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CNISP·PCSIN

# Canadian Nosocomial Infection Surveillance Program

# Surveillance for viral respiratory infections among inpatients in CNISP hospitals

FINAL

JANUARY 1, 2023

## Contact Information

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## Working Group

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## Background

Viral respiratory infections (VRI) cause increased morbidity and mortality in both adult and pediatric patients. Age is a key risk factor with regards to the severity, transmission and impact of VRI. The consequences of VRI are especially concerning for children and older adults with existing co-morbidities or underlying conditions such as cardiac and pulmonary disease, cognitive disorders or immunosuppression. The emergence of avian influenza, novel H1N1 influenza, MERS-CoV and SARS-CoV-2 have underlined the need for data to inform infection prevention and control practices for respiratory pathogens in healthcare settings.

## Rationale

A hospital's ability to appropriately manage VRI patients will be dependent on many factors including an understanding of the burden of both community and healthcare associated severe respiratory infections. This surveillance will assist in understanding the burden and severity of VRI, including COVID-19 in adults and pediatric patients in Canadian hospitals.

A real-time hospital based surveillance system will assist in identifying high-risk groups, as well as describing risk factors and patient outcomes in order to inform infection prevention and control practices, public health decisions and evaluate interventions.

## Short term objectives

1. Provide timely data (e.g. weekly aggregate severe outcome data) to hospitals and PHAC regarding trends of patients hospitalized with VRI.

## Long term objectives

1. Describe patient and clinical characteristics, risk factors, treatment and outcomes of the pediatric and adult populations infected with HA-VRI in order to inform infection prevention and control strategies.
2. Facilitate intra- and inter-hospital comparison of adult and pediatric HA-VRI rates over time.
3. Describe nosocomial transmission of VRI in acute care hospitals.
4. Compare the epidemiology of HA-COVID-19 infection to other viral respiratory infections (e.g. influenza and RSV) among pediatric and adult inpatients.
5. Report trends in antimicrobial utilization among healthcare-associated VRI patients

## Methods

### Study Design

Sentinel surveillance of adult and pediatric inpatients with VRI at participating CNISP hospitals.

This surveillance is comprised of two components:

1) Weekly aggregate reporting of all COVID-19, Influenza and RSV hospitalizations
2) Patient-level questionnaires for all healthcare-associated VRI

### Site Eligibility

All CNISP hospitals are eligible to participate.

## Surveillance period

Year round calendar surveillance (January 1 to December 31). Cases are assigned to a surveillance year based on the date of positive test.

## Case definitions

**VRI case definition (excluding COVID-19)**

- Positive viral culture by PCR (polymerase chain reaction), DFA (direct fluorescent antigen) or EIA (enzyme immunoassay) for a viral respiratory tract pathogen.

AND

- At least one of the following signs or symptoms:
  fever (> 38 °Celsius) or single temperature >1.1°Celsius over baseline from any site (oral, rectal, tympanic, axillary), rhinitis, nasal congestion, pharyngitis, sneezing, cough, wheeze, stridor, apnea, dyspnea, laboured breathing, increased respiratory secretions, change in characteristics of chronic secretions, decreased air entry on auscultation, rales, rhonchi, decreased oxygen saturation, need for increased Fi02, increased ventilator support, increased suctioning or new abnormality on chest radiograph.

AND

- No other evident cause for the abnormality.

**COVID-19 case definition**

- Positive viral culture by PCR (polymerase chain reaction) for SARS-CoV-2 in the past 14 days.
- *If the patient has multiple positive tests, please use the date of the first positive test in the past 90 days to determine eligibility*

## Exposure classification for all viral respiratory infections

Once the patient has been identified with a VRI, the case will be classified as 1) healthcare-associated acquired in your acute-care facility, 2) healthcare-associated, acquired in another healthcare facility or 3) community-associated, based on the following criteria and in accordance with the best clinical judgement of the healthcare and/or infection prevention and control practitioner (ICP).

**Healthcare-associated acquired in your acute care facility (HA-YAF)**

- Symptom onset $\geq$ 72 hours (>3 calendar days) after admission to the reporting hospital and using best clinical judgement. For COVID-19 patients, in the absence of symptoms, please use the date of positive test

OR

- If patient is readmitted with a positive test < 72 hours ($\leq$3 calendar days) after discharge from your hospital and using best clinical judgement.

**Healthcare-associated acquired in another healthcare facility (HA-Other)**

- Any patient who has a VRI not acquired at your facility that is thought to be associated with another healthcare facility (e.g. another acute-care facility, long-term care, rehabilitation facility, etc.). Retirement homes are not considered another healthcare facility.

**Community-associated**

- No exposure to healthcare that would have resulted in this infection (using best clinical judgement) and does not meet the criteria for a healthcare-associated infection.

| Days of admission | | | | |
|---|---|---|---|---|
| Calendar day | 1 | 2 | 3 | 4 |
| Time (hours) | 0 | 24 | 48 | 72 |

## Data collection and submission

Please refer to Appendix A for a data submission flow chart.

### 1) Weekly reporting

A weekly report form with the aggregate number of incident (i.e. new) hospitalizations, ICU admissions, patients receiving mechanical ventilation and deaths among inpatients with laboratory-confirmed COVID-19, Influenza A, Influenza B and RSV stratified by age group will be submitted to CNISP electronically every Tuesday. This weekly report will include all cases identified (i.e. tested positive) in the previous week, i.e. Sunday to Saturday. The weekly report form will also capture the number of new VRI outbreaks, reason for admission (admission related or unrelated) for COVID-19 patients and the number of COVID-19, Influenza A, Influenza B and RSV hospitalizations by acquisition (e.g. healthcare vs. community-associated) (Appendix B).

There are two ways that sites can choose to submit weekly data:

- Complete the form on CNPHI VRI module (this is the preferred method)
- Complete the Word document and email it to CNISP (cnisp-pcsin@phac-aspc.gc.ca)

For weekly COVID-19 surveillance, weekly admissions will be estimated using 2020-2022 quarterly patient admissions.

