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TO: **REFERRING CLIENTS**

FROM: Barb Baltzer, Coordinator

DATE: August 21, 2013

SUBJECT: **Galactomannan Testing**

Galactomannan antigen testing was introduced by HRLMP 1 year ago. Detection of Galactomannan represents a major advance in the treatment of patients at risk for Invasive Aspergillosis [IA], a disease that is a rapidly progressive and often fatal infection occurring in patients who are severely immunosuppressed.

Given the relative lack of awareness of this test, and the fact that it represents a major advance in the treatment of patients at risk for Invasive Aspergillosis, we are providing a review of the disease and test in this communication.

Effective and early diagnosis of IA may also be important in improved antibiotic stewardship and in better cost management through the decreased need for hospitalization and treatment.

The ABCs of Galactomannan Testing:

Aspergillus spp.

Aspergillus spp. is a hyaline, saprophytic mold that is capable of causing opportunistic fungal infections in immunocompromised hosts. They are rapidly growing usually within 3-5 days, demonstrating clear, translucent hyphae with (septate) constrictions.

Aspergillus spp. are widely distributed in nature; they are found in soil, on decaying vegetation, and a wide variety of organic matter.
The most commonly encountered species found in clinically laboratories are: *A. fumigatus*, *A. flavus*, *A. niger*, and *A. terreus*. The majority of serious infections are caused by *A. fumigatus* (1).

What is Invasive Aspergillosis?

EORTC - MSG (European Organization for Research and Treatment of Cancer - Mycoses Study Group) defines Invasive Aspergillosis (IA) as a rapidly progressive, often fatal infection that occurs in patients who are severely immunosuppressed, including those who are profoundly neutropenic, those who have received bone marrow or solid organ transplants, and patients with advanced AIDS or chronic granulomatous disease. This infectious process is characterized by invasion of blood vessels, resulting in multifocal infiltrates, which are often wedge-shaped, pleural-based, and cavitary. Dissemination to other organs, particularly

the central nervous system, may occur. The transmission of fungal spores to the human host is via inhalation.

Human host defense against the inhaled spores begins with the mucous layer and the ciliary action in the respiratory tract. Macrophages and neutrophils encompass, engulf, and eradicate the fungus. However, many species of *Aspergillus* produce toxic metabolites that inhibit macrophage and neutrophil phagocytosis. Corticosteroids also impair macrophage and neutrophil function. Underlying immunosuppression (clinical and pharmacologic) also contributes directly to neutrophil dysfunction or decreased numbers of neutrophils. In individuals who are immunosuppressed, vascular invasion is much more common and may lead to infarction, hemorrhage, and necrosis of lung tissue.

Invasive Aspergillosis can be difficult to diagnose clinically as the findings on clinical imaging may be non-specific and the results of routine cultures for *Aspergillus* are of poor yield.

What is Galactomannan?

Galactomannan is an exo-antigen (polysaccharide fungal cell wall component) released from *Aspergillus* hyphae during tissue invasion (3). Detection of circulating galactomannan in the course of progressive disease in serum and bronchoalveolar lavage can be achieved by ELISA (enzyme-linked immunosorbent assay) that is currently available at HRLMP using a validated commercial kit (4).

Clinical Implications

Galactomannan testing represents a major advance in the treatment of patients at risk for IA, particularly those with hematological malignancies in the setting of profound neutropenia and/or hematopoietic stem cell transplantation (2), solid organ transplants, AIDS, and pulmonary diseases (5). Early diagnosis and therapy has shown to improve outcomes, however reaching a definitive diagnosis quickly can be problematic (2). Correlation of galactomannan test results with other clinical data, including radiological findings, greatly improves the clinician's ability to diagnose IA.

Galactomannan antigen testing for serum and bronchoalveolar lavage (BAL) specimens has been available in HRLMP Microbiology since May 14, 2012. Results are provided within 2 - 3 days of sample receipt.

For further questions, please contact:

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References:

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