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Brief Report

Hospital affiliated long term care facility COVID-19 containment strategy by using prevalence testing and infection control best practices



Paula Eckardt MD, FACP, AAHIVS^{a,*}, Rachel Guran MPH, BSN, RN, CIC^b, Jon Hennemyre LNHA^c, Roshan Arikupurathu APRN, ANP-C^d, Julie Poveda MSL, BS MT, ASCP^e, Nancimae Miller PhD, D(ABMM)^f, Randy Katz DO, FACEP^g, Judith Frum RRT, BSN, MBA^h

^a Division of Infectious Diseases, Infection Prevention, Memorial Healthcare System, 5647 Hollywood Boulevard, Hollywood, FL

^b Infection Prevention and Epidemiology, Memorial Healthcare System, Hollywood, FL

^c Memorial Manor, Memorial Healthcare System, Hollywood, FL

^d Memorial Regional Hospital South, Memorial Healthcare System, Hollywood, FL

^e Laboratory Services, Memorial Regional Hospital South, Memorial Healthcare System, Hollywood, FL

^f Microbiology and Molecular Infectious Disease, LLC, Memorial Healthcare System, Hollywood, FL

^g Department of Emergency Medicine, Memorial Regional Hospital, Memorial Healthcare System, City of Hollywood Fire Rescue, Hollywood, FL

^h Memorial Regional Hospital, Memorial Healthcare System, Hollywood, FL

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In a hospital affiliated long term care facility, we found an opportunity to interrupt a potential outbreak of COVID-19 using a point prevalence testing containment strategy and applying infection prevention and control best practices. Three serial point prevalence studies were conducted on all residents and employees in 14-day intervals and percent positive was used as marker for effective infection control efforts. A multidisciplinary strike team from acute care was used to disseminate infection control education and support to long term care partners. These results highlight the need for swift identification and action in congregant high risk settings to prevent rapid spread and large scale outbreaks of COVID-19.

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BACKGROUND

In the United States, the elderly population is the most vulnerable and likely to succumb to complications and die of COVID-19. We have seen multiple reports of deaths due to a COVID-19 outbreak in group living facilities. Beginning with the Life Care Center in Kirkland, Washington, multiple confirmed cases of COVID-19 affecting residents, healthcare personnel (HCP), and visitors were found to be epidemiologically linked to an outbreak.^{1–4} Since then, a large number of long term care (LTC) facilities have reported multiple outbreaks and deaths from COVID-19. The Florida Department of Health reported a total of 665 deaths from COVID-19 at such facilities out of 1,875 total deaths in the state reflecting a grim 35% of all deaths.⁵ As of May 12, 2020 the Florida Department of Health had reported there were 1,601 infected residents of LTC facilities, 2,063 positive

residents that were transferred to acute care facilities, and 1,851 infected staff in 482 long-term care facilities throughout the state.⁵

The population of postacute facilities including LTC assisted living facilities have been greatly affected during the COVID-19 pandemic.⁶ There are many risk factors that continue to negatively predispose this community. Residents are one of the most vulnerable populations due to their increased age and multiple comorbidities leading to debilitation. Many are unable to communicate any changes to their health or offer insight into new onset of symptoms. This leads to a delay in identifying symptomatic individuals who may have been shedding virus in close proximity to staff and other residents in the congregant setting.⁶ Caretakers and HCP in this setting need to be extremely vigilant in their assessments while discerning minute fluctuations in patient status. Another prominent risk factor is that many staff at postacute care facilities may work part-time at other facilities promoting an exhausted workforce that has little opportunity for self-care including sleep, nutrition, and a lower quality of health that could increase risk of susceptibility of illness.⁷ Part-time workers may not have access to paid time off and are forced to work while ill, further contributing an introduction of virus into the facility. Other cross-contamination risks, inadequate protocols including infection

* Address correspondence to Paula Eckardt MD, FACP, AAHIVS, Division of Infectious Diseases, Infection Prevention, Memorial Healthcare System, 5647 Hollywood Boulevard, Hollywood, FL 33021.

E-mail address: peckardt@mhs.net (P. Eckardt).

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control practices and access to personal protective equipment (PPE) may be contributing factors.⁸ Standalone facilities not connected to large health systems have poor access to testing and hurdles to quickly identifying and triaging residents. There are always opportunities for a regional control approach to infection control involving transitions between acute care and postacute care.⁹ This report demonstrates the outcome of a COVID-19 outbreak investigation in a 120 bed long-term care facility and containment strategy using prevalence testing and infection control best practices.