### 2) Patient questionnaires

For each case that meets the HA-YAF or HA-Other case definition (page 3), a detailed patient questionnaire (Appendix C) should be completed by reviewing the patients' chart. Please note that the patient questionnaire should only be completed for healthcare-associated VRI cases (including COVID-19).

a) If a patient tests positive for two viruses on the same test result and both are determined to be healthcare-associated all data may be captured on the same form.

b) If a patient is identified with a HA-VRI and is later identified with a second HA-VRI during the same hospitalization (e.g. 4 or more days after the initial HA-VRI AND new or worsening symptoms which may indicate a new infection), please complete a new patient questionnaire and identify the PID of the first HA-VRI so that we may link the data. Please note that for HA-COVID-19 patients, the time between two positive COVID-19 tests must be greater than 90 days to be considered a new infection (and only then would a new patient questionnaire would be completed).

*Example 1: On Aug 1, 2022, a patient tests positive for HA-COVID-19 and is hospitalized from Aug 1 to Aug 8, 2022. The patient is hospitalized again on Dec 6, 2022 and on Dec 9, 2022 tests positive for HA-RSV. As these are two separate hospitalizations, please complete two forms (one for the HA-COVID-19 infection and one for the HA-RSV infection) and indicate the PID of the first HA-VRI so that we may link the data.*

*Example 2: On January 10, 2022, a patient tests positive for both HA-COVID-19 and HA-RSV on the same test result during the same hospital admission, please complete one form and indicate that they tested positive for both viruses.*

*Example 3: Patient is positive for HA-Influenza on Feb 1st and tests positive for HA-RSV Feb 6th (with new/worsening symptoms) during the same hospital admission. Please complete two forms (one for the HA-Influenza and one for the HA-RSV) as the cases were identified greater than 4 days apart AND the patient had new or worsening symptoms. Please identify the PID of the first HA-VRI so that we may link the data.*

Please submit data electronically on CNPHI. If submitting electronically, please contact CNISP to obtain the CNPHI uploader template (cnisp-pcsin@phac-aspc.gc.ca).

**Denominator data**

Denominator data will be collected on the quarterly denominator form and submitted in CNPHI.
The data collected will include:

1) total number of patient admissions per year

2) total number of inpatient-days per year

**Submission timelines**

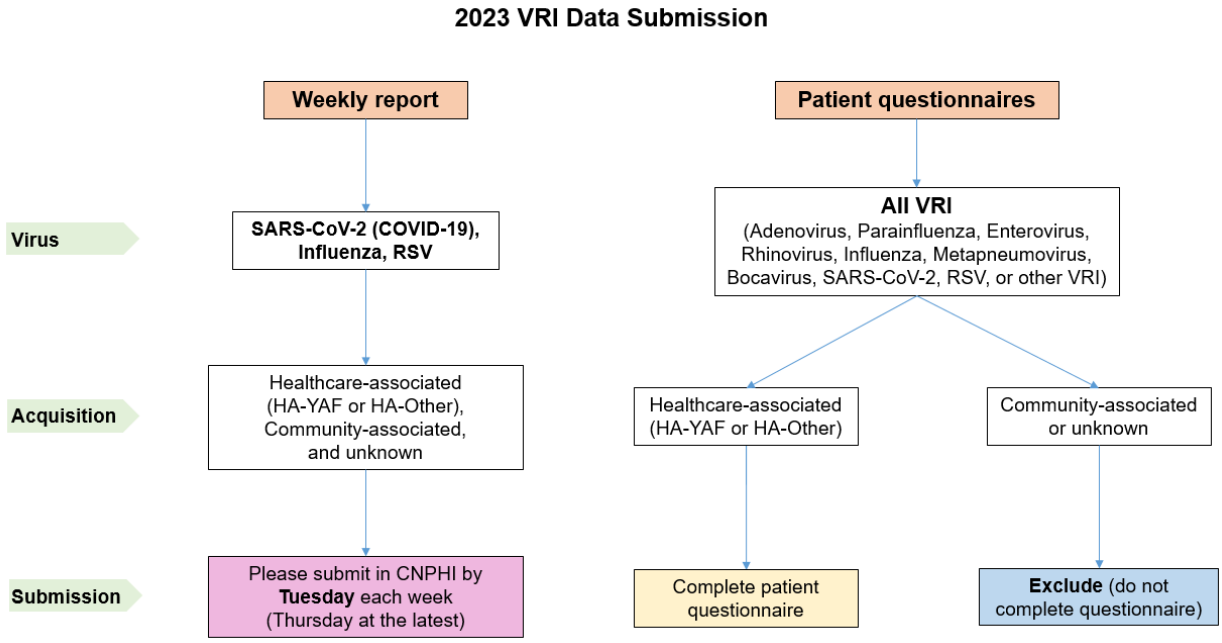
Please submit HA-VRI patient questionnaire and denominator data according to the following timeline:


| | | | | |
|---|---|---|---|---|
| **Numerator** (cases) | Data due by December 31St | Data due by March 31st of following surveillance year | Data due by June 30th | Data due by September 30th |
| **Denominator data** | | | | |

### Zero report

For any week where your site does not have weekly data to report, please enter zero in the weekly report form and submit to CNISP either in CNPHI or email the report to cnisp-pcsin@phac-aspc.gc.ca.

# APPENDIX A. DATA SUBMISSION FLOW



# APPENDIX B. WEEKLY VRI REPORT FORM

**CHEC Site # :** Select CHEC Site. **Submission date:** yyyy-mm-dd

**Surveillance week (i.e. Sunday to Saturday)**

Sunday: yyyy-mm-dd to Saturday: yyyy-mm-dd

Did your site declare a new outbreak for any of the following VRI for the above reporting week?

| | | | |
|---|---|---|---|
| COVID-19 | ☐ Yes | ☐ No | ☐ Unknown |
| Influenza | ☐ Yes | ☐ No | ☐ Unknown |
| RSV | ☐ Yes | ☐ No | ☐ Unknown |
| Other virus, please specify: | ☐ Yes | ☐ No | ☐ Unknown |

If yes, please provide your site's outbreak case definition:

Please provide data for **newly**[a] identified laboratory confirmed COVID-19, Influenza and RSV inpatients for the surveillance period specified above.

| **Virus** | **Indicator** | **0-17 years** | **>=18 years** | **Weekly total** | |
|---|---|---|---|---|---|
| COVID-19 | Number of new hospitalizations[b] | | | | |
| | *COVID-19 related admission*[c] | | | | |
| | *Admission unrelated to COVID- 19 (i.e. incidental finding)* | | | | |
| | *Unknown* | | | | |
| | Number of new ICU admissions | | | | |
| | Number of new patients receiving mechanical ventilation | | | | |
| | Number of new deaths | | | | |
| Influenza A | Number of new hospitalizations | | | | ☐ Data not collected |
| Influenza B | Number of new hospitalizations | | | | ☐ Data not collected |
| RSV | Number of new hospitalizations | | | | ☐ Data not collected |

[a]Data to reflect new cases based on the date of positive test.

