

Supplementary Information

Table of Contents

Supplementary methods

Methods S1. Description of outbreak interventions implemented by the ORT.

Methods S2. Aute care document created by working group for management of the wandering COVID-19 patient.

Supplementary tables

Table S1. Positivity rate of SARS-CoV-2 patient prevalence testing carried out during the outbreak (n = 922 tests).

Table S2. Asymptomatic hospital staff tested for SARS-CoV-2 during outbreak period (n = 6256; total 22 cases identified).

Table S3. Breakdown of individual COVID-19 case clusters comprising the outbreak.

Supplementary figure

Figure S1. Visualization map of transmission patterns of COVID-19 cases involved in the outbreak.

Appendix 1, as supplied by authors. Appendix to: Kanji JN, Chan YLE, Boychuk LR, et al. SARS-CoV-2 outbreak in a Canadian suburban tertiary hospital necessitating full facility closure: a descriptive observational study. *CMAJ Open* 2022. DOI:10.9778/cmajo.20210064. Copyright © 2022 The Author(s) or their employer(s).

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Methods S1. Description of outbreak interventions implemented by the ORT.

During the course of the outbreak, the ORT implemented a series of interventions aimed at controlling SARS-CoV-2 spread. A dedicated COVID-19 isolation unit was created for all newly diagnosed SARS-CoV-2 positive patients to minimise further transmission on general units.¹

Nursing, rehabilitation, pharmacy, and physician staff were rapidly trained to become PPE coaches to help prevent PPE breaches by direct observation.² A proportion of PPE coaches also conducted ward-based audits with active real-time feedback regarding hand hygiene, environmental cleaning, and social distancing when possible.³

Screening for symptoms of COVID-19 in patients and staff was increased to twice per shift. Staff were advised to wear continuous eye protection (face shield or goggles) in all clinical areas, in addition to the continuous masking policy that was already in-place. Mandatory sign-in sheets were implemented for every patient room, staff break and locker rooms to facilitate contact tracing, if required. Restrictions on the number of staff members who could be in a break or locker room to ensure appropriate social distancing (6 feet; 2 meters) were put in place, with the occupancy being a component of ward-based audits.

Due to inherent risks of false negatives results,^{4,5} the process for removing patients from isolation precautions upon receipt of a negative COVID-19 test was modified to require a dual assessment by both the most responsible healthcare provider and a senior nursing staff member to ensure repeat testing was not warranted, as opposed to a physician only evaluation.

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A working group of practitioners in geriatrics, neurology, geriatric psychiatry, and IPC developed a multi-disciplinary approach to support isolation of patients with suspect or confirmed COVID-19 who had underlying dementia and wandering behavior.⁶ The risk this group of patients poses to widespread dissemination of SARS-CoV-2 was identified when a patient was found to be positive and infected several healthcare workers. The recommendations from this working group were implemented over the course of the outbreak (Methods S2).

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Methods S2. Acute care document created by working group for management of the wandering COVID-19 patient.

Background

- Wandering is not an uncommon symptom in patients with cognitive impairment
- Majority of these patients are usually redirectable and manageable
- Wandering can pose a major risk for spreading COVID-19 to other residents and care staff
- Treatment of these patients can be challenging for physicians and the healthcare team
- There are multiple contributing factors to restlessness and wandering
- Currently there is limited evidence for symptomatic treatments in dementia
- Non-pharmacological approaches should be considered the mainstay of therapy, complemented by psychotropic medications only when unavoidable
- Agitation is defined as a state of excessive psychomotor activity accompanied by increased tension and irritability and may include aberrant hyperactive motor behavior such as wandering
- It is accompanied by emotional distress and excess emotional lability
- Behaviors may be worse in evening hours “sundowning”
- There will be conflicting needs between best practice in senior and dementia care whilst balancing infection control considerations to contain transmission and spread

Ethical Considerations

Patients with cognitive issues, including those with dementia, deserve careful consideration of the ethical values at stake in our efforts to continue to provide quality care during COVID-19.

The COVID-19 pandemic has precipitated a shift from care focused on individual patients to care from a public health ethics perspective centering on minimizing illness, death, and community disruption.

