



## Original Article

# Pandemic response gaps: Infection prevention and control lessons learned during coronavirus disease 2019 (COVID-19) outbreaks in skilled nursing facilities in Detroit, Michigan

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## Abstract

**Background:** Hospitalizations among skilled nursing facility (SNF) residents in Detroit increased in mid-March 2020 due to the coronavirus disease 2019 (COVID-19) pandemic. Outbreak response teams were deployed from local healthcare systems, the Centers for Disease Control and Prevention (CDC), and the Detroit Health Department (DHD) to understand the infection prevention and control (IPC) gaps in SNFs that may have accelerated the outbreak.

**Methods:** We conducted 2 point-prevalence surveys (PPS-1 and PPS-2) at 13 Detroit SNFs from April 8 to May 8, 2020. The DHD and partners conducted facility-wide severe acute respiratory coronavirus virus 2 (SARS-CoV-2) testing of all residents and staff and collected information regarding resident cohorting, staff cohorting, and personnel protective equipment (PPE) utilized during that time.

**Results:** Resident cohorting had been implemented in 7 of 13 (58.3%) SNFs prior to point-prevalence survey 1 (PPS-1), and other facilities initiated cohorting after obtaining PPS-1 results. Cohorting protocols of healthcare practitioners and environmental service staff were not established in 4 (31%) of 13 facilities, and in 3 facilities (23.1%) the ancillary staff were not assigned to cohorts. Also, 2 SNFs (15%) had an observation unit prior to PPS-1, 2 (15%) had an observation unit after PPS-1, 4 (31%) could not establish an observation unit due to inadequate space, and 5 (38.4%) created an observation unit after PPS-2.

**Conclusion:** On-site consultations identified gaps in IPC knowledge and cohorting that may have contributed to ongoing transmission of SARS-CoV-2 among SNF residents despite aggressive testing measures. Infection preventionists (IPs) are critical in guiding ongoing IPC practices in SNFs to reduce spread of COVID-19 through response and prevention.

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Coronavirus disease 2019 (COVID-19) cases in skilled nursing facilities (SNFs) have transformed these centers into frequent epicenters of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) outbreaks.<sup>1</sup> The vulnerability of this population highlights the critical need for rapid implementation of outbreak response measures, infection prevention and control (IPC) training, and capacity building at SNFs.<sup>2</sup> As COVID-19 cases among SNF residents increased in March 2020, SNF efforts to implement infection control measures were inadequate to control the transmission of SARS-CoV-2.<sup>3</sup> The Centers for Disease Control and

Prevention (CDC) and Centers for Medicare and Medicaid Services (CMS) rapidly established guidance for SNFs to prevent and control COVID-19 outbreaks; however, they were constantly changing with continuous new data.<sup>1,4</sup> Therefore, the CDC now recommends that all SNFs have a dedicated infection preventionist on site to educate, coordinate, and enforce the newest guidelines.<sup>5</sup>

An overwhelming surge of COVID-19 cases was observed in SNFs in Michigan, particularly in the City of Detroit, in March 2020.<sup>6</sup> The Detroit Health Department (DHD) first received information regarding a COVID-19 outbreak in a single SNF on March 23, 2020. Based on further notifications about COVID-19 outbreaks occurring at other SNFs, the DHD partnered with the CDC and academic healthcare systems (Henry Ford Health, Wayne State University, and Detroit Medical Center) to initiate epidemiologic investigations and facility-wide testing (point-prevalence surveys) coupled with on-site IPC assessments to identify gaps in IPC

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practices and potential causes of ongoing SARS-CoV-2 transmission in affected SNFs. Here, we describe common IPC challenges encountered during the COVID-19 outbreaks in SNFs that may have contributed to ongoing SARS-CoV-2 transmission in these facilities.