[b]New hospitalization includes all patients who meet the case definition (page 3) (i.e. patients admitted due to COVID, patients admitted for other reasons, healthcare-associated cases and patients whose reason for admission is unknown).

**Note:** a patient may be counted in multiple categories (for instance, if patient was both admitted to the ICU and ventilated within the specified 7 days they would be included in both categories). If there is a delay in obtaining any of this information for a week please update when the data are available (for instance, if a patient was admitted to the ICU on a Friday and your system does not capture in time for that weekly report, please update the report for that week when the data are available).

[c]**Below are criteria to help determine if a patient's admission is related to COVID-19 (i.e. patient is admitted due to COVID-19 or COVID-19 contributed to their admission). Please use your best clinical judgement when applying the criteria below and/or other available clinical information to determine if the admission is COVID-19 related or not.**

- COVID-19 listed as a primary admitting diagnosis
- Patient has COVID-19 related symptoms*
- Admitted with complications following COVID-19 infection:

  Neurological

  Respiratory (clinical and radiographic findings suggestive of pneumonia; requiring oxygen therapy for shortness of breath due to COVID-19 illness and/or oxygen saturation level <92%)

  Dermatological

  Cardiac

  Secondary bacterial infection (e.g. pneumonia, sinusitis, acute otitis media, mastoiditis)
- Patient received treatment for COVID-19 infection (e.g. Remdesivir, Dexamethasone)

Additional criteria for pediatric patients:

- Patients < 12 months of age admitted to rule out sepsis
- Admitted with a diagnosis of at least one of the following
  - bronchiolitis
  - croup
  - pneumonia
  - multisystem inflammatory syndrome in children (MIS-C)/Kawasaki disease
  - febrile seizure

*COVID-19 related symptoms may include: fever, cough, shortness of breath, fatigue, sore throat, nasal congestion, anosmia or agueusia, myalgias, headache, nausea/vomiting, diarrhea, light headedness or general deterioration (elderly adults).

*If possible, for the COVID-19 hospitalizations above, please indicate the number of hospitalizations by acquisition. Please note that the total number of new hospitalizations in the table below should be equal to the total number of hospitalizations in the table above.*

| | Number HA-YAF[c] | Number HA-Other[d] | Number CA[e] | Unknown | Total | |
|---|---|---|---|---|---|---|
| Number of new COVID-19 hospitalizations | | | | | | |
| Number of new Influenza A hospitalizations | | | | | | ☐ Data not collected |
| Number of new Influenza B hospitalizations | | | | | | ☐ Data not collected |
| Number of new RSV hospitalizations | | | | | | ☐ Data not collected |

**[c]Healthcare-associated acquired in your acute care facility (HA-YAF)**

- Symptom onset ≥ 72 hours (>3 calendar days) after admission to the reporting hospital and using best clinical judgement. For COVID-19 patients, in the absence of symptoms, please use the date of positive test.

OR

- If patient is readmitted with a positive test < 72 hours (≤3 calendar days) after discharge from your hospital and using best clinical judgement.

**[d]Healthcare-associated acquired in another healthcare facility (HA-Other)**

Any patient who has a VRI not acquired at your facility that is thought to be associated with another healthcare facility (e.g. another acute-care facility, long-term care, rehabilitation facility etc.). Retirement homes are not considered another healthcare facility.

**[e]Community-associated**

- No exposure to healthcare that would have resulted in this infection (using best clinical judgement) and does not meet the criteria for a healthcare-associated infection.

# APPENDIX C. COVID-19/VRI PATIENT QUESTIONNAIRE

| | |
|---|---|
| **1.** | **CHEC Site # :** Select CHEC Site. |
| **2.** | **Unique Patient ID :** Enter unique patient ID.<br>(CHEC Site #) (Year) (Case Number) |
| **3.** | **Date of positive test** yyyy-mm-dd |
| **4.** | **Viruses isolated *(please select all viruses)*:**<br>☐ Adenovirus<br>☐ Parainfluenza<br>☐ Parainfluenza 1 (only if virus=Parainfluenza)<br>☐ Parainfluenza 2 (only if virus=Parainfluenza)<br>☐ Parainfluenza 3 (only if virus=Parainfluenza)<br>☐ Parainfluenza 4 (only if virus=Parainfluenza)<br>☐ Non-typeable (only if virus=Parainfluenza)<br>☐ Enterovirus<br>☐ Enterovirus/Rhinovirus<br>☐ Rhinovirus<br>☐ RSV<br>☐ Influenza A<br>☐ Influenza A H3 (only if virus=Influenza A)<br>☐ Influenza A H1 (only if virus=Influenza A)<br>☐ Non-typeable (only if virus=Influenza A)<br>☐ Influenza B<br>☐ Metapneumovirus<br>☐ Bocavirus<br>☐ SARS-CoV-2 (COVID-19)<br>☐ Other human coronavirus (NOT SARS-CoV-2)<br>☐ 229E (alpha coronavirus) (only if virus= Other human coronavirus)<br>☐ NL63 (alpha coronavirus) (only if virus= Other human coronavirus)<br>☐ OC43 (beta coronavirus) (only if virus= Other human coronavirus)<br>☐ HKU1 (beta coronavirus) (only if virus= Other human coronavirus)<br>☐ MERS-CoV (only if virus= Other human coronavirus)<br>☐ SARS-CoV-1 (only if virus= Other human coronavirus)<br>☐ Other, please specify: |
| **5.** | **Age:** Enter age. **Specify :** Years, months or days |
| **6.** | **Sex:** ☐ Male ☐ Female ☐ Unknown |
| **7.** | **Date of admission** yyyy-mm-dd |