Pandemic ethics frameworks seek to protect the greatest number of community members while not placing overly burdensome restrictions on individuals. This utilitarian perspective is justified in a public health emergency.

Given the limitations to individual liberty that come with pandemic restrictions, we need to be particularly careful to preserve a sphere of individual autonomy and dignity for our patients.

Though we are making community protection our foremost goal, treatments, interventions, and care plans should reflect least restrictive measures. Restrictions should be carefully considered, proportionate to the risks involved, and fair. To promote fairness, we need to treat patients in equal proportion to their individual need so that patients with equivalent needs will receive equivalent care.

Within the context of restrictions, we should continue to seek opportunities to enhance patient well-being. Providing quality care for COVID-19-positive patients with cognitive issues will require collaborative multidisciplinary teamwork.

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To maintain trusting relationships with patients and their loved ones, clinicians, staff and administrators should be able to explain the reasons for restrictions in transparent communication and to provide clarification to facilitate understanding.

Health care professionals have a duty to care, i.e., to use their knowledge and skills for the betterment of patients. With COVID-19, the duty to care for patients must be balanced with the duty to self, family and others but must not lead to patient abandonment.

Our leaders in administration owe a reciprocal duty of care to staff to ensure that they do not experience harm to physical, emotional, or mental health while caring for COVID+ patients with cognitive issues. Given the complexity of this vulnerable population and the massive changes in health care caused by COVID-19, it is not unexpected that clinicians may experience moral distress. Ethics, Spiritual Care, and Wellness resources are available to all staff.

The risk of COVID-19 affects all people in an institutional setting. We are guided in our endeavor to care for the vulnerable population of COVID-19-positive patients with cognitive issues by upholding these values:

- Common good
- Respect for individuals
- Proportionality (risk/benefit)
- Duty to care
- Fairness
- Trust
- Transparency
- Collaboration and reciprocity

Management Begins with Assessment

Causes

- Modifiable factors: unmet needs, acute medical problems, knowledge about the condition, caregiver distress, over/under stimulation, lack of routine, caregiving quality, caregiving quantity, caregiving knowledge, family dynamics
- Unmodifiable factors: medical comorbidities, stage of dementia, type of dementia, brain changes, personality, life history, infrastructure of care facility

Describe, measure and document assessment of wandering and restlessness

- When and how severe
- Associated with depression
- Emotional dysregulation and insomnia
- Safety issues
- Any identifiable triggers
- Family dynamics

Analyze - what do we know about the patient, and what could be contributing

- Medical, psychological, or social factors

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Identification of Triggers

- What event(s) are creating anxiety and/or wandering behavior?
- Is toileting required?
- Is the patient experiencing pain?
- Is there withdrawal from substances e.g., nicotine?
- Have any medications been stopped or started in the past 2 - 4 weeks?
- Have any medication dosages been changed in the past 2 - 4 weeks?
- Are there sensory barriers or losses to consider – vision, hearing?
- Is there social isolation without family presence?
- Is PPE worn by staff creating fear and worry?

Immediate Identification of COVID-19 Risk or Suspect Positive

- Monitor all patients for signs and symptoms of COVID-19 at a minimum of twice daily
- Promptly place symptomatic patients on contact and droplet isolation
 - o Staff providing care to suspect or COVID-19-positive patients must protect themselves and wear appropriate PPE for contact and droplet precautions
 - o Staff not providing patient care and are at risk for being exposed to wandering suspect or COVID-19-positive patients must wear PPE based on a risk assessment. Contact IPC for direction.
 - o Provide education on when and how to don and doff PPE.
 - o Also suggest adding “establish a buddy system” and/or have assigned officers (i.e., staff dedicated to observe individual staff donning and doffing practices) to ensure correct donning and doffing procedures are followed to prevent self-contamination.
- Expedient placement in private accommodation with up to one-to-one care
- Unit should immediately be considered high risk
- Initiate enhanced environmental cleaning immediately

Staffing Considerations

- Constant care with up to one-to one support
- Consistency in staffing assignment and caregivers
- Engagement with family as much as possible virtually
- Are there cultural considerations that should be embraced?
- Calm and supportive approach for all care provision
- Ensure there is a detailed written plan of care
- Engage consultation and advice of a behavioral therapist if available