METHODS

Interventions for an outbreak containment strategy began with review of literature. From the beginning of the pandemic, all Centers for Disease Control (CDC), Agency for Healthcare Administration (AHCA) and Centers for Medicare and Medicaid (CMS) guidelines⁸ were put into practice. A facility walkthrough was conducted with trained infection prevention and control practitioners and facilities engineers to identify opportunities in hand hygiene, PPE use, air efficiency, and HVAC optimization.¹⁰ An infection control strike team as described in the CMS nursing home best practices toolkit was integrated into the facility response.³ The strike team consisted of affiliated hospital system physician and administrative leadership, trained infection prevention and control practitioners and facilities engineers. There was close communication with local paramedics and emergency medical services (EMS) providers to identify potential outbreaks in all surrounding long-term care facilities by tracking residents transferred to the emergency department (ED). This facilitated communication from acute care to postacute care and involved local health department personnel immediately to facilitate fast outbreak response. These were considered baseline interventions.

Secondary interventions were started once a visiting provider tested positive. HCP and all facility residents were screened twice daily for symptoms including shortness of breath, new or changes in cough, sore throat, muscle aches, and temperature on or over 100°F. HCP were screened at the beginning and the end of the shift. The facility began to actively check anyone entering the facility for signs and symptoms of COVID-19 including temperature checking. No entry to the facility was allowed if anyone screened positive for symptoms of COVID-19 or had a temperature equal or over 100°F. After a few weeks, all visitors to the facility were banned to control introduction of burgeoning community spread. Group activities including communal dining were stopped to maintain social distancing. Therapies were conducted one-on-one inside resident rooms. Increased monitoring of ill residents including assessment of symptoms, vital signs, oxygen saturation, and respiratory exam at least 3 times daily was instituted. Immediate isolation in a separate wing of the facility with designated staff for further evaluation was implemented while the symptoms were evaluated. As the elderly may not show a typical course of the disease, atypical symptoms such as new or worsening malaise, new dizziness, or diarrhea were also included as part of the screening process for residents.

The staff that were working in multiple facilities were considered to pose a higher risk and were encouraged to disclose to administrators if they had exposures or contact with identified COVID-19 cases in other facilities. Staff were offered more shifts at the facility in order to incentivize working in one facility only. Telemedicine was instituted for all providers to see patients virtually instead of coming into the building thus limiting exposure as much as possible.

When concern arose for an institutional outbreak, universal prevalence testing was started. Using occupational health exposure best practices, a routine testing protocol for COVID-19 by RT-PCR for SARS-CoV-2 viral RNA was instituted by collecting nasopharyngeal (NP) swab specimens on all residents and staff every 14 days. Testing was performed at the Memorial Regional South Hospital Molecular

Laboratory of Memorial Healthcare System using the CDC 2019–Novel Coronavirus Real-Time RT-PCR Diagnostic Panel. The point prevalence testing was conducted 3 times during a 6-week period and included all residents, HCP and other facility workers such as contract environmental, dietary personnel, security officers, and administrative staff. Trained nurses skilled in the correct technique for specimen collection were recruited from our affiliated hospital to collect the specimens in order to decrease the incidence of false negative results.

A cohort unit was established to avoid placing unexposed residents into a shared space with previously exposed residents. The cohort unit is a dedicated area in the facility to care for residents who may have been exposed to COVID-19 and included private rooms with a private bathroom. This unit housed residents exposed to the positive provider, new admissions or readmissions in a separate location in the facility for 14 days. We implemented close monitoring of roommates and other residents who might have been exposed to an individual with COVID-19. These residents were kept on contact and droplet precautions including eye protection. We assigned dedicated staff for these groups for the same shifts and they only worked in this area of the facility. Residents were transferred out of the cohort observation unit and into the facility's general population if they remained afebrile and without symptoms and had a negative SARS-CoV-2 RT-PCR test for 14 days after their exposure or admission. Testing at the end of this period was considered to increase the certainty that the resident was not infected. All positive, confirmed cases were transferred to the hospital for complete medical evaluation and airborne isolation which is not available at the LTC facility. The cohort unit did not see any conversions to positive.

The affiliated hospital infection control policy following closely with state regulations delineated patients were not to be discharged to postacute care facilities for at least 14 days after positive SARS-CoV-2 RT PCR test and only after 2 negative NPs 24 hours apart. If the patient had a tracheostomy, a tracheal aspirate was also sent for SARS-CoV-2 RT PCR testing. If the patient had a tracheostomy, a tracheal aspirate was also sent for COVID-19 PCR. Occupational health, infectious disease and infection control specialist ensured return to work protocols were consistent with CDC and local health department.

