# EVIDENCE SYNTHESIS BRIEFING NOTE

**TOPIC**: **BEST PRACTICES FOR CARING FOR PERSONS UNDER INVESTIGATION FOR COVID-19 IN HOSPITAL SETTINGS**

*Information finalized as of December 2, 2020.*[a]
This Briefing Note was completed by the Research, Analysis and Evaluation Branch (Ministry of Health).


**Purpose**: This note summarizes best practices on how to house and care for persons under investigation (PUIs) in hospital settings, with the goal of maximizing hospital bed use and minimizing the potential for COVID-19 outbreaks. PUIs are symptomatic people who are admitted to the hospital who have had a COVID-19 test, but for whom the result is pending.

**Key Findings**:

- Limited information was identified on best practices for managing PUIs in hospital settings. Most of this literature discussed caring and housing PUIs in terms of:
  - **Testing**: Although resource-intensive, two studies from the United Kingdom (UK) and United States (US) found point-of-care testing led to a reduction in the time to availability of results, improvement in IPC measures, and reduction in bed moves and time spent in assessment areas.
  - **Triaging**: Studies and/or guidance from Manitoba, Canada, UK, US, and South Korea suggest reorganizing hospitals into several zones to segregate PUIs from other patients. These zones may be defined by the likelihood of COVID-19 and risk of outcomes (e.g., low/high likelihood and low/high-risk), which can determine the order of priority for isolation in single-occupancy rooms, segregation in waiting rooms/areas that allows for physical distancing, or cohorting.
  - **Isolation**: Studies and/or guidance from Canada, UK, US, South Korea, South Africa, and Australia support the immediate isolation of PUIs, either in single-occupancy rooms or waiting rooms/areas that allow for social distancing or cohorting. Physical barriers (e.g., curtains, partitions, doors) can be constructed to create isolated areas.
  - **Cohorting**: Studies and/or guidance from Alberta, UK, and Singapore suggest cohorting PUIs in areas segregated from the rest of the hospital when isolation capacity is limited. A staged approach to cohorting may be based on minimizing risk to the most patients, consultation with IPC experts, underlying patient conditions (e.g., immunocompromised), vaccination status (e.g., flu shot), and whether a caregiver is required for patient support (e.g., parents for pediatric cases). Guidance from Canada, Manitoba, Alberta, US, and Australian states does not recommend cohorting PUIs if it can be avoided; cohorting should ideally be only for patients confirmed to have COVID-19. PUIs and confirmed COVID-19-positive patients should not be cohorted together.
  - **Infection Prevention and Control (IPC) Measures**: All testing, triaging, isolation, and cohorting best practices should be implemented with appropriate IPC measures including: screening, personal protective equipment for health care workers, mask wearing by PUIs, clear signage for designated areas, separate entrance/exit points, construction of physical barriers, bed spacing by at least 1.5-2 metres, dedicated toilets and handwashing sinks, hand hygiene, proper ventilation, enhanced cleaning, and contact tracing. Staff cohorting may be implemented to minimize the risk of transmission; if staffing levels cannot support this, then care should be done in a sequential fashion (care for PUIs first, then move to confirmed patients).

**Analysis for Ontario**: No findings identified.

**Implementation Implications**: Best practices for managing PUIs in hospital settings are likely to involve a combination of testing, triaging, isolation, cohorting, and IPC measures.


[a] This briefing note includes current available evidence as of the noted date. It is not intended to be an exhaustive analysis, and other relevant findings may have been reported since completion.

## Context

To reduce health care-associated spread in hospitals, the standard recommendation is that single-person rooms with dedicated toilets be used to isolate suspected COVID-19 cases, and negative-pressure airborne infection isolation rooms be used for cases in which aerosol-generating procedures may be required. However, during an outbreak of COVID-19 with ongoing local transmission, distinguishing COVID-19 from ordinary viral respiratory tract infection becomes challenging, as the symptoms of COVID-19 are non-specific. The delay between clinical suspicion and confirmatory testing adds to the complexity of the problem. Moreover, admitting all patients with acute respiratory disease into dedicated isolation wards during a COVID-19 outbreak poses a logistical challenge, especially in hospitals with limited resources (e.g., hospital beds, staff).[1,2,3]

## Supporting Evidence

Table 1 below summarizes best practices for managing persons under investigation (PUIs) in hospital settings from scientific evidence and Canadian/international organizations in terms of testing, triaging, isolation, cohorting, and infection prevention and control (IPC) measures.

### Table 1: Best Practices for Managing Persons Under Investigation (PUIs) in Hospital Settings

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| ***Scientific Evidence*** | • **Rapid Testing**<br>  ○ A UK study (October 8, 2020) assessed the clinical impact of molecular point-of-care testing for COVID-19 for acute admissions, and showed that routine use of point-of-care testing can deliver rapid, accurate, and actionable results.[b] The use of point-of-care testing led to a large reduction in the time to availability of results compared with laboratory PCR, and this reduction was associated with improvements in IPC measures and patient flow, with patients spending approximately one day less in assessment areas and having fewer bed moves before arriving in definitive COVID-19-positive or COVID-19-negative clinical areas.[4]<br>• **Testing and Isolation**<br>  ○ A US study (August 13, 2020) of a large academic medical centre in Massachusetts described an approach to the evaluation and isolation of hospitalized PUIs for COVID-19 in whom clinical evaluation and additional diagnostic testing after a first negative nucleic acid amplification test (NAAT) were guided by infectious disease physician review.[c] The purpose was to achieve accurate COVID-19 diagnoses, minimize nosocomial transmission, and conserve PPE.<br>  ▪ The study found that this approach was resource intensive, but effective. Subsequent diagnosis of COVID-19 occurred in only two of 1,949 patients (0.10%) after initial evaluation prompted resolution of PUI status and cessation of isolation. Only a small proportion (2.9%) of PUIs with one or more repeated NAATs after a negative NAAT were diagnosed with COVID-19; this was a low false-negative rate.[5]<br>• **Triaging and Isolation**<br>  ○ A South Korean study (July 17, 2020) described how the emergency department in a regional base hospital was reorganized into several zones to segregate PUIs from other patients. The emergency personnel in these zones wore PPE (i.e., KF94 respirator, face shield or goggles, disposable surgical gown, disposable cap, and disposable gloves). All patients who visited the emergency department, except those who required immediate resuscitation or were critically ill, were allowed to enter only after undergoing a screening chest x-ray for pneumonia. If the chest x-ray showed the possibility of pneumonia, the patient was sent to the designated isolation zone. The number of designated single isolation rooms were increased in this zone, and |

[b] Nose and throat swab samples taken at admission from patients in the point-of-care testing group were tested with the QIAstat-Dx Respiratory SARS-CoV-2 Panel. The QIAstat-Dx Respiratory SARS-CoV-2 Panel detects two gene targets, ORF1b and the E gene, in a single assay, and detection of either gene is reported as positive (Brendish et al., October 8, 2020).
[c] All SARS-CoV-2 NAATs were performed using Food and Drug Administration (FDA) emergency use authorized (EUA) assays. The test turnaround time for inpatient upper respiratory tract NAATs ranged from one to 30 hours and the test turnaround time for lower respiratory tract NAATs ranged from one to nine days. Infectious disease physicians reviewed 80-110 PUIs per day from 6 A.M. to midnight, requiring ~70 person hours per day (Dugdale et al., August 13, 2020).

a glass diaphragm with an automatic door between the beds was installed. Patients at risk of transmission of a respiratory infection were mandatorily held in this area until they tested negative for COVID-19. Patients with normal chest x-ray findings went to the regular zone, where the emergency care personnel performed the usual emergency department management routine. This remodeling of the emergency department reduced unexpected exposure to other patients and ensured the safety of emergency personnel.[6]