Environmental Considerations

- Cohorting COVID-19-positive patients
- Can the unit be secured?
- What can be modified within the environment – wayfinding, organizing furniture?
- Pictures of loved ones
- Assess noise level
- Mirrors – can be helpful in some cases distracting in others

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- With staff masked – picture of staff person on their identification
- Eliminate clutter
- Visual communication methods such as images and posters
- Consideration to placing a stop sign/signage on the entrance to an area they should not enter
- Bold line on the floor that creates visual separation
- Try to have patients in rooms with a window to outside
- Camouflage the door knob
- Instillation of chime device when door opens
- Ensure lighting within the room is not too bright or dark to create shadows
- Door closures, pony doors or dividers to redirect

Non Pharmacological Strategies

- Are there unmet care needs – hunger, pain, feeling hot/cold, needing social connection?
- Is there medical decompensation – chronic diseases or the COVID-19 illness in and of itself?
- What type of redirection can be tried?
- Adherence to a routine to reduce uncertainty for the patient
- Increase recreational activities within the patient's room (e.g., coloring). Dedicate recreational items to a single patient. Ensure items used for recreational activities are cleanable and cleaned between single-patient use. If recreational items are not cleanable, discard after use.
- Occupational therapy and physiotherapy to have exercise programs within the room to help use up energy
- Reminiscence therapy
- PPE with staff – need to focus more on tone of voice, eye contact and body language
- Communication needs to be simple and repeated often – avoid asking questions
- Accompany tasks that are different within pandemic context with storytelling, soft music
- Consultation to Psychiatry or Geriatrics Services, as required
- If patient can be masked – take for escorted walks if on a cohorted unit
- Try to avoid excessive napping during the day
- Reduce distractions or unplanned activities
- If patient does not have capacity, conversation early with alternate decision maker
- Having family come in and deemed designated family support person/essential visitor – screened, accompaniment, PPE

Pharmacological Intervention or Chemical Restraints

- Are there PRN medications that can reduce agitation and anxiety
- Consult specialists as required to determine options
- For recommendations refer to the Seniors Delirium Protocol:
<https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-bjh-hf-seniors-delirium-protocol.pdf>

Mechanical Restraints

- Always last resort if all other interventions and strategies have failed

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- Should only be considered when there is imminent harm
- Consider involvement of Clinical Ethics
- Consult specialties such as Geriatric Services or Psychiatry to review options

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Response and Containment Algorithm/Checklist for Wandering COVID-19 Patient in Acute Care

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Wandering patient has symptoms of COVID-19 or has been in close contact of a Confirmed COVID-19 patient

Immediate Actions (Patient):

- Move wandering patient into private accommodation as soon as possible irrespective of COVID-19 risk
- Order/assign 1:1 care staff or 2 staff if behavior is limiting ability to keep the patient within their room
- Place patient on contact and droplet precautions
- When providing direct care and/or in contact with patient's environment staff must wear gown, gloves, procedure mask and eye protection.
- Notify IP&C, Manager On Call for Unit and Most Responsible Physician Or Designate for further discussion/direction

Intermediate Actions (Unit):

- Provide immediate hand hygiene to all patients on unit
- Assess all patients for symptoms of COVID-19
- Isolate all patients within their rooms and close doors to all patient rooms
- Collect specimen swabs as ordered
- Conversation with IP&C re: use of PPE Officers or Buddies in Place and how to define unit risks
- Ensure staff that are working with a wandering patients are dedicated to that patient only

Rapid Environmental Intervention:

- Notification of Environmental Services for enhanced unit and surface cleaning
- Internal intense cleaning action list to be created for all staff – participation of all
- When patient becomes or identified positive – transfer to confirmed COVID-19 unit

Reporting Obligations:

- Inform OHS or WHS
- IP&C in collaboration with MOH initiate COVID-19 swabs on all patients within unit
- Inform formal or informal decision maker regarding the scenario

Employ all Interventions Relevant for Dementia-Type Patients:

- Creation of patient specific care plan that is reviewed and revised as required
- Attend to responsive behaviours as such
- Reduce external stimulation if possible
- Adopt redirection strategies that have proven helpful in other settings (e.g., home, facility)
- Capitalize on positive relationships with some staff members
- Consult Geriatric Medicine, Geriatric Psychiatry, Behavioural Therapist