| | |
|---|---|
| **8.** | **Where was this VRI acquired?**<br>☐ Healthcare-associated (acquired at your acute care facility) [1]<br>☐ Healthcare-associated (other healthcare facility)[2] |
| **9.** | **Is this a NEW infection in a patient who was previously identified with a HA-VRI in this surveillance year?**<br>☐ No ☐ Unknown<br>☐ Yes, please enter the original/previous unique patient ID:<br>**_____(**e.g. 99ZYY0001)<br>*(CHEC site #) (year) (case number)* |
| **10.** | **Postal Code[3]** *(first 3 digits):* **_____** |
| **11.** | **Was this patient admitted from a long-term care home[4]?**<br>☐ Yes ☐ No ☐ Unknown |
| **12.** | **Was this patient exposed to a symptomatic/tested positive health care worker prior to illness onset?** ☐ Yes ☐ No ☐ Unknown |
| **13.** | **Was this patient exposed to a symptomatic/tested positive caregiver/visitor in the hospital AND prior to illness onset?**<br>☐ Yes ☐ No ☐ Unknown |
| | **Q14. For influenza patients only** |
| **14.** | **Did this patient receive the influenza vaccine for the current season?**<br>☐ Yes ☐ No ☐ Unknown |
| | **Q15-17. For COVID-19 patients only** |
| **15.** | **For COVID-19 patients, was this patient vaccinated for COVID-19?** ☐ Yes ☐ No ☐ Unknown ☐ N/A (e.g. < 6 months of age) |

*[1] HA-VRI (YAF): Symptom onset ≥ 72 hours (> 3 calendar days) after admission to the reporting hospital and using best clinical judgement OR if patient is readmitted with a positive test < 72 hours (≤3 days) after discharge from hospital and using best clinical judgement. For COVID-19 patients, in the absence of symptoms, please use the date of positive test.*

*[2] Any patient who has a VRI not acquired at your facility that is thought to be associated with another healthcare facility (e.g. another acute-care facility, long-term care or rehabilitation facility etc.). Retirement homes are NOT considered another healthcare facility and should be reported under community-associated.*

*[3] If the postal code is unknown or not available, please enter 999*

*[4] A long-term care home is a facility where a person resides who requires routine/daily nursing care whereas a retirement home is a place where an individual may live independently (i.e. in their own room or apartment and may gather for meals). Given that definitions and facility types vary by province, please apply the criteria above to the best of your knowledge.*

| | |
|---|---|
| **16.** | **If yes, how many doses did they receive?** ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ Unknown |
| **17.** | **If yes, date of most recent dose** yyyy-mm-dd ☐ Unknown |
| **18.** | **Is there evidence the patient had pre-existing comorbidities at the time of admission?**<br>☐ No<br>☐ Unknown<br>☐ Yes *(please check all that apply)*<br>☐ Liver disease<br>☐ Cancer (active)<br>☐ Lung disease (e.g. asthma, COPD)<br>☐ Kidney disease (includes all patients on dialysis)<br>If yes to kidney disease, was this patient on dialysis?<br>☐ Yes ☐ No ☐ Unknown<br>☐ Pregnancy, if yes weeks of gestation Enter weeks of gestation.<br>☐ Organ transplant recipient<br>☐ Other immunosuppression[5], please specify Click here to specify.<br>☐ Chronic heart disease (excludes hypertension)<br>☐ Severe neurological disease[6]<br>☐ Diabetes<br>☐ Dementia/Alzheimer's disease<br>☐ Obesity (as recorded in patient chart or BMI $\geq$30 kg/m$^2$)<br>☐ Hypertension<br>☐ Other, please specify Click here to specify. |
| **19.** | **Which of the following syndromes did this patient have?**<br>☐ None, asymptomatic (COVID-19 only)<br>☐ Respiratory (e.g. cough, SOB, sore throat, nasal congestion)<br>☐ Gastrointestinal (e.g. nausea, vomiting, diarrhea)<br>☐ General constitutional symptoms (e.g. fever, chills, myalgias, headache)<br>☐ General neurological symptoms (e.g. altered level of consciousness, general deterioration)<br>☐ MIS-C/MIS-A (COVID-19 only) |

*[5] Includes congenital or acquired immunodeficiency, chemotherapy, immunosuppressive drugs, chronic high-dose systemic steroids (≥ 2 mg/kg or ≥ 20 mg/day prednisone or equivalent for > 2 weeks).*

*[6] Includes:*

a. *moderate to profound intellectual disability or developmental delay*
b. *epilepsy or cerebral palsy if accompanied by (a)*
c. *neuromuscular disorders (e.g., muscular dystrophy), when associated with impaired respiratory function*
d. *other neurological disorders associated with impaired pulmonary function and/or difficulty handling lung secretions*

| | |
|---|---|
| | ☐ Unknown<br>☐ Other, please specify Click here to specify. |
| **20a.** | **Did this patient receive an antiviral for their current HA-VRI?**<br>☐ Yes ☐ No ☐ Unknown |
| **20b.** | **If this patient received an antiviral, please select all that apply:**<br>☐ Remdesivir (COVID only)<br>☐ Molnupiravir (COVID only)<br>☐ Paxlovid (COVID only) start date yyyy-mm-dd ☐ Date not available<br>☐ Oseltamivir (Tamiflu) (Influenza only)<br>☐ Zanamivir (Relenza) (Influenza only)<br>☐ Peramivir (Rapivab) (Influenza only)<br>☐ Baloxavir (Xofluza) (Influenza only) |
| **21.** | **Did this patient receive an antibacterial for their healthcare associated respiratory infection?**<br>☐ No ☐ Yes ☐ Unknown |
| | **Q22. For COVID-19 patients only** |
| **22a.** | **Did this patient receive an immunoglobulin for their current HA-COVID infection?**<br>☐ Yes ☐ No ☐ Unknown |
| **22b.** | **If this patient received an immunoglobulin, please select all that apply:**<br>☐ Sotrovimab (COVID only)<br>☐ Tocilizumab (COVID only)<br>☐ Baricitinib (COVID only)<br>☐ Evusheld (COVID only)<br>☐ Other, please specify: |
| **23.** | **During this admission, was this patient infected with HA-CDI after their VRI?**<br>☐ Yes ☐ No ☐ Unknown |
| **24.** | **Did this patient require dialysis (hemo- or peritoneal dialysis) within the 30 days following positive test as a complication of their HA-VRI?**<br>☐ Yes ☐ No ☐ Unable to determine |
| **25.** | **Did this patient require mechanical ventilation within the 30 days following positive test?** ☐ Yes ☐ No ☐ Already ventilated at time of test ☐ Unable to determine |
| **26.** | **Did this patient require ECMO within the 30 days following positive test?**<br>☐ Yes ☐ No ☐ Already on ECMO at time of test ☐ Unable to determine |