## Methods

The DHD COVID-19 SNF investigations began around March 23, 2020. The DHD immediately conducted SARS-CoV-2 testing of symptomatic SNF residents until April 8, when the DHD testing capacity increased. The expansion allowed the DHD to conduct facility-wide testing at SNFs regardless of symptoms. Any testing conducted from April 8 to April 25 was considered point-prevalence survey 1 (PPS-1) and any testing done from April 30 to May 8 was included in point-prevalence survey 2 (PPS-2). We used 2 different testing platforms for SARS-CoV-2 testing. During PPS-1, the Abbott ID NOW molecular COVID-19 test was used in the DHD rapid-testing clinic. Specimens collected from residents' anterior nares were tested using this point-of-care platform. During PPS-2, nasopharyngeal specimens were tested using real-time reverse transcription-polymerase chain reaction (RT-PCR) assay for SARS-CoV-2.<sup>7</sup> At 2 facilities, anterior nares specimens for PPS-2 were collected and sent to an off-site reference laboratory for real-time RT-PCR testing. All specimens were collected, transported, and tested in accordance with CDC recommendations.<sup>8</sup>

The on-site IPC consultation visits conducted by academic healthcare partners and the DHD were initiated on April 13, 2020, and were conducted until June 1, 2020. They sought (1) to gather information regarding cohorting, (2) to identify triaging and isolation practices involving SNF residents and employees, (3) to obtain information on personal protective equipment (PPE) shortages and challenges, and (4) to discuss staff shortages and staffing mitigation practices.

The IPC on-site response team included teams of 1–4 staff including epidemiologists, physicians, a nurse practitioner, and a physician assistant. Testing of residents was performed by DHD staff and various medical volunteers. A central command structure was established at the DHD that conducted daily assessment of testing logistics, supplies needed, and site visit scheduling. The DHD provided PPE, conducted rapid testing, and reported testing results to facilities within 3 days. IPC recommendations were based on test results, existing cohorting practices, and CDC guidance on protocols and PPE. IPC recommendations were communicated to facilities during follow-up phone calls from the DHD. The highest priority facilities (ie, those with increasing numbers of positive tests) were visited more frequently (up to 3 visits per week) for additional diagnostic testing and to implement infection control assessments, training, and support.

The 13 SNFs reviewed for this report are a representative group among the 26 facilities in the City of Detroit. These SNFs had many COVID-19 cases and were able to allow repeated on-site testing. The selected facilities are representative of the demographics of both staff and residents, the socioeconomic characteristics of the staff, residents, and underlying population served by these facilities, as well as their ongoing relationship with the DHD and the state health department. We report findings regarding cohorting of residents and staff and other IPC practices, and we further describe our experience in 3 SNFs (facilities A–C) as examples of different IPC measures followed in the early pandemic.

Facility A has a total capacity of 181 beds, 3 floors, and 4 units; it serves residents undergoing rehabilitation and cognitive

impairment. Facility B has 124 beds and 4 units; it serves 104 elderly residents, many of whom have cognitive impairment. Facility C has 110 beds and 3 units; it serves 80 elderly residents with disabilities undergoing rehabilitation. This study was approved by Wayne State University Institutional Review Board.

## Results

All 13 SNFs experienced an outbreak of COVID-19 among residents during March–May 2020. We report our experience and highlight 3 core infection control challenges: (1) lack of a dedicated observation unit for high-risk residents, (2) barriers to proper cohorting of residents, and (3) inappropriate staff cohorting. The results of PPS-1 and PPS-2 showed an overall SARS-CoV-2 attack rate of 44%, a case hospitalization rate of 37%, and a 24% fatality rate.<sup>6</sup> Prior to the pandemic, the DHD did maintain oversight and regulate SNFs but because of limited staffing, but this activity was focused on responding to emerging issues.

None of the 13 SNFs had a dedicated infection preventionist. Most SNFs had individuals that were given the title of infection preventionist but were too busy performing duties unrelated to infection control to focus on resident cohorting, staff cohorting, creating an observation unit, and PPE supply.

### Cohorting and PPE supply

#### Resident cohorting

Designated COVID-19 resident units were implemented in 7 (54%) of 13 facilities prior to PPS-1. After PPS-1, 4 more facilities established COVID-19 units within their facilities, and 2 facilities designated a regional COVID-19 facility. Despite having a COVID-19 resident unit, 4 facilities (31%) did not place all residents with SARS-CoV-2 infection in rooms within the designated COVID-19 unit due to logistical challenges and space constraints.