- **Triaging, Isolation, and Cohorting**
  - A UK study (August 2020) evaluated the use of a triage tool for prompt isolation or cohorting of patients in the context of the COVID-19 pandemic at a hospital in London. The tool was designed to manage patient flow, in the event of insufficient single-occupancy rooms to isolate all suspected cases at admission. An infectious diseases clinician allocated patients to triage categories defined by likelihood of COVID-19 and risk of a poor outcome: Category A (low-likelihood; high-risk), B (high-likelihood; high-risk), C (high-likelihood; low-risk), and D (low-likelihood; low-risk). This determined the order of priority for isolation in single-occupancy rooms, with Category A being the highest priority. Patients in other groups were cohorted when isolation capacity was limited with additional interventions to reduce transmission (e.g., PPE donning and doffing stations, construction of physical separations such as doors, bed spacing within wards).
    - Ninety-three patients were evaluated with 79 (85%) receiving a COVID-19 diagnosis during their admission. Of those without a COVID-19 diagnosis: 10 were initially triaged to Category A and placed in single-occupancy rooms; zero to B; one to C, and four to D. No symptomatic hospital-acquired infections were detected in the cohorted patients. The study concluded that early assessment of patients with suspected COVID-19, by a clinician with appropriate expertise, effectively identified a high-risk cohort most appropriate for isolation. This approach, combined with innovative IPC measures, reduced bed pressures without increasing the risk of health care-associated transmission.[7]
- **Isolation and IPC Measures**
  - A South African study (September 16, 2020) noted that a district-level hospital[d] in Cape Town physically reorganized their emergency centre to limit nosocomial transmission during the COVID-19 pandemic by: 1) converting a gynaecology examination room into a PUI room; and 2) creating a COVID-19 isolation ward by relocating the adult short stay wards to the outpatients' department (which was closed because of the pandemic) and by merging and moving the paediatric intermediate acuity area and paediatric short stay area to the adult low acuity area. The hospital noted that three completely separated areas (with separate entrances) are ideally needed to host confirmed cases, PUIs, and confirmed negative patients, but the physical layout and limited resources (e.g., staff, equipment) prevents this. Future reorganization plans include constructing physical barriers and Perspex partitioning to create physical barriers.[8]
- **Cohorting and IPC Measures**
  - A Singaporean study (June 26, 2020) described how individuals with clinical syndromes compatible with COVID-19 (e.g., undifferentiated viral fever) but no epidemiologic risk (e.g., no history of contact with COVID-19 cases) were placed in cohorted general wards for COVID-19 testing in a tertiary hospital.[e] These general wards, termed as respiratory surveillance wards (RSWs), were segregated from the rest of the hospital, and comprised a mixture of single rooms (with single toilets) and cohorted cubicles (with shared toilets). Each cohorted cubicle and single room had its own normal-pressure ventilation system, and air was not recirculated between cubicles or rooms.[f] To mitigate risk, an infection control bundle was implemented in the RSW comprising infrastructural enhancements (e.g., physical partitions between beds, bed spacing), enhanced cleaning, PPE, social distancing, and enhanced testing and contact tracing.[g]

[d] The emergency centre sees around 3,000 new patients per month with a reported inpatient bed occupancy level at ± 130% (Furstenburg et al., Sept 16 2020).
[e] The Singapore General Hospital is the largest public acute tertiary care hospital in Singapore, with 1,785 beds (Wee et al., September 1, 2020).
[f] Patients who required supplemental oxygen, non-invasive ventilation, or had clinical features suspicious of viral pneumonia (e.g., normal procalcitonin, lymphopenia) were prioritized for admission to single rooms, though this was not always feasible due to the large number of admissions (Wee et al., September 1, 2020).
[g] Infrastructural enhancements included constructing partitions between beds and placing three beds per cubicle spaced two metres apart (compared to an average of five to six patients per cohorted cubicle in a typical general ward). Cleaning and disinfection with 1,000 ppm sodium hypochlorite were stepped up, with the wards and toilets being cleaned three times a day. A risk-stratified approach was adopted for PPE. Initially, health care workers used N95 respirators as PPE during routine care, with full PPE (i.e., N95 respirators, eye protection, gown, and gloves) reserved for instances where aerosol-generating procedures needed to be performed. However, from mid-March 2020, given the rising number of COVID-19 cases being picked up in the