The practice of universal masking was implemented. Facial coverings were required of all persons entering the facility and whenever residents were leaving their rooms. Hand hygiene utilizing World Health Organization's 5 Moments¹¹ was enforced using alcohol based hand sanitizer in every room and common areas of the facility. PPE use and supply was monitored daily with conservation methods in place recommended by the CDC. We periodically reviewed strategies to optimize supplies of gowns, procedure masks, face shields, and N95 respirators before shortages occurred.

Dietary and sanitation strategies to decrease potential spread of infection were applied. Sanitizing began three times daily in all food preparation, serving, staff dining areas and flat surfaces. Terminally cleaning of kitchen completed daily. The facility staff were socially distant at lunch enforced by different scheduled times for breaks and three per breakroom rule. Facility cleaning and disinfection rotations were increased. We ensured EPA-registered hospital-approved disinfectants from List N were used according to the manufacturer's instructions for use. High touch surfaces including bed rails, bedside tables, medicine carts and computers are cleaned twice daily if not more. All common areas are cleaned daily. Restrooms are cleaned twice daily.

RESULTS

Over 6 weeks, we were able to contain the spread of the disease shown by the prevalence decreasing from 5.4% to 3.6% to 0.41%. Infection control interventions at the facility were implemented on March 4, 2020. The first patient that tested positive for COVID-19 at the facility was diagnosed on April 7, 2020. This patient developed

respiratory symptoms without a fever and was transferred to the hospital. During case investigation it was discovered that 10 days before this first patient was diagnosed positive, an ARNP who cares for the patients in the south wing disclosed she was diagnosed with COVID-19 on March 28, 2020 but was asymptomatic. Prior to her diagnosis she had been at the facility and was stated she abided by all the infection control protocols. The ARNP was tested as part of exposure at another LTC facility not associated with our healthcare system.

Following the diagnosis of the first COVID-19 positive case, on April 8, 2020 all staff and residents were tested for COVID-19 by collection of a NP swab specimen for RT-PCR for SARS-CoV-2. We implemented serial point prevalence testing of all staff and residents every 14 days. Our findings included the following: a total of 9 patients were positive at the facility during the period of April 7–May 6, 2020. All the patients that were found to be positive came from the rehabilitation (*south wing*) of the facility. The LTC unit (*north wing*) had no positive cases. The APRN provider who was the first known positive was epidemiologically linked to 2 of the 9 positive cases found within the facility. All positive patients were referred to the system acute care hospital for assessment in airborne isolation which was not available at the LTC facility. Of the 9 patients, only 2 had symptoms. Of the remaining 7, 2 are completely resolved. The 5 are in the process of testing for resolution. There were 2 patients' deaths during this period related to family decisions to place them in hospice care due to other comorbidities unrelated to the recent COVID-19 diagnoses. Patients returned to the facility once they met CDC's test based strategy for clearance and were placed in in the facility's cohort unit for 14 days prior to transfer into general population.

A total of 11 employees (nurses and nursing assistants) and 5 contracted staff (environmental services and security) were positive; all of them were asymptomatic. Employees were immediately quarantined and educated on home isolation and were not allowed back to the facility until 2 NP swabs collected 24 hours apart both tested negative. Employees were quarantined if they had a household member positive for COVID-19. All positive staff were asymptomatic and self-isolated at home. Positive staff were self-quarantined for 14 days and returned once asymptomatic for 72 hours and after 2 negative SARS-CoV-2 RT PCR tests of NP specimens 24 hours apart. [Table 1](#) for summary of point prevalence studies in residents and employees.

DISCUSSION

After the first death was reported in Life Care Center on February 26, 2020, concern for nosocomial spread of COVID-19 disease inside LTC facilities was heightened. Early identification of the highly infective COVID-19 respiratory virus was paramount in prevention of an outbreak. We recognized the need for universal prevalence testing as a containment strategy when we detected a provider had tested positive for COVID-19 and their patient subsequently became symptomatic. Residents of LTC facilities are at a high risk of exposure from personnel working at the facilities (physicians, nurse practitioners, environmental service, dietary, physical and occupational therapy) where COVID-19 has community spread. These residents are usually older and disabled with multiple comorbidities. The residents may be pre-symptomatic, asymptomatic, present with uncommon symptoms, and may be unable to communicate changes in status. Our

Table 1
Periodic point prevalence of positