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Concise Communication

Control of SARS-CoV-2 infection in skilled nursing facilities in Detroit, Michigan: a model for emerging infectious diseases

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Abstract

An infection prevention bundle that consisted of the development of a response team, public–academic partnership, daily assessment, regular testing, isolation, and environmental controls was implemented in 26 skilled nursing facilities in Detroit, Michigan (March 2020–April 2021). This intervention was associated with sustained control of severe acute respiratory coronavirus virus 2 infection among residents and staff.

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Introduction

Severe acute respiratory coronavirus virus 2 (SARS-CoV-2) infections spread rapidly in skilled nursing facilities (SNFs) across the United States, particularly Detroit, starting March 2020. SNFs faced many challenges, as residents experienced high mortality rates from coronavirus disease 2019 (COVID-19). High infection rates and mortality during the early months of the pandemic were a result of a multitude of factors; the pandemic was in an evolving state with ever-changing control guidance, limited availability of testing, limited staffing in facilities, and inadequate surveillance systems due to lack of infection prevention and control (IPC) systems.[1–4] Efforts were hampered by under-resourced facilities, inadequate supply of personal protective equipment (PPE), lack of sufficient environmental facility controls, and unclear policies and guidelines.[1–4] In early 2020, a survey of residents in 26 SNFs in Detroit revealed an attack rate of 44%, a hospitalization rate of 37%, and case fatality rate of 24%.[2] In this report, we provide information on effective intervention measures for SARS-CoV2 in SNFs. We present a stepwise bundled approach that is intended to serve as a model to prevent and control infection of emerging communicable diseases in the SNF population.

Methods

In response to the March 2020 surge in COVID-19 cases among SNF residents, the Detroit Health Department (DHD), in collaboration with the Centers for Disease Control and Prevention (CDC), local government, academia, and healthcare partners, initiated IPC measures across Detroit SNFs until April 2021.[2–6] This included guidance on managing positive cases, isolation, and cohort isolation. A specialized team conducted on-site assessments, with biweekly testing that provided results within 24 hours. Symptom screening for residents and staff began at admission and continued daily. Positive screenings mandated staff testing, with quarantines for close contacts and increased testing to weekly during outbreaks.

Incoming residents to each SNF were quarantined for 10 days. If residents had a positive SARS-CoV-2 test and if they did not meet criteria for hospitalization, isolation occurred either in a designated COVID-19 unit within their original facility, or they were transferred to a COVID-19-specific SNF (referred to as COVID-19 hubs). In-person infection control assessments and education sessions were completed at each facility; sessions occurred at minimum monthly or were prompted when there was an outbreak. An outbreak in a long-term care facility was defined as 1 or more facility-acquired COVID-19 case among residents or 2 or more cases among staff who were associated with an epidemiological link.[5] Guidance on environmental control and sanitation measures was addressed including discussing with the Director of Nursing (DON) various disinfecting techniques using Food and Drug Administration (FDA)-approved supplies, evaluating cleaning supplies and cleaning protocols, and training staff on proper sanitation techniques and PPE. Prior to vaccine dissemination, meetings with the DON of each facility and education sessions were held to address any hesitancies around the COVID-19 vaccine. The Federal Pharmacy Long-term Care Program was largely responsible for COVID-19 vaccine distribution services to SNFs in Detroit.[6] In early 2021, a DHD behavioral

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Table 1. SNF staff and resident vaccination rates, staff vaccination rates based on provided incentives and Director of Nursing (DON) support as of 30 April 2021

Vaccination rates			
	Residents (n=2,367)	Staff (n=2,998)	*P* value
Partial vaccination (1 dose) (n, %)	1,499 (63.3)	777 (25.9)	
Complete vaccination (2 doses) (n, %)	1,370 (57.9)	703 (23.4)	
Impact of vaccine incentives on staff vaccination rate			
	Incentives provided	Incentives not provided	
Mean percentage of fully vaccinated staff (%)[a]	30.4	22.1	.057
Number of facilities[b]	9	16	
Impact of DON vaccine status on SNF vaccination rate			
	DON vaccination	DON not vaccinated	
Mean percentage of fully vaccinated staff (%)	27.3	16	.031
Number of facilities[c]	16	5	

Note. SNF, skilled nursing facility.
[a]Fully vaccinated staff received two-doses of Moderna, NIAID, or Pfizer BioNTech vaccine.
[b]Unknown if incentives were provided at one facility.
[c]Unknown if DON was vaccinated at five facilities.

