician or practitioner
- Requests for copies of results to be delivered to other physicians who care for the patient
- Provision of a telephone number for communication with the patient in case of an emergency
- Administration of entitlement to OHIP coverage when properly signed or initialed by a healthcare provider

If improperly managed, the requisition is a source of potential medical error.

When a patient is served by MDS Diagnostic Services in one of our Patient Service Centres (PSC), we are able to swipe the health card in order to verify patient identifiers and, because we

have direct contact with the patient, confirm information such as a telephone number, time of dosage of medication and time of collection of samples.

When specimens are procured in a physician's office, careful completion of the requisition is particularly important for there is no direct contact with the patient and no opportunity for us to collect or verify necessary information. The physician's office must therefore take responsibility for the accuracy of information including emergency contact

information. Under some circumstances, we are forced to reject specimens and in other situations, problems with completion of requisitions result in a delay in testing.

An illegible requisition or one that is not fully completed will, at best, result in a delay in processing and management but may impair patient safety in a variety of ways.

Ambiguity in the identification of a patient and inability to confidently link a laboratory sample to an individual and with previous history is an obviously unsafe situation. This may occur when a familiar name rather than that present on the patient's health card is used and unique identifiers such as the health card number, date of birth and gender are not provided.

Failure to uniquely identify an ordering physician may result in the inability to deliver a report, which may have significant clinical consequences, or may result in a privacy breach should a report be misdirected. Because of this MDS Diagnostic Services is unable to forward copies of laboratory reports to physicians unless full name and address are noted on the requisition.

The use of an OHIP requisition pre-printed with a physician's name and office address is an important way to allow clear unequivocal identification of the ordering practitioner.

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Failure to provide an emergency contact number for the patient will seriously impede the ability to deal with a rare laboratory emergency particularly when on-call involves physicians other than the patient's primary physician.

An unsigned requisition must be returned by the laboratory to a physician office for a signature in order to establish the patient's entitlement to coverage. This clearly introduces administrative inefficiency for the laboratory as well as for the physician office.

Ways to ease the administrative burden:

Maintaining the supply of laboratory requisitions preprinted with your identifiers helps prevent misidentification and misdirection of reports.

Many office management systems will automatically generate labels containing all of the patient's necessary unique identifiers along with the date of ordering. The use of these labels removes the laborious task of completing this by hand and ensures the legibility of information.

Involve your patient; they have a vested interest

The patient being tested can be asked to check the accuracy of personal information including a contact telephone number.

In addition they may complete the time of correction for microbiology samples and time of last dose of therapeutic drugs, which are being measured.

The patient should also be aware of the full name and address of any physicians who should receive a copy of the report and can enter this information.

Unless we have complete information, MDS Diagnostic Services will not forward the report for we cannot risk a privacy breach. ■

HEPATITIS C CONFIRMATORY TESTING

Beginning April 3rd, MDS Diagnostic Services began sending samples out for confirmatory Hepatitis C testing to the Public Health Laboratory (PHL). Diagnostic Services performs an initial screen, using the Abbott AxSYM MEIA Version 3.0 assay. Samples which are Non-reactive by the screening method are reported by MDS. Samples which are initially Inconclusive or Reactive by the screening method are then forwarded on to PHL for further testing. A final report for these samples is sent out by PHL. ■

MANAGING SPECIMENS WHICH MUST BE FROZEN PRIOR TO ANALYSIS

MDS Diagnostic Services strongly recommends that physicians who normally procure samples in an office environment refer their patients to one of our Patient Service Centres (PSC) when a test is ordered which requires the analytical sample be frozen prior to transportation. Because of lability of the analytes listed below, results will be meaningless if strict specimen handling procedures are not complied with.

Coagulation tests with the exception of the INR (Prothrombin Time) fall into this category.

The most commonly requested test in this group is the Activated Partial Thromboplastin Time (APTT). Platelet poor plasma required for this assay must be obtained by centrifugation at 1500 g for 15 minutes followed by aliquoting of the upper three quarters of the plasma leaving behind the platelets in the lower one quarter then immediately freezing at -20°C. The sample must be transported ensuring it remains frozen.

Although it may be inconvenient, referring a patient to a MDS Diagnostic Services PSC will eliminate the possibility of a spurious value related to improper handling of special coagulation test samples, which may result in a critical value call or needless investigation.

