GUIDELINES FOR SUBMISSION TO THE NATIONAL INFLUENZA SURVEILLANCE PROGRAM, THE NATIONAL SARS-COV-2 SURVEILLANCE PROGRAM, AND FOR DIAGNOSTIC ANTIVIRAL SUSCEPTIBILITY TESTING AT NMLB WINNIPEG

The following recommendations are intended to support the collaboration between Canadian provincial and territorial public health laboratories and the National Microbiology Laboratory Branch (NMLB) in Winnipeg, Canada. NMLB serves as Canada's World Health Organization (WHO) National Influenza Centre and contributes to the WHO Global Influenza Surveillance and Response System. NMLB is also a WHO Reference Laboratory for SARS-CoV-2 and contributes to the WHO Coronavirus Network.

Representative influenza isolates and respective sequence information derived from clinical specimens submitted by provincial and territorial partners will be forwarded to a WHO Collaborating Centre for Influenza (The Francis Crick Institute, United Kingdom) for further characterization.

The NMLB has established two national surveillance programs, the National Influenza Surveillance Program and the and National SARS-CoV-2 Surveillance Program, that are supported by two virological-based platforms:

1. **Influenza and SARS-CoV-2 Viral Characterization .** This program provides genetic and antigenic characterization of circulating influenza and SARS-CoV-2 viruses. Genomic and phenotypic analyses determine viral lineages, monitors viral evolution, and assesses antigenic relatedness to current vaccine strains. These activities support the early detection and characterization of emerging viruses with pandemic potential and support national and global surveillance efforts, including informing WHO recommendations for seasonal influenza and SARS-CoV-2 vaccine strain selection.
2. **Influenza and SARS-CoV-2 Antiviral Susceptibility Assessment.** This program monitors circulating influenza and SARS-CoV-2 viruses for susceptibility to antiviral therapeutics through phenotypic and genomic analyses. Surveillance activities include susceptibility assessment of amantadine, oseltamivir, and zanamivir for influenza viruses, and remdesivir and nirmatrelvir/ritonavir for SARS-CoV-2. These activities enable the early detection of antiviral resistance, support public health decision-making regarding treatment options, and contribute to the prevention and control of influenza and SARS-CoV-2.

Please ensure that you are using the proper submission form for your request. This is important to avoid confusion with requested tests and delays in turn around times.

Submission forms for all Influenza, Respiratory Viruses and Coronavirus testing are available on the Guide to Services site: https://cnphi.canada.ca/gts/laboratory/1013

- **For Influenza:** Complete the requisition for the "National Influenza Surveillance Program and WHO Global Influenza Surveillance and Response System" available on the Guide to Services site: https://cnphi.canada.ca/gts/laboratory/1013

- **For SARS-CoV-2:** Complete the requisition for the "National SARS-CoV-2 Surveillance Program and WHO Coronavirus Network" available on the Guide to Services site: https://cnphi.canada.ca/gts/laboratory/1013

All clinical specimens will be cultured for antigenic characterization and a subset will undergo antiviral susceptibility testing. Please do not submit a separate submission form for antigenic characterization and antiviral susceptibility surveillance.

Sequence analysis is required for downstream testing.

- If sequencing has been performed and submitted to a public repository, please provide the corresponding accession number on the requisition.
- If the specimen has been performed but will not be uploaded to a public repository, please indicate "No ID, sequenced internally" on the requisition.
- If sequencing has not been performed, select "Not Sequenced" on the requisition. NMLB will perform sequencing and submit the resulting sequence data to GISAID.
- In some cases, sequence data generated from NMLB-cultured isolates may also be submitted to GISAID as separate records.

A subset of cultured isolates will be forwarded to WHO with associated GISAID accession number; PLEASE NOTE: CLINICAL SPECIMENS WILL **NOT** BE FORWARDED TO WHO.

Please note: The NMLB provides separate antiviral susceptibility diagnostic testing (see below).

SAMPLE CRITERIA: NATIONAL INFLUENZA AND/OR SARS-COV-2 SURVEILLANCE PROGRAMS

To ensure the timely collection and reporting of surveillance data, please avoid batching samples and submit them promptly to the NMLB. Samples received more than three months after the collection date will not be tested unless an exception has been discussed with the Section Chief or designate (see contact info below).

