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Section: <b>Virology Manual</b>	Subject Title: <b>Introduction</b>	
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## INTRODUCTION

Diagnostic Virology is performed for a variety of reasons, ranging from the diagnosis of an acute illness to the determination of asymptomatic carrier state.

The methods used to diagnose viral infections are based on the fact that many viruses produce characteristic changes in cells of the host and that most of them induce the production of infectious viruses or viral antigens in body tissues, secretions and excretions. This in turn is usually followed by the production of antibodies, which are specific for the virus and its associated antigens. The many diagnostic procedures used in Diagnostic Virology can be grouped into 4 categories, each with its particular role, limitations and advantages. These include:

- I. Microscopic examination of infected tissues and exudates from the patient for evidence of viral inclusions or other pathologic alterations which may be characteristic of certain viruses.
- II. Isolation (Propagation) and identification of virus from infected tissues or other specimens obtained from the patient.
- III. Serologic studies for detection of virus-specific antibodies or antigens in patient's serum. (See Serology Manual).
- IV. Direct detection of virus, viral antigens or viral nucleic acids (DNA or RNA) in tissues or other specimens from patients, independent of the propagation of these viruses in the laboratory. (eg. Direct Antigen Detection [Direct Smear], Centrifugation enhancement, Polymerase Chain Reaction [PCR], etc).

TML/MSH Virology Lab is a Containment Level 2\* facility that performs or reports the following procedures:

1. **Virology Direct Smear:**  
Antigen Detection done directly on specimens using Cytospin centrifugation and Immunofluorescence staining performed only on cell-containing materials such as Bronco-Alveolar Lavage (BAL), vesicular aspirates and buffy coat.

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2. Virology PCR:  
Nucleic Acid Amplification using PCR performed usually on specimens lacking in cellular materials, viable viruses or viral antigens such as CSF and plasma.
3. Virology Shell Vial Assay:  
Centrifugation-enhanced culture that detects antigens during early stages of viral propagation. Identification is done by immunofluorescent staining.
4. Virology Tube Culture Assay:  
Many clinically significant viruses can be propagated and detected in appropriately selected cell lines. Identification is done by immunofluorescent staining..
5. Virology Referred Out Tests:  
Assays that are not performed in this lab, such as Electron Microscopy (EM), are usually sent to the Public Health Laboratory (PHL). EM is done on viruses that cannot be propagated such as Norwalk, rota and other viruses causing gastro-enteritis. Other viruses requiring EM include BK, JC and Papovavirus.

Selection of these assays is driven by the nature of the specimen (eg. type and quantity); seasonality (eg. influenza in winter, enterovirus in summer); information supplied (eg. suspected viruses, symptoms and the degree of urgency); availability of resources and constraints placed on the laboratory. Samples that are improperly identified; improperly transported or unsafe will not be processed. Specimens containing agents requiring higher than Level 2 Containment\* or assays not available in this lab may be referred to other laboratories for testing.

- \* Agents that are transmitted through the air, and can cause serious or life threatening disease (Level 3); viral agents causing haemorrhagic fevers such as the Ebola virus, Marburg virus and Lassa Fever (Level 4) will not be processed in this laboratory. Refer to Safety Manual or Health Canada web site for a more complete list and Laboratory Biosafety Guidelines [www.hc-sc.gc.ca/pphb-dgspsp/publicat/lbg-ldmbl-96/index.html](http://www.hc-sc.gc.ca/pphb-dgspsp/publicat/lbg-ldmbl-96/index.html)