Specimens which are submitted to us and do not comply with the strict handling requirements must be rejected.

Labile Assays which require freezing of specimens:

Coagulation/Hematology

Activated Partial Thromboplastin Time (APTT)
Factors II, VII, VIII, IX, X, XI, XII, XIII
Plasminogen Activity and Antigen
Von Willebrand Profile
Protein C
Protein S
Hemophilia A Profile
Hemophilia B Profile
Heparin Induced Thrombocytopenia
Heparin dependent platelet Antibodies

Complement

C2, C3, C4, CH 50 Hemolytic Complement
C1 Q binding activity

Vitamins

B1, B6, D (1.25 Hydroxy and 25 Hydroxy) ■

PATIENT CARE IMPROVEMENT: VACUTAINER CHANGES

On April 3rd, 2006, MDS Diagnostic Services introduced the use of plastic Hemogard vacutainer tubes for collection of Chemistry analytes. The new, smaller tubes, which are 13 x 75 mm SST tubes and draw a blood volume of 3.5 mL, replace the use of 16 x 100 mm SST 10 mL vacutainers.

This initiative has allowed us to reduce the total volume of blood drawn on the patient as well as minimize the requirement for specimen aliquoting, enhancing patient safety by permitting testing from the primary collection tube and reducing the potential for biohazard exposure.

In addition, the minimum blood volumes required per test and per analyzer were revisited and reduced where possible. Following implementation, we have realized a significant decrease in the total volume of blood drawn per patient and an 80% reduction in serum aliquoting.

To accommodate this change in collection, the plastic "clam shells" used to transport specimens were also redesigned. The redesigned container permits transport of patient swabs and vacutainers together in one container and is a reusable and recyclable product. ■

A NEW METHODOLOGY FOR RENIN TESTING

MDS Diagnostic Services will introduce a new methodology for Renin testing within the next month.

Diagnostic Services had previously measured the Renin immunoreactivity concentration using the direct Nichols immunoradiometric assay (IRMA). The new method (Diasorin radioimmunoassay) measures the plasma renin enzymatic activity (PRA) by the quantitative assay of angiotensin I, generated by the enzymatic action of renin on renin substrate.

Due to the significant difference in the principle of the new assay (enzyme activity of renin) compared to the old (immunoreactivity of renin), both the reporting unit and the reference ranges will correspondingly change with the implementation of the new method. ■

ALKALINE PHOSPHATASE (ALP) ISOENZYME TESTING

Alkaline Phosphatase, ALP, is part of a group of enzymes that catalyze the hydrolysis and transfer of a phosphate group from a donor molecule to an acceptor molecule at alkaline pH.

ALP released from cells can appear in serum unchanged, modified by a number of different mechanisms, or bound to a cellular membrane fragment. As such, ALP exists in many forms, each with varying properties of electrophoretic migration, heat stability and susceptibility to chemical inhibition. ALP has at least 9 recognized isoenzymes which include, but are not limited to, Hepato I (fast liver), Hepato II, Bone, Intestinal, Placental, Renal, Fetal, Regan, and Nagao, the latter 2 being associated with tumors.

There are a number of clinical conditions which involve elevation of ALP activity, the most common sources of the elevation being liver, bone, and placental isoenzymes. Values of 1.5 to 3 times the upper limit of normal (ULN) suggest hepatocellular involvement, while values greater than 3 times the ULN are usually associated with biliary involvement. Bone, on-the-other-hand, can be involved at any ALP value. Familial and transient isolated hyperphosphatasemia of infancy can produce extremely high ALP values (>7 times the ULN).

The literature suggests that there is a significant number (20-30%) of hospitalized patients who have unexplained elevation of ALP, and this incidence can be expected to be higher in an asymptomatic population. Elevations of ALP more than 1.5 times the ULN on 2 occasions at least 6 months apart warrant a workup for liver and bone disease.

The use of ALP Isoenzyme testing can be used to differentiate the source of the elevated ALP, but is not helpful in patients with normal Total ALP levels. For this reason, and because benign elevation of ALP is fairly common, MDS will stop performing ALP Isoenzyme testing if the Total ALP is within reference range, effective May 1st.