Clinical Considerations:

- Rule out Delirium as a contributing factor to agitation and wandering
- Medication adjustments or rapid behavioural interventions possibly available
- Consider and assess triggers such as pain, hunger, toileting and medications
- Consider pharmacologic restraint if patient cannot comply with isolation
- Consider physical restraint as last resort if patient cannot adhere
- Consider Form 1 in accordance with the Mental Health Act

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Table S1. Positivity rate of SARS-CoV-2 patient prevalence testing carried out during the outbreak (n = 922 tests).*

Date of tests	Positivity Rate (%)	Total patients screened	Number of patients positive
21/06/2020	17.2	29	5
24/06/2020	7.7	13	1
25/06/2020	16.7	18	3
27/06/2020	0	12	0
28/06/2020	0	12	0
30/06/2020	0	43	0
01/07/2020	0	12	0
03/07/2020	0	19	0
04/07/2020	11.3	62	7
05/07/2020	0	59	0
07/07/2020	4.6	65	3
08/07/2020	0	40	0
10/07/2020	3.6	56	2
11/07/2020	0	26	0
14/07/2020	0	68	0
17/07/2020	0	54	0
20/07/2020	0	49	0
23/07/2020	0	42	0
26/07/2020	0	42	0
29/07/2020	0	42	0
01/08/2020	0	41	0
05/08/2020	0	40	0
09/08/2020	0	39	0
13/08/2020	0	39	0

* Prevalence screens generally took place every 72 hours but were initially staggered on different units. By July 11, 2020 the entire hospital was on one schedule for patient prevalence screening. Total numbers of patients screened decreased as patients were slowly discharged from hospital.

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Table S2. Asymptomatic hospital staff tested for SARS-CoV-2 during outbreak period (n = 6256; total 22 cases identified).

Week	Week Number	Total number tested	Number positive (%)
June 21-27, 2020	Week 1	964	6 (0.62)
June 28-July 4, 2020	Week 2	397	6 (1.5)
July 5-11, 2020	Week 3	1664	4 (0.25)
July 12-18, 2020	Week 4	1114	6 (0.54)
July 19-25, 2020	Week 5	1181	0
July 26-August 1, 2020	Week 6	1009	0
August 2-8, 2020	Week 7	1	0

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Table S3. Breakdown of COVID-19 outbreak clusters.^a