| | |
|---|---|
| **27.** | **Was this patient admitted to the ICU within the 30 days following positive test?**<br>☐ Yes, related to VRI ☐ Yes, unrelated to VRI ☐ No ☐ Patient already in ICU at time of positive test ☐ Unable to determine |
| **28.** | **Date of ICU admission** yyyy-mm-dd ☐ Not applicable |
| **29.** | **Date of discharge from ICU** yyyy-mm-dd<br>☐ Not applicable ☐ Patient still admitted |
| **30.** | **What was the patient outcome at 30 days after positive test?**<br>☐ Patient alive, still in hospital<br>☐ Patient survived and discharged Date of discharge yyyy-mm-dd<br>☐ Patient survived and transferred Date of transfer: yyyy-mm-dd<br>☐ Patient died Date of death: yyyy-mm-dd<br>☐ Unknown |
| | **Only complete Q31 and Q32 for patients that died** |
| **31.** | **If the patient died within 30 days after positive test, did this patient have a directive (e.g. DNR order) that specified no admission to ICU and/or intubation?**<br>☐ Yes ☐ No ☐ Unable to determine |
| **32.** | **If the patient died within 30 days after positive test, please indicate the relationship of VRI to the death**<br>☐ VRI was the cause of death[7]<br>☐ VRI contributed to death[8]<br>☐ Death is unrelated to VRI[9]<br>☐ Causality between VRI and death cannot be determined[10] |
| **33.** | **Additional comments.** Click here |

[7] *VRI was the cause of death (i.e. the patient had no other condition that would have caused death during this hospitalization)*
[8] *VRI contributed to death (i.e. VRI exacerbated an existing condition that led to the patient's death)*
[9] *VRI was unrelated to death*
[10] *Unable to determine the causality between VRI and death.*

# Appendix D - Data Dictionary for Patient Questionnaire

*indicates a mandatory variable

**1) CHEC Site #***

This will be the **3-character** alphanumeric number assigned to your institution. It will always begin with the two-digit number assigned to your CHEC member e.g., 99, and a letter assigned by the CHEC member for that specific institution e.g., A, B, C, etc. The CHEC site # for each institution should always be the same for all the CHEC/CNISP surveillance projects and will always have all three alphanumeric digits reported as the CHEC site #, e.g., 99Z

**2) Unique patient ID***

This 10-character code should consist of the 3 character CHEC site # (e.g., 99Z), the surveillance year the infection occurred in (e.g. 2023), and a consecutive number starting at 0001 and continuing on with each additional case. An example of the first case in an institution would be 99Z230001. An example of the thirty-fifth case would be 99Z230035, and so on. Please note that the surveillance year for is calendar (January 1 to December 31st).

**3) Date of positive test***

Please indicate the date of first positive test. Please do not report the date of positive rapid antigen test. Only laboratory-confirmed tests (e.g. PCR) should be included.

**4) Viruses isolated***

Please select all viruses that were isolated with the same date of positive test.

If a patient tests positive for two viruses on the same test result and both are determined to be healthcare-associated all data may be captured on the same form.

If a patient is identified with a HA-VRI and is later identified with a second HA-VRI during the same hospitalization (4 or more days after the initial HA-VRI), please complete a new patient questionnaire and identify the PID of the first HA-VRI so that we may link the data. Please note that for HA-COVID-19 patients, the time between two positive COVID-19 tests must be greater than 90 days to be considered a new infection (and then a new patient questionnaire would be completed).

**5) Age***

Please enter the patient's age at the time of positive test and please specify the age units (in years, months or days).

**6) Sex***

Check male, female or unknown as appropriate.

**7) Date of admission***

Please indicate the date when this patient was admitted to this hospital.

**8) Source of acquisition***

**Please note that the patient questionnaire should only be completed for healthcare-associated VRI cases (including COVID-19).**

**Healthcare-associated acquired in your acute care facility (HA-YAF)**

- Symptom onset ≥ 72 hours (>3 calendar days) after admission to the reporting hospital and using best clinical judgement. For COVID-19 patients, in the absence of symptoms, please use the date of positive test.

OR

- If patient is readmitted with a positive test < 72 hours (≤3 calendar days) after discharge from your hospital and using best clinical judgement.

**Healthcare-associated acquired in another healthcare facility (HA-Other)**

- Any patient who has a VRI not acquired at your facility that is thought to be associated with another healthcare facility (e.g. another acute-care facility, long-term care, rehabilitation facility, etc.). Retirement homes are not considered another healthcare facility.

| Days of admission | | | | |
|---|---|---|---|---|
| Calendar day | 1 | 2 | 3 | 4 |
| Time (hours) | 0 | 24 | 48 | 72 |

**9) New viral respiratory infection**

Please indicate if this is a new viral infection in a patient previously identified with a viral respiratory infection in this surveillance year.

If a patient tests positive for two viruses on the same test result and both are determined to be healthcare-associated all data may be captured on the same form.

If a patient is identified with a HA-VRI and is later identified with a second HA-VRI during the same hospitalization (e.g. 4 or more days after the initial HA-VRI or new or worsening symptoms which may indicate a new infection), please complete a new patient questionnaire and identify the PID of the first HA-VRI so that we may link the data. Please note that for HA-COVID-19 patients, the time between two positive COVID-19 tests must be greater than 90 days to be considered a new infection (and then a new patient questionnaire would be completed).