#### Staff cohorting

Of the 13 facilities, 4 (31%) did not have dedicated healthcare workers (HCWs) to work exclusively in the COVID-19 unit or a separate break room for the HCWs providing care for residents with confirmed COVID-19. Also, 3 facilities (23.1%) did not restrict access for ancillary HCWs and 4 facilities (30.7%) had no dedicated environmental service (EVS) staff for COVID-19 resident units (Table 1). Furthermore, 7 facilities (53.8%) had confirmed COVID-19 resident cases linked to exposures to staff (ie, HCWs and/or ancillary and EVS staff) who were caring for both SARS-COV-2–positive and SARS-COV-2–negative residents.

#### Observation unit

Of the 13 facilities, 5 had an observation unit: 3 (23%) prior to PPS-1 and PPS-2 (15%) after PPS-1. Also, 4 facilities (31%) formed an observation unit after PPS-2 results were obtained. However, 4 facilities (31%) did not form a dedicated observation unit at any point during the public health response, but these facilities did implement an isolation policy for assigning high-risk residents a single-person room if a private room was available with appropriate staffing.

#### PPE supply

The IPC consultation visits conducted in April 2020 also identified 6 (46.1%) facilities that lacked an adequate supply of disposable gowns for COVID-19 units.

**Table 1.** Resident and Staff Cohorting for COVID-19 Units Among 13 Outbreaks in Skilled Nursing Facilities in Detroit, Michigan

| Facility | SARS-CoV-2-Positive Residents Cohorted in COVID-19 Unit | Dedicated Staff for COVID-19 Unit | Separate Staff Breakroom for COVID-19 Unit | Restricted Access on COVID-19 Unit for Ancillary Staff | Dedicated EVS Staff for COVID-19 Unit |
|----------|---|-----------------------------------|--|--|---------------------------------------|
| A        | Yes   | Yes                               | Yes  | Yes  | Yes                                   |
| B        | No  | Yes                               | Yes  | Yes  | Yes                                   |
| C        | Yes   | Yes                               | Yes  | No   | No                                    |
| D        | Yes   | No                                | No   | Yes  | No                                    |
| E        | No  | No                                | No   | No   | No                                    |
| F        | No  | No                                | No   | Yes  | No                                    |
| G        | Yes   | Yes                               | Yes  | No   | Yes                                   |
| H        | Yes   | Yes                               | Yes  | Yes  | Yes                                   |
| I        | Yes   | No                                | Yes  | Yes  | Yes                                   |
| J        | No  | Yes                               | Yes  | Yes  | No                                    |
| K        | Yes   | Yes                               | Yes  | Yes  | Yes                                   |
| L        | Yes   | Yes                               | Yes  | Yes  | Yes                                   |
| M        | Yes   | Yes                               | No   | Yes  | Yes                                   |

### Facility A

The first SARS-CoV-2-positive case was detected on March 28 in a symptomatic resident who was subsequently transferred to the hospital. Afterward, this facility separated symptomatic residents (those with fever, cough, and shortness of breath) and asymptomatic individuals, but did not establish a COVID-19 unit. PPS-1 was conducted on April 17, with 97 residents tested, and 28 (29%) tested positive for SARS-CoV-2. Of the confirmed cases, 2 (7%) were receiving dialysis at an outpatient facility. After PPS-1 results were obtained, confirmed cases were transferred out of the building to a designated COVID-19 unit at an affiliated SNF. However, residents exposed to confirmed cases at facility A were not placed in an observation unit or in a private room for the recommended 14-day observation period. On-site contact tracing was conducted by DHD staff, who identified 2 potential sources of COVID-19 exposure. Among 28 residents who tested positive during PPS-1, at least 10 residents had exposures to a confirmed COVID-19 case. These cases involved a resident who had been transferred from a hemodialysis facility to the SNF with unknown COVID-19 status. This dialysis resident was not placed in an observation area or a single-person room when admitted back to the SNF. PPS-2 was conducted on April 30, and 16 new SARS-CoV-2-positive cases were identified. Among them, 5 (31%) had been exposed to an asymptomatic dialysis resident. All 5 residents were cared for by the same staff on a floor that had been designated as an asymptomatic unit following the initial symptom-based cohorting strategy.