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| | ▪ Over a three-month period, the hospital found that implementation of the infection control bundle mitigated the risk of environmental contamination and transmission in the RSW. Routine testing for patients presenting with clinical syndromes compatible with COVID-19 allowed for early detection and early isolation, reducing the duration of exposure in the general ward setting and further mitigating the risk of health care-associated transmission. Via early testing and detection, the duration of exposure in the cohorted RSW was kept relatively short (~15 hours on average).[9] |
| ***International Scan*** | • **Triaging and Isolation**<br>○ **US**: Guidance (September 11, 2020) from the Centers for Disease Control and Prevention (CDC) describes triaging protocols for suspected COVID-19 patients in health care settings, including hospitals. A standardized triage algorithm should be used to immediately isolate/separate patients at high risk for COVID-19 (e.g., travel history or exposure to someone with confirmed or suspected COVID-19) in well-ventilated single-person rooms with doors closed or designated COVID-19 waiting areas. A medical mask should be given to patients with respiratory symptoms if they do not already have one and must keep it on at all times. Clear signs about the location of these waiting areas should be posted, and paper tissues, alcohol-based hand rub, and trash bins with lids should be provided. The triage area should be cleaned with 0.1% chlorine or 70% alcohol at least twice a day focusing on frequently touched surfaces.[10]<br>• **Isolation and IPC Measures**<br>○ **Australia**: Guidance (November 9, 2020) from the Australian government states that suspected or confirmed COVID-19 patients should be placed in a single room with the door closed, or, if this is not available, be placed in a designated isolation area that is physically separated from other patient areas and is not used as a thoroughfare.[11]<br>○ **Victoria, Australia**: Guidance (April 28, 2020) from the Victorian Department of Health and Human Services states that PUIs must be physically separated from: 1) patients with laboratory-confirmed COVID-19; 2) patients without clinical suspicion for COVID-19 and vulnerable groups; and 3) patients with respiratory infections caused by other pathogens. When negative-pressure rooms or single rooms are not available, PUIs should be placed in designated and self-contained areas with beds at least two metres apart and curtains drawn between bed spaces. Separate entrance/exit points should be created.[12]<br>• **Cohorting and IPC Measures**<br>○ **US**: CDC guidance (November 4, 2020) suggests that it might not be possible to distinguish patients who have COVID-19 from patients with other respiratory viruses. Patients with different respiratory pathogens can be cohorted on the same unit. However, only patients with the same respiratory pathogen may be housed in the same room. A patient with COVID-19 should not be housed in the same room as a patient with an undiagnosed respiratory infection or a respiratory infection caused by a different pathogen.[13]<br>○ **England**: Public Health England's flow chart (July 31, 2020) for managing possible cases of COVID-19 suggests symptomatic patients be isolated and cohorted whilst awaiting test results when admitted to hospitals. Health care workers should wear appropriate PPE (i.e., aprons, gloves, fluid repellent mask, and eye protection) while assessing and treating patients.[14]<br>○ **Queensland, Australia**: Queensland Health's guidelines (October 4, 2020) does not recommend cohorting suspect cases if it can be avoided. Cohorting of suspect, probable, or confirmed cases must only be undertaken following consultation with local experts (e.g., infectious diseases physicians). Probable and suspect cases should not be cohorted with confirmed cases, and cohorting should not be undertaken in settings/for patients where a caregiver is required for patient support (e.g., in paediatrics where a parent will be present). Physical distancing measures must be adhered to with a minimum of 1.5 metres distance maintained between patients at all times. Curtains, privacy screens, or barriers should be used at all times to |

RSW, health care workers used full PPE when caring for these patients. Compliance with usage of PPE in the RSW was audited by infection control nurses. Patients were advised to wear surgical masks at all times, except during meals. For epidemiology investigations, upon detection of a confirmed case of COVID-19 in the RSW, the affected room or cohorted cubicle was temporarily locked down (i.e., no new admissions to and no transfers out of the cubicle). Both the confirmed cases, as well as patient close contacts, were transferred to an isolation ward. Simultaneously, contact tracing was done to identify health care workers who had come into contact with the confirmed case, and risk stratification was done based on the duration of contact, nature of activity, and type of PPE worn at the time of contact. For testing, patients could only be transferred out of the RSW if oropharyngeal swabs for SARS-CoV-2 PCR were negative on two consecutive occasions, completed 24 hours apart (Wee et al., September 1, 2020).