**10) Postal code (first 3 digits)**

Please indicate this patient's residential postal code (first 3 digits). If the postal code is unknown or not available, please enter 999 for postal code.

**11) Was this patient admitted from a long-term care home?**

Please indicate if this patient was admitted from a long-term care home. A long-term care home is a facility where a person resides who requires routine/daily nursing care whereas a retirement home is a place where an individual may live independently (i.e. in their own room or apartment and may gather for meals). Given that definitions and facility types vary by province, please apply the criteria above to the best of your knowledge.

**12) Was this patient exposed to a symptomatic/tested positive health care worker prior to illness onset?**

Please indicate if the patient was exposed to a health care worker who was symptomatic or tested positive for COVID-19 prior to the patient's illness onset.

**13) Was this patient exposed to a symptomatic/tested positive caregiver/visitor in the hospital AND prior to illness onset?**

Please indicate if the patient was exposed to a caregiver/visitor who was symptomatic or tested positive for COVID-19 prior to the patient's illness onset.

**14) For influenza patients only, did this patient receive the influenza vaccine for the current season?**

This question only applies to influenza patients. Please indicate if the patient received the influenza vaccine for the current season.

**15) For COVID-19 patients only, was this patient vaccinated for COVID-19?**

Q15-Q17 only applies to COVID-19 patients. Please indicate if the patient received at least one dose of a COVID-19 vaccine.

**16) If yes, how many doses did they receive?**

If the patient did receive a COVID-19 vaccine, how many doses did they receive?

**17) If yes, date of most recent dose?**

Please indicate the date of the most recent dose of a COVID-19 vaccine.

**18) Is there evidence this patient had pre-existing comorbidities at the time of admission?**

If yes, please select all conditions that apply from the list provided. If the patient has kidney disease, please indicate whether they are on dialysis. If the patient is pregnant, please specify the number of week's gestation. If the patient has an immunosuppression condition as per the definition below, please specify. If the patient has other conditions not listed, please specify under 'other'.

Chronic heart disease may include: angina, arrhythmia (e.g. atrial fibrillation), cardiomyopathy, previous myocardial infarction, congestive heart failure, congenital heart disease etc.

Note that hypertension should NOT be included under chronic heart disease.

Other immunosuppression includes congenital or acquired immunodeficiency, chemotherapy, immunosuppressive drugs, chronic high-dose systemic steroids (≥ 2 mg/kg or ≥ 20 mg/day prednisone or equivalent for > 2 weeks).

Severe neurological disease includes:

a. moderate to profound intellectual disability or developmental delay
b. epilepsy or cerebral palsy if accompanied by (a)
c. neuromuscular disorders (e.g., muscular dystrophy), when associated with impaired respiratory function
d. other neurological disorders associated with impaired pulmonary function and/or difficulty handling lung secretions

Active cancer is defined as any malignancy for which active treatment (systemic chemotherapy or RT) is scheduled, and non cutaneous malignancy not under active treatment (including lymphoma, leukemia or solid tumour not requiring active treatment, or receiving only palliative care).

Obesity defined as recorded in patient chart or BMI >30kg/$m^2$

**19) Which of the following syndromes did this patient have?**

Please select all syndromes that apply from the list provided. If the patient has other syndromes not listed, please specify under 'other'. Response options "None, asymptomatic" and MIS-C/MIS-A only apply to COVID-19 patients

**20)**

**a) Did this patient receive an antiviral for their current HA-VRI?**

Please select yes if this patient received an antiviral for their current VRI infection.

**b) If this patient received an antiviral, please select all that apply.**

Please select all antivirals the patient received from the list provided. If the patient received paxlovid, please indicate the start date if available.

**21) Did this patient receive an antibacterial for their healthcare associated respiratory infection?**

Please indicate if this patient received an antibacterial for their respiratory infection.

**22)**

**a) For COVID-19 patients only, did this patient receive an immunoglobulin for their current HA-VRI?**

This question only applies to COVID-19 patients. Please indicate if this patient received an immunoglobulin related to their HA-VRI during their hospitalization.

**b) If this patient received an immunoglobulin, please select all that apply.**

Please select all immunoglobulins the patient received from the list provided. If the patient received an immunoglobulin not listed, please specify under 'other'.

**23) During this admission, was this patient infected with HA-CDI after their VRI?**

Please indicate whether the patient was infected with HA-CDI after their VRI.

**24) Did this patient require dialysis (hemo or peritoneal dialysis) within the 30 days following positive test as a complication of their HA-VRI?**

Please indicate if this patient required dialysis (hemo or peritoneal) or continuous renal replacement therapy (CCRT) within 30 days following positive test as a complication of their viral respiratory infection. If this patient was receiving dialysis prior to their positive test, please select no and indicate yes to kidney disease – patient on dialysis (Q18).

**25) Did this patient require mechanical ventilation within the 30 days following positive test?**

Please indicate if this patient required mechanical ventilation (i.e. intubated) within the 30 days following positive test.

**26) Did this patient require ECMO within the 30 days following positive test?**

Please indicate if this patient required extracorporeal membrane oxygenation (ECMO) within the 30 days following positive test.

**27) ICU admission**

Please indicate if this patient required admission or transfer to the ICU within the 30 days following positive test.

**28) Date of ICU admission**

If yes to Q27, please indicate the date of ICU admission

**29) Date of ICU discharge**

If yes to Q27, please indicate the date of ICU discharge or if this patient was still in ICU

**30) What was this patient's outcome at 30 days after positive test?***

At 30 days following positive test, please select one of the outcome options available. Please indicate discharge, transfer or date of death if applicable.

Transferred refers to transfer to another facility; discharge refers to being discharged home (e.g. where they were living prior to hospitalization); if the patient is still hospitalized (in any unit) in your hospital then they would be captured under 'patient alive, still in hospital'.

**31) If the patient died within 30 days after positive test, did this patient have a directive (e.g. DNR order) that specified no admission to ICU and/or intubation?**

If this patient died within 30 days after positive test, please indicate if this patient had an advanced planning directive (e.g. DNR) which specified that the patient did not wish to be admitted to an intensive care unit and/or be intubated.