### Facility B

On March 23, 2020, this facility identified its first SARS-CoV-2-positive resident and subsequently created a COVID-19 resident unit and a SARS-CoV-2-negative unit. PPS-1 was conducted on April 16, and 51 residents were tested; 18 (35%) tested positive for SARS-CoV-2. Although this facility had established a SARS-CoV-2-positive unit upon identification of the first positive resident, they did not place all positive residents in the designated COVID-19 unit due to cognitive impairment and challenging

behavior of the residents who tested positive. Those residents stayed in their respective rooms on SARS-CoV-2-negative floors. PPS-2 was conducted on May 3, 2020, and 6 new SARS-CoV-2-positive cases were identified among the 69 residents who were tested. Of these 6 cases, 1 was a resident newly discharged from a local hospital, 1 resident was on dialysis, and the 4 remaining residents had no clear exposure identified. An observation unit could not be established in this facility due to limited space, although high-risk residents (immunosuppressed or those exposed) were placed in a private room when possible.

### Facility C

The facility recognized residents with COVID-19 symptoms beginning on March 13, 2020, and sent 7 symptomatic residents to the hospital. This SNF never accepted any COVID-19 patients from local hospitals, all of whom were sent to a designated COVID-19 facility beginning mid-March 2020. PPS-1 was conducted on April 23, and 18 SARS-CoV-2-positive cases were identified. After PPS-1 results were obtained, this facility created a COVID-19 unit and SARS-CoV-2-negative unit. PPS-2 was conducted on May 8, 2020, with a total of 68 residents tested and 5 new cases identified. A potential transmission source was identified as a SARS-CoV-2-infected staff member (physical therapist), who was providing therapy to both SARS-CoV-2-positive and -negative residents.

### Discussion

Despite the implementation of aggressive SARS-CoV-2 testing in SNFs in Detroit, inadequate IPC practices led to ongoing SARS-CoV-2 transmission in many SNFs. Challenges related to resident cohorting, staff cohorting, and placement of high-risk residents in an observation unit or single-person room were commonly identified.

#### Cohorting and PPE supply

##### Resident cohorting

After PPS-1, all facilities had a resident cohorting plan, establishing either a COVID-19 resident unit or a dedicated regional facility. However, the use of a designated regional facility may not be

effective with high disease prevalence. Facility A had 16 new SARS-CoV-2-positive cases during PPS-2, likely due to increased exposure of HCWs when assisting with transfers. These HCWs could have exposed other residents within the SNF's asymptomatic unit. During a period of widespread outbreaks and high community prevalence, facilities can create a COVID-19 resident unit within each facility rather than sending SARS-CoV-2-positive residents to a designated COVID-19 regional facility.

Despite the creation of a COVID-19 resident unit, some facilities still had difficulty achieving complete cohorting of residents due to resident-related barriers. For example, incomplete cohorting was conducted in facility B due to behavioral issues related to cognitive impairment and concern for worsening confusion and agitation if such residents were moved to an unfamiliar environment and isolated.<sup>9</sup> Other barriers included logistical challenges such as double rooms and space constraints.<sup>9</sup> Additionally, obesity of residents and refusal to move if residents preferred to remain in their current room were barriers. When residents with confirmed COVID-19 were not moved into the COVID-19 resident unit, HCWs were often responsible for providing care to both SARS-CoV-2-positive and SARS-CoV-2-negative residents during the same shift, creating opportunities for transmission of SARS-CoV-2 virus.

#### *Staff cohorting*

Cohorting among dietary, physical therapy, nursing aides, licensed practical nurses, registered nurses, and EVS staff is critical in reducing transmission of SARS-CoV-2. Assigning dedicated staff to the COVID-19 resident unit, observation unit, and negative unit is recommended, but this was not achieved or maintained at all SNFs.<sup>10</sup> For example, facility C had 5 new confirmed cases of COVID-19 during PPS-2, likely due to incomplete staff cohorting, and 9 of the 13 SNFs were unable to maintain staff cohorting because of staffing shortages. These factors can lead to greater possibility of resident COVID-19 cases in SNFs, specifically when registered nursing levels are below recommended levels.<sup>10</sup> Additionally, many SNFs in the United States experienced high HCW turnover; up to 50% leave their nursing positions within a year.<sup>10</sup> High HCW turnover, shortage of trained HCWs in IPC practices, and illness rates due to COVID-19 of HCWs could have resulted in incomplete staff cohorting, resulting in more transmission. Partly due to these factors, SNFs did not have a true infection preventionist. The CDC recommends that all SNFs with >100 residents should have a full-time infection preventionist.<sup>5</sup> One HCW could have been given the title or assigned the duties, however, these individuals were performing duties unrelated to ICP and had little time to train other HCWs on ICP practices that would help control and prevent the spread of COVID-19. The increase of cases also increased the burden of reporting all SARS-CoV-2-positive cases to the Michigan Disease Surveillance System (MDSS) and slowed the communication between the DHD and SNF IPs.