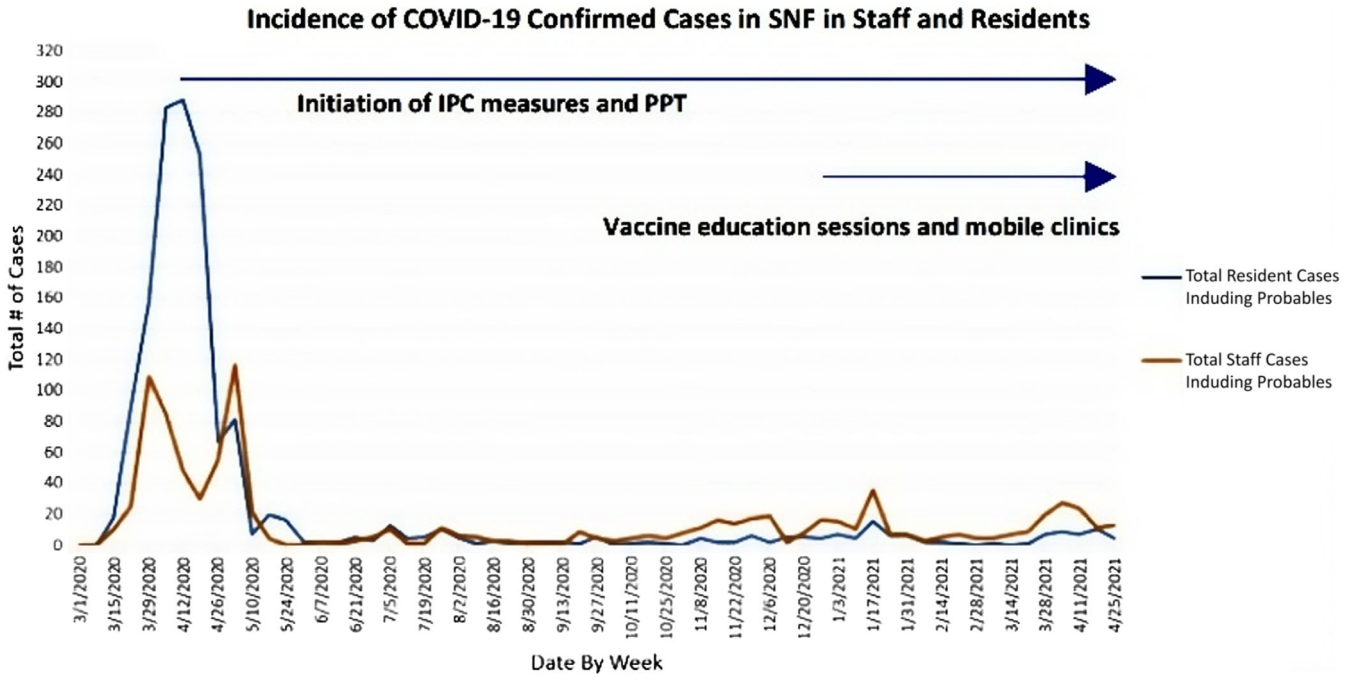

Figure 1. Incidence of COVID-19 cases among residents and staff at SNFs. *Note:* COVID-19, coronavirus disease 2019; SNFs, skilled nursing facilities.

health team met with SNF staff to discuss vaccine hesitancy. On-site assessments of mental health of residents and staff were also conducted with a focus of impact, coping, and the aftermath of COVID-19.

Results

In April 2021, the mean census across the 26 SNFs were 2,260 residents (2,031–2,367) and 2,956 staff (1,834–3,176). There were 50,054 SARS-CoV-2 tests administered from July 2020 to April 2021. There were 1,464 positive resident cases and 914 positive staff cases during the project period (Figure 1). Most cases during the project period occurred during the early stages of the pandemic, prior to the implementation of the stepwise intervention bundle.

In March 2021, partial and complete COVID-19 vaccination doses within the SNFs were recorded (Table 1). For SNF residents, 63.3% and 57.9% and, for SNF staff, 25.9% and 23.4% completed first and second doses, respectively. Varying practices were used to promote staff vaccination. When vaccine incentives were provided, the vaccination rate in staff increased from 22.1% to 30.4% (*P* value: .057). (Vaccine initiatives and DON support of the vaccine were associated with increased staff vaccination rate (Table 1)).

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Discussion

We describe a multifaceted approach for control and response to SARS-CoV-2 infections in SNFs. Control measures were effective despite surges of infection in the community and before immunization was available. The effort was a multidisciplinary partnership between the City of Detroit Mayor's Office, DHD, and local academic institutions. This is a model for consideration of use for prevention of other emerging infectious diseases. Detroit, with a population of 78% Black and 32% experiencing poverty, was disproportionately affected with COVID-19 cases and deaths compared to other cities around the state of Michigan during the initial stages of the pandemic.[7,8] We found that regular testing with rapid turnaround, symptom assessment, and isolation for both staff and residents and outbreak response were critical measures to control facility transmission. Despite surges of the delta and omicron variant in November 2020 and April 2021, cases in SNF residents remained controlled even before vaccination. However, cases in staff increased because of acquisition in the community along with lower vaccination rates at the time.

Other studies have shown facilitators and barriers to COVID-19 vaccination. Challenges for staff may have included mistrust in government and scientific authorities, as Detroit is known to have historically marginalized communities that can exhibit healthcare hesitancy.[9,10] Continued timed focus groups, trusted messengers providing the education, consistent visits, calls from familiar individuals from the DHD, and sensitivity to one's autonomy and the need for time to make their own decisions are measures to consider to build trust. Though the efficacy and importance of vaccine distribution were prioritized, it is important to note significant vaccine hesitancy in staff in this study, demonstrating the need to continue efforts to build trust.

The study faced several limitations, including its observational and non-randomized control design, which hindered the ability to establish causality in the stepwise approach. Moreover, the analysis did not extensively examine the significance of each component within the bundled intervention. Some limitations arose due to the urgent need to act swiftly to save lives, contributing to the scarcity of statistical data that could link the two major COVID-19 infection surges in the general population with consistent control measures in SNFs. Additionally, testing within SNFs varied due to differences in cooperation, test availability, and evolving guidelines and requirements. Another notable limitation was the insufficient data on adherence to the interventions, except for vaccination rates. Lastly, the results may have been influenced by a reduction in the number of vulnerable individuals, either due to fatalities or other factors like immunity acquired through infection within the SNF community.

Our approach integrates social, medical, and public health strategies to manage infection control during the pandemic. There is a need for further research to assess the impact, cost-effectiveness, and practicality of different interventions on infection rates. Our strategy demonstrates the effectiveness of regular testing, continuous IPC advice, and comprehensive vaccination campaigns in decreasing SARS-CoV-2 infections among underserved populations. This study highlights the importance of a coordinated, multifaceted strategy in addressing future outbreaks of infectious diseases, providing valuable insights for establishing best practices.

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Competing interests. None.

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