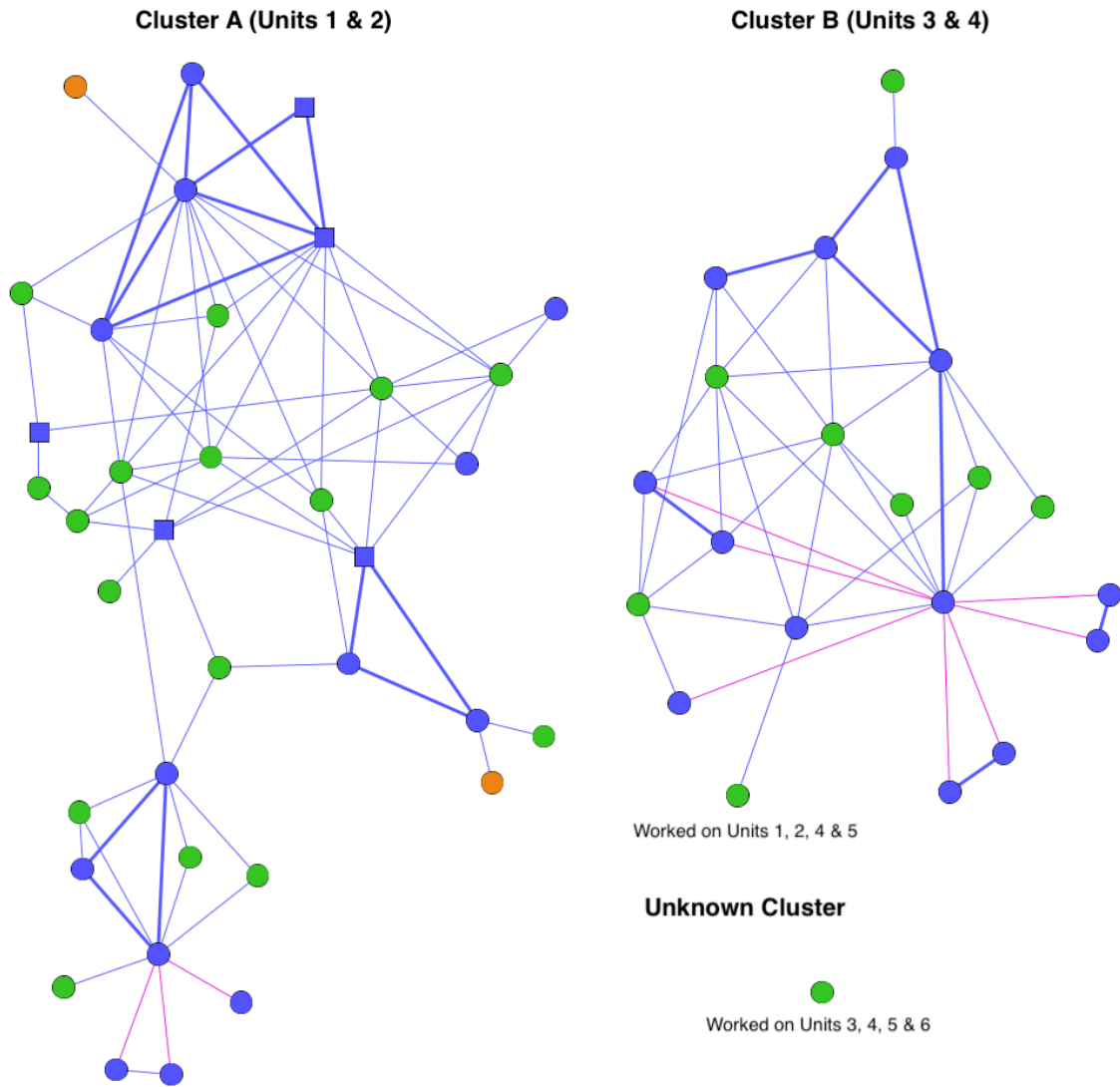
Cluster	Number of patient cases	Number of visitor cases	Number of staff cases	Total
Cluster A	18	2	16	36
Unit 1	12	2	11	25
Unit 1 and 2	1	0	0	1
Unit 2	5	0	4	9
Endoscopy and CCU	0	0	1	1
Cluster B	13	0	7	20
Unit 3	1	0	1	2
Unit 4	10	0	6	16
Unit 3 and 4	2	0	0	2
Cases that cannot be classified to A or B	0	0	2	2
Units 1, 2, 4, and 5	0	0	1	1
Units 3, 4, 5, and 6	0	0	1	1
Total	31	2	25	58

^aUnits 1, 2, 3, 4, and 5 were medical units (internal medicine and hospitalist medicine) while unit 6 was a surgical unit.

Abbreviations: CCU – coronary care unit

Appendix 1, as supplied by authors. Appendix to: Kanji JN, Chan YLE, Boychuk LR, et al. SARS-CoV-2 outbreak in a Canadian suburban tertiary hospital necessitating full facility closure: a descriptive observational study. *CMAJ Open* 2022. DOI:10.9778/cmajo.20210064. Copyright © 2022 The Author(s) or their employer(s).

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- Nodes:**
- Community-acquired case (defined as symptom onset within 7 days of admission)
 - Patient
 - Staff
 - Visitor
- Edges:**
- Known contact (with or without adequate PPE)
 - Known contact – Shared room
 - Known contact (or high potential for) – Wandering patient

Appendix 1, as supplied by authors. Appendix to: Kanji JN, Chan YLE, Boychuk LR, et al. SARS-CoV-2 outbreak in a Canadian suburban tertiary hospital necessitating full facility closure: a descriptive observational study. *CMAJ Open* 2022. DOI:10.9778/cmajo.20210064. Copyright © 2022 The Author(s) or their employer(s).

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Figure S1. Visualization map of transmission patterns of COVID-19 cases involved in the outbreak.

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