Sample types include:

- Nasopharyngeal swab specimens
- Throat swab specimens
- Cultured isolates

Clinical Specimens: Where available, please submit clinical specimens with a **Ct value of <20.** If Ct values are not available, please provide a random selection of clinical specimens. All clinical specimens should have a minimum volume of 1.0 ml to maximize the likelihood of successful virus propagation.

Virus Isolates: A volume of between 1.5 and 2.0 ml of virus isolates is required for analysis.

Clinical specimens and isolates should be shipped frozen on dry ice.

Laboratories are encouraged to submit **10% of their positive samples for each virus group**, up to a maximum of **20 clinical specimens or isolates per week per virus** with any of the following conditions:

1. Representative circulating specimens collected throughout all phases of the seasonal wave, including the pre-season, initial, peak, and terminal phases
2. Specimens from individuals with illness associated with international travel
3. Specimens from individuals receiving antiviral treatment whose illness is not resolving, or from contacts who subsequently became ill
4. Specimens collected during outbreak investigations occurring in immunized populations
5. Influenza: Specimens that cannot be subtyped
6. Influenza: Specimens with a non-seasonal type or subtype (e.g. H1N2)
7. Influenza: Specimens from cases of suspected animal-to-human transmission of influenza virus
8. SARS-CoV-2: Representative specimens of new and emerging variants or sub-variants of concern

SPECIMEN CRITERIA: INFLUENZA OR SARS-COV-2 ANTIVIRAL SUSCEPTIBILITY DIAGNOSTIC TESTING

If a laboratory requires diagnostic antiviral susceptibility testing, complete the following submission forms:

- **For Influenza:** Complete the requisition for "Antiviral Susceptibility Testing for Influenza Virus" available on the Guide to Services site: https://cnphi.canada.ca/gts/laboratory/1013
- **For SARS-CoV-2:** Complete the requisition for "Antiviral Susceptibility for SARS-CoV-2" available on the Guide to Services site: https://cnphi.canada.ca/gts/laboratory/1013

Please do not use this form for specimens that are being submitted for the National Influenza and/or SARS-CoV-2 Surveillance Programs.

Specimen types include:

- Nasopharyngeal swab specimens
- Throat swab specimens
- Cultured isolates

Specimens should be shipped frozen on dry ice.

SHIPPING SAMPLES TO THE NATIONAL MICROBIOLOGY LABORATORY BRANCH

Notification of Incoming Specimens/Cultures

Please complete the appropriate requisition form(s) and fax it to the Influenza, Respiratory Viruses and Coronaviruses section at 204-789-2082 on the day of shipment.

Requisition Forms

Laboratory and epidemiologic information about the specimens must be provided using the required submission forms on the Guide to Services site: https://cnphi.canada.ca/gts/laboratory/1013

Shipping Temperature

Please ship frozen specimens on dry ice. Ensure the tubes are sealed and parafilmed carefully.

Clinical Specimens/Cultures

Submit all clinical specimens and viral cultures in sterile, 2 mL polypropylene screw-capped tubes with O-ring seals. Multiple tubes may be submitted when required.

Do not submit clinical specimens or cultures in bijou bottles or glass tubes.

All shipments must comply with the Transportation of Dangerous Goods regulations:

- Clinical specimens: UN3373 - Biological Substance, Category B
- Cultured isolates: UN2814 – Infectious Substance, Affecting Humans

Address

Influenza, Respiratory Viruses and Coronaviruses
National Microbiology Laboratory
Canadian Science Centre for Human and Animal Health
1015 Arlington Street
Winnipeg, Manitoba R3E 3R2
nml.irv-ivr.lnm@phac-aspc.gc.ca

CONTACT PERSON

Any questions regarding shipping, selection of primary specimens to ship, laboratory procedures used in the identification and diagnosis of strains, as well as results on specimens submitted should be directed to:

Dr. Nathalie Bastien
Chief, Influenza, Respiratory Viruses and Coronaviruses
National Microbiology Laboratory
Canadian Science Centre for Human and Animal Health
1015 Arlington Street
Winnipeg, Manitoba R3E 3R2
Telephone: (204) 789-6047
Fax: (204) 789-2082
E-Mail: Nathalie.bastien@phac-aspc.gc.ca