**32) If this patient died within the 30 days following positive test, please indicate the relationship of VRI to the death.**

If this patient died within 30 days after positive test, please indicate if VRI was the cause of death (i.e. the patient had no other condition that would have caused death during this hospitalization); VRI contributed to death (i.e. VRI exacerbated an existing condition that led to the patient's death); VRI was unrelated to death or unable to determine the causality between VRI and death.

# Appendix E: Revision History

| Date | Revisions Made |
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| March 27, 2020 | • Updated weekly aggregate report form (removed line list and added older age group)<br>• Added symptoms to patient questionnaire (Q13) |
| April 9, 2020 | • Added question regarding if HCW provided direct patient care to COVID-19 positive patient(s) (Q7b) |
| April 20, 2020 | • Updated patient questionnaire<br>  ○ Added date of readmission<br>  ○ Primary admitting diagnosis changed to a text field<br>  ○ Added date of onset for each symptom<br>  ○ Added secondary bacterial infection<br>  ○ Added dialysis required under impact within 30 days<br>  ○ Added date of ICU admission and discharge from ICU<br>  ○ Added date of discharge from readmission<br>  ○ Added comments section |
| April 28, 2020 | • Added asymptomatic as a response option under symptoms<br>• Modified the COVID-19 case definition to reflect that best clinical judgement should be used for patients who are COVID-19 positive greater than 14 days prior to being admitted |
| June 11, 2020 | • For all other VRI (i.e. non-COVID-19 cases), a patient questionnaire is only required to be completed for healthcare-associated cases<br>• Zero report section updated to reflect reporting of zero reports for weekly data<br>• Definitions included as footnotes in questionnaire moved to Appendix D - data dictionary<br>• Q10 modified from 'long-term care facility' to 'long-term care and retirement homes'<br>• Added response options for admitting diagnosis<br>• Added the following underlying medical conditions (Q13): dementia/Alzheimer's disease and obesity<br>• Added the following under symptoms (Q14): chills, hypoxia, fatigue/lethargy, poor appetite/weight loss, dizziness, dehydration and altered mental status<br>• Q15 modified from 'type of VRI' to 'site of respiratory infection'<br>• Chloroquine removed from antiviral question (Q20) as it is captured under other treatment question (Q21)<br>• Added the following response options under 'other treatment" (Q21): Amoxicillin/Clavulin, Cefazolin, Ceftriaxone, Piperacillin/Tazobactam, Meropenem, Vancomycin and Steroid<br>• For Q22 secondary bacterial infection, added pathogen response options<br>• Removed the question 'Impact within 30 days' and created separate questions for the following: non-invasive ventilation, new oxygen requirements and dialysis required due to COVID-19<br>• Removed 'increase in ventilator settings' question |

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| | • Added 'total number of days ventilated' for mechanical and non-invasive ventilation |
| Sept 18, 2020 | • Beginning the week of Aug 23-29th, new age groups are collected on the weekly report form<br>• Updated denominator data collection form to collect patient days and patient admissions by age group<br><br>Updated COVID-19 case definition to specify:<br><br>• If the patient has multiple positive tests, please use the first positive test date to determine eligibility<br><br>• Any patient who has met the case definition in the past and is re-admitted to a participating hospital with laboratory confirmed COVID-19 identified either during their re-admission or in the 14 days prior to being re-admitted<br><br>• Please complete a questionnaire for every admission that occurs within 14 days of a SARS-CoV-2 positive test<br><br>The following changes were made to the patient questionnaire:<br><br>• For consistently with other CNISP surveillance projects, added the first three digits of the patient's postal code<br>• Added 'was this patient previously admitted and me the COVID-19 case definition'<br>• Under primary admitting diagnosis the following response options will be combined under acute respiratory illness: FRI, ILI, COVID-19, pneumonia, ARD<br>• Added 'has this patient tested positive for SARS-CoV-2 in the three months prior to this positive test'<br>• Added 'if CA, please specify the source of exposure if available'<br>• Changed healthcare worker to healthcare personnel<br>• Added 'setting where HCP worked in 14 days prior to positive test'<br>• Added 'type of HCP'<br>• Removed steroid response option from 'other treatment' and created specific question asking about receipt of corticosteroid, type and date.<br>• Added date of positive culture and site of infection to question regarding secondary bacterial infection<br>• Also collecting CNISP PID if CDI, MRSA BSI, VRE BSI and CPE are identified among COVID-19 patients<br>• Added 'did this patient have a stroke within 30 days of positive test?'<br>• Added 'did this patient have a pulmonary embolism within 30 days of positive test?<br>• Updated non-invasive ventilation question from "Did this patient require non-invasive ventilation (e.g. BiPAP, CPAP) within 30 days of positive test?" to "Did this patient require BiPAP or CPAP within 30 days of positive test"<br>• Removed question regarding 'did this patient require new oxygen requirements?' |

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| Oct 20, 2020 | • Clarified COVID-19 case definition: *If the patient has multiple positive tests, please use the first positive test related to this admission date to determine eligibility*<br>• Updated the following question from "Did this patient have a secondary bacterial infection?" to "Did this patient have a bacterial co-infection?"<br>• Updated criteria to indicate that continuous renal replacement therapy (CCRT) should be captured under Q33. Did this patient require dialysis (hemo or peritoneal dialysis) within 30 days of positive test as a complication from COVID-19 infection?<br>• Updated definition of long term care or retirement home to include facilities such as a private or public care home, residential assisted living building or a nursing home with varying levels of care for older persons. This excludes group homes for persons with developmental disabilities, mental health or addiction issues.<br>• For primary admitting diagnosis if a COVID-19 positive patient was admitted from a long term care or retirement home for non-clinical reasons (e.g. home cannot cope with isolation requirements, lack of nursing support etc.), please specify and include this information in the "other" text field.<br>• Added the following definition regarding data submission for re-admitted patients:<br>*If a patient is re-admitted within 30 days of positive test => collect all data on the same form*<br>*If a patient is re-admitted between 31 and 89 days after positive test => do not capture re-admission*<br>*If a patient is re-admitted ≥ 90 days (3 months) after first admission => please complete a new form and indicate the PID from the 1st form so that we may link the case data*<br>• Date of re-admission (that was removed Sept 28th) have been added back in.<br>• Clarified the following question: "Was this patient previously admitted > 3 months prior to this admission and met the COVID-19 case definition?<br>• Clarified the following question: "Was the patient treated with an antiviral for their current VRI?"<br>• Clarified the following question: "Did this patient receive an antimicrobial for their current VRI?"<br>• Clarified the following question: "Did this patient receive a corticosteroid for their current VRI?"<br>• Clarified the following question: "Was this patient receiving any of the following treatments for their current VRI?"<br>• If the postal code is unknown or not available, please enter 999 for postal code |
| Nov 30, 2020 | • The following question was added to the weekly report "Did your site declare a new COVID-19 outbreak for this reporting week?" If yes, please provide your site's COVID-19 outbreak case definition. |
| Dec 7, 2020 | • Hypertension was added as a separate response option and is no longer collected under chronic heart disease |