#### *Observation unit*

High-risk residents, such as those who are immunocompromised, were recently hospitalized, or have underlying respiratory disease, should be promptly placed in an observation unit or in a single-person room for 14 days.<sup>1,11</sup> Facility A, and many other SNFs, did not quarantine exposed residents identified on PPS-1 and failed to recognize that residents transferred from the hospital or dialysis facility should be quarantined with dedicated staff. This resulted in 5 SARS-CoV-2-positive cases linked to 1 SARS-CoV-2-positive

asymptomatic dialysis resident with a recent hospitalization. Although this resident was placed in a private room, they were placed in a SARS-CoV-2-negative unit instead of an observation unit with dedicated staff. Guidance was provided to all 13 facilities to place all high-risk residents in an observation unit with dedicated staff that follows the same ICP precautions required for COVID-19 resident units. Creation of an observation unit was challenging in some facilities due to limited private rooms and space availability.

During transitions of care, residents require specialized IPC practices, particularly those on dialysis. Dialysis residents have increased susceptibility to contract COVID-19 due to immunosuppression, and they are also a major source of transmission given increased exposure to other residents and HCWs in dialysis facilities. Thus, placing these patients in an observation unit in their SNF is critical.<sup>7,12</sup> Because these residents cannot practice shelter in place, a careful and strategic approach is needed to triage such residents en route to and from dialysis.<sup>13,14</sup> Both facilities should communicate to each other if a resident is exhibiting any symptoms, had an exposure to a confirmed COVID-19 case, or has been diagnosed with COVID-19 so that appropriate precautions and IPC measures can be taken while receiving care.

#### *PPE supply*

Evolving PPE optimization strategies, combined with PPE shortages and no formal PPE training or compliance checks, created barriers to mitigating the spread of the SARS-CoV-2 virus. Furthermore, shared medical equipment used among residents on the same unit might not have been adequately cleaned and/or disinfected between residents.

This report demonstrates the importance of having a full-time infection preventionist on site at the SNF who can assist with outbreak preparedness by formulating an organized and effective response plan. Early in the COVID-19 pandemic, IPC recommendations were changing frequently as we learned more about the SARS-CoV-2 virus. A dedicated infection preventionist in SNFs can assist in educating HCWs about constant changes and implementing best practices as guidelines change. Infection preventionists can also monitor compliance with the infection control practices and give prompt feedback when lapses in infection control are identified. An infection preventionist can inform the SNF and health department officials of challenges being encountered, such as increased need for testing due to a potential outbreak or an inadequate supply of PPE (eg, gowns, masks or N95 respirators, and face shields).

This study had several limitations. Our IPC consultation visits consisted of on-site conversations with the director of nursing of each facility during each visit; however, we did not tour each facility on every visit. We did not have results of follow-up visits after the recommendations from our IPC consultation visits based on PPS-2 results, which concluded on May 8, 2020. Our site visits occurred early in the pandemic, and guidance and best practices have since changed.

In conclusion, our experience in this group of SNFs in Detroit showed that resident cohorting practices were quite variable and reflected the unique structural, procedural, and personal challenges present in each site. To improve the health and safety of residents, robust infection control practices are needed in SNFs to control the spread of the SARS-CoV-2 virus. Strengthened efforts and policies will be enhanced with the assistance of dedicated IPs at SNFs who can educate staff on IPC best practices to contain the virus and ensure the safety of residents during transitions of care.

The on-site consultation visits provided by the DHD and academic health partners functioned similarly to the role that an on-site IP would fulfill, as on-site teams aided in cohorting and infection prevention measures during the peak of the COVID-19 pandemic in the City of Detroit. To provide sustainable IPC education, capacity building, and support to SNFs going forward, the on-site presence of a dedicated infection preventionist is urgently needed in each long-term care facility.

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