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| | physically separate patients. Other considerations include records of all persons entering cohort areas, ventilation of cohort areas, PPE escalation, and increasing cleaning frequency.[15]<br>○ **Victoria, Australia**: According to guidance (April 28, 2020) from the Victorian Department of Health and Human Services, to prepare for cohorting and isolating patients, hospitals must: screen and triage at all points of access for patients presenting for clinical review; implement procedures to identify and isolate or cohort patients who may be a source of disease transmission; and do not mix patients with confirmed COVID-19 patients who do not have a COVID-19 laboratory diagnosis (including suspected patients). The following five zoning types are recommended: 1) *confirmed COVID-19*, clinical care for patients who have laboratory confirmed COVID-19; 2) *suspected COVID-19*, clinical care for patients who meet suspected case definition; 3) *high-risk*, clinical care for patients who do not meet the case definition for suspected or confirmed COVID-19, but are located within areas of increased clinical risk (e.g., emergency departments, intensive care units); 4) *standard*, clinical care for patients who are not confirmed or suspected COVID-19 cases; and 5) *vulnerable*, clinical care for patients who do not present with clinical or epidemiological risk, and are immunocompromised, neonates, infants, and are at risk of COVID-19 mortality (based on race, age, and comorbidities).[16]<br>○ **Western Australia, Australia**: Department of Health guidance (August 31, 2020) on in-patient management states that PUIs are to be placed in negative pressure isolation rooms or a standard single room when available. The decision to cohort will need to be undertaken by the health care team. Patients with confirmed COVID-19 are not to be cohorted with patients who have not yet been diagnosed with COVID-19. Hospitals may consider creating cohort wards, especially where heating and ventilation air conditioning systems can be isolated. Cohort wards should be separate from other patient areas and are not to be used as a thoroughfare. Clear signage indicating the appropriate transmission-based precautions and required PPE are to be placed at the entrance of the cohort ward. Gowns, masks, and eye protection may remain between patients in the same cohort ward providing they are not soiled. Upon leaving the cohorted unit, all PPE must be removed and discarded. Where possible, dedicated health care workers that have been assessed as competent in donning and doffing the appropriate PPE should be allocated to work in cohort wards.[17] |
| ***Canadian Scan*** | • **<u>Triaging, Isolation, and IPC Measures</u>**<br>○ **Canada:** The Government of Canada's interim guidance (April 30, 2020) for acute health care settings states that triage should allow for rapid identification and placement of patients presenting with acute respiratory illness. Physical barriers (e.g., partitions or clear transparent barriers) should be in place at triage, reception desks, patient reception desks/areas, screening desks/areas, emergency departments, and any areas where patients present directly for treatment or care (e.g., diagnostic imaging, ambulatory care, outpatient laboratory).[18]<br>○ **Manitoba**: Shared Health's guidance (November 20, 2020) for acute settings in Winnipeg recommends assessing and triaging symptomatic persons at entrance screening points to orange, red, and green zones. PUIs should be masked and immediately segregated into a single room, or to a segregated waiting room/area that is physically separate from the main waiting room/area and that allows for a two metre separation between patients (orange/red zone).[19]<br>• **<u>Isolation and IPC Measures</u>**<br>○ **Canada**: The Government of Canada's interim guidance (April 20, 2020) states patients with suspected or confirmed COVID-19 infection should be cared for in a private room with a private toilet and sink (if available). Patients with confirmed and suspected COVID-19 infections should be restricted to their room until their symptoms have resolved and in accordance with provincial and territorial guidance.[20]<br>▪ When the number of confirmed or suspected COVID-19 cases in the institution is high, consideration should be given to having dedicated teams of health care workers specific to these patients, to reduce the risk of transmitting infection in the acute health care setting, and to allow highly trained health care workers to develop expertise in caring for these patients.<br>▪ IPC measures to ensure prompt identification and management of all patients presenting with signs and symptoms of an acute respiratory illness include, for example: signage instructing patients to alert health care workers of any signs and symptoms of COVID-19, provision of masks to be worn at all times, PPE, and immediately escorting patients to a private room/area where a space of at least two meters between patients can be maintained.[21]<br>• **<u>Cohorting and IPC Measures</u>**<br>○ **Canada**: The Government of Canada's interim guidance (April 30, 2020) states that if cohorting is necessary, only patients who are confirmed to have COVID-19 infection should be cohorted. Health care workers should be cohorted to work only with COVID-19 patients whenever possible. As the numbers of |

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| | patients with COVID-19 increase, a specific unit or area should be designated for COVID-19 patients; this unit or area should not be located near those with high risk patients (e.g., acute oncology).[22]<br>○ **Manitoba**: Shared Health's guidance (November 20, 2020) for acute settings in Winnipeg does not recommend cohorting PUIs; cohorting should only be for patients with confirmed COVID-19. If cohorting is necessary, IPC should be consulted. Health care workers are advised to cohort as much as possible, but if unable to, the recommended workflow should be managed to first care for well residents, then ill residents, in order to minimize transmission.[23]<br>○ **Alberta**: Alberta Health Services' guidelines (November 23, 2020) on cohorting of probable or confirmed COVID-19 patients in acute care states that each site can develop their own cohorting plan based on site-specific capacity, facility design, and patient population. The following principles may be considered:<br>▪ The decision to cohort must be made in consultation with IPC.<br>▪ A staged approach to cohorting should be based on minimizing risk to the most patients. Consideration should also be given to underlying patient conditions (e.g., immunocompromised), vaccination status (e.g., flu shot), and co-infection with other diseases. Designated units (ideally single-bed rooms) may be designated as COVID-19-positive only or COVID-19-positive and suspect based on facility infrastructure and local decision making. These units should use staff cohorting to minimize the risk of transmission; if staffing levels cannot support this, then care should be done in a sequential fashion (care for suspect patients first, then move to confirmed patients).<br>▪ Criteria should be established to move PUIs who test negative to another space in the facility.<br>▪ There should be strict adherence to IPC measures (e.g., point-of-care risk assessment, hand hygiene, appropriate use of PPE, spatial separation of patient beds by at least two metres, physical barriers such as a curtain, appropriate cleaning and disinfection).[24,25] |
| ***Ontario Scan*** | • No information identified. |

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