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| Mar 25, 2021 | • Updated long term objectives<br>• Updated data collection and submission section to reflect new VRI CNPHI module and additional data collection (e.g. # new outbreaks)<br>• Added question regarding direct transfer from another acute care facility and date of admission to the original acute care facility<br>• Where SARS-CoV-2 was isolated, added question to identify which variant strain was identified<br>• Added new questions regarding influenza and COVID-19 vaccination<br>• Added new question to determine if the patient had a directive that specified no intubation or admission to ICU<br>• Split question "was this patient admitted from a long term care or retirement home" into two separate questions<br>• Under primary admitted diagnosis, pregnancy related complications are included with labour<br>• Updated pre-existing comorbidities as follows:<br>o Added the following question: "if yes to kidney disease, was this patient on dialysis?" |
| April 25, 2021 | The weekly report was updated to captured ICU capacity |
| Sept 3, 2021 | The weekly report was updated to capture vaccination status by age group for patients hospitalized, admitted to ICU and deaths |
| Sept 10, 2021 | Under COVID-19 case definition the following was added:<br>o *If a patient was admitted directly from another hospital, please use the date of admission to the original hospital to determine eligibility (i.e. patient should test positive in the 14 days prior to admission to the original hospital).*<br>Data submission timeline was added (quarterly - similar to other CNISP surveillance projects)<br><br>The following questions were removed from the patient questionnaire:<br>• For COVID-19 positive patients, was this patient previously admitted > 3 months prior to this admission and met the COVID-19 case definition<br>• If community-associated, please specify the most likely source of exposure if available<br>• If this patient is a HCP, in the 14 days prior to positive test, did this patient work in any of the following settings?<br>• If this patient is a HCP, what type of HCP are they?<br>• If this patient is a HCP, did they provide direct care to a COVID-19 positive patient(s) in the 14 days prior to positive test?<br>• Site of respiratory infection<br>• Specimen type<br>• Type of test<br>• Did this patient receive any of the following treatments for their current VRI |

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| | • Removed collection of dates and names for all medications received (antivirals, antimicrobial etc.)<br>• Did this patient have a bacterial co-infection?<br>• Total number of days on CPAP or BiPAP<br><br>The following questions were added to the patient questionnaire:<br><br>• New viral respiratory infection - if the patient subsequently tests positive for a new virus during the same surveillance year, please complete a new form.<br>• If a patient is readmitted, please only include patients who are readmitted due to their VRI within 30 days of positive test. |
| February 18, 2022 | • Updated inclusion criteria to capture re-infected patients<br>• Note that 7 day ICU admission and 7 day outcome were collected on the patient questionnaire only during the month of January<br>• The surveillance period was updated from seasonal to calendar beginning January 1, 2022<br>• Updated weekly report form to reflect the collection of 0, 1, 2 or 3+ doses<br>• Note that reason for admission was added to the weekly report form for the month of January<br>• Added 4th dose response option for a COVID-19 vaccine on patient questionnaire<br>• If patient tests positive for two different viruses during the same hospitalization (but on different days) only one form needs to be completed |
| April 20, 2022 | • Included criteria to determine if a patient's admission is related to their COVID-19 infection.<br>• Questions removed from the weekly report form include: ICU capacity, ECMO indicator, reduced age groups to adult/peds and vaccination status to 2+ dose, 1 dose, unvaccinated, unknown and not applicable. Data now stratified by reasons for admission, vaccination status and age group<br>• Removed the following questions from the patient questionnaire: direct transfer from another facility, date of transfer, and number of days ventilated<br>• For patients whose admission is unrelated to COVID-19 only Q1-10 need to be completed. For patients whose admission is related to COVID-19, the entire questionnaire needs to be completed.<br>• If a patient's admission was unrelated to COVID-19 but they acquired COVID-19 while in hospital (i.e. they met the case definition for healthcare-associated) the full questionnaire should be complete.<br>• Added the following questions to the patient questionnaire: receipt of remdesivir, paxlovid, molnupiravir, dexamethasone, evusheld, sotrovimab and tocilizumab and their start dates. |
| June 6, 2022 | • Update language explaining the criteria used to help determine if an admission is COVID related or not.<br>• Added 3 and 4+ doses to the weekly report form. |

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| December, 21 2022 | • Patient questionnaires are only to be completed for HA-VRI (including COVID)<br>• COVID-19 included in HA-definition with all other VRI (e.g. symptom onset ≥ 72 hours (> 3 calendar days) after admission.<br>• The following questions were removed from the patient questionnaire: variant; reason for admission; readmission; healthcare professional status; admitted from a retirement home; travel; symptoms; symptom onset date; targeted or empiric Abx treatment; receipt of corticosteroid, convalescent plasma, anticoagulant and other medications for VRI; co-infection with MRSA, VRE, CPE, CLABSI; CPAP/BiPAP, stroke and pulmonary embolism<br>• The following questions were added to the patient questionnaire: syndromes, presence of sick caregiver, visitor or HCW, antiviral for treatment of influenza, parainfluenza 1-4, influenza A H3 and H1 and other human coronaviruses.<br>• The weekly number of adult and peds influenza A, influenza B and RSV hospitalizations (HA and CA) was added to the weekly form and data on acquisition (HA vs. CA) will also be collected for influenza and RSV. |