REFERENCES

1. Reust CE. *The Journal of Family Practice*. Clinical Inquiries. June 2001.
2. *Interpretation of Paragon System Isopal Alkaline Phosphatase Isoenzyme Kit*. 1990. Beckman Instruments, Inc. Brea, CA.

ORDERING HCG

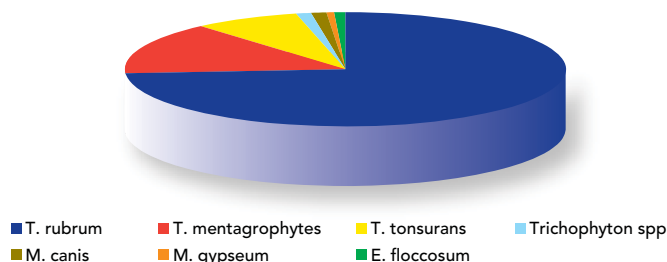
When ordering a hCG assay on a blood sample for investigation of pregnancy, it is necessary to write hCG on the OHIP Laboratory Requisition. When the box for Pregnancy Test is ticked, a laboratory must perform a urine test. ■

EPIDEMIOLOGY AND LABORATORY DIAGNOSIS OF ONYCHOMYCOSIS

Dermatophytes are fungi that are able to invade keratinized tissue causing infection in hair, skin and nail. Onychomycosis is a common infection of the nail with a prevalence of 2-18%. Risk factors for onychomycosis include advanced age, male gender, diabetes, nail trauma, peripheral vascular disease, immunodeficiency and the presence of tinea pedis.

Dermatophytes are the causative agent of onychomycosis in the majority of cases. Dermatophytes include *Trichophyton spp*, *Microsporum spp* and *Epidermophyton floccosum*. The epidemiology will vary depending on geographic location, temporal and exposure history. The epidemiology of infection from nail, skin and hair specimens at MDS Diagnostic Services represents data from across Ontario. In 2005, the mean positivity rate for dermatophytes from nail, skin and hair was 15.1% (range 10 to 20%) and for opportunistic fungi (including yeast) was 18.2% (range 12-25%). The frequency of isolation for the most common dermatophytes in skin, nail and hair is described in the chart below.

Dermatophyte Prevalence 2004



Several non-dermatophytic opportunistic fungi have been implicated as a cause of onychomycosis; however, many are also contaminants. Table 1 lists the most common opportunistic pathogens. Determining the clinical significance can be difficult. A laboratory diagnostic method that can help improve the specificity is *isolation of the same opportunistic fungus from successive specimens with at least one of the specimens demonstrating fungi on the direct examination (KOH-Calcofluor)*.

Mixed culture of a dermatophyte and an opportunistic fungi does not occur frequently. The non-dermatophyte may be a transient or persistent colonizer where treatment of the dermatophyte will eliminate the non-dermatophyte; however, occasionally the opportunistic fungi can be invasive.

To help interpret the laboratory significance of opportunistic fungi, the mycology report will be modified to add the interpretative comment: "Possible agent of onychomycosis. This isolate may be significant if positive KOH and isolated from repeat cultures."

Table 1: Opportunistic Fungi that may be associated with Onychomycosis

- *Acremonium spp* • *Alternaria alternata* • *Aspergillus spp*.
- *Candida albicans* and *Candida spp other than C. albicans*
- *Fusarium spp* • *Curvularia spp* • *Onychocola canadensis*
- *Pseudoallescheria boydii* • *Scopulariopsis spp*
- *Scytalidium spp* • *Cladophialophora carrionii* ■

REQUESTS TO PROVIDE COPIES OF REPORTS TO OTHER PHYSICIANS

When an ordering physician requests MDS Diagnostic Services to direct reports to another physician/ healthcare provider, we must be able to confidently identify the intended recipient. Under some circumstances, a failure to do this will result in a breach of privacy so we must ensure our policies and procedures minimize this risk.

In future, MDS Diagnostic Services will comply with requests to copy reports to other physicians when we are provided with name and initials of the intended recipient and either a full address or physician number. Patients are usually able to provide the address of the provider to whom the copy should be sent. You may wish to ask your patient to insert the correct address on the requisition.

If we are not provided with the required information, the report will be directed only to the ordering physician alone.

Unacceptable

~~Dr. Smith
Toronto~~

~~Dr. John Smith
London~~

~~A Hospital Clinic
Ottawa~~

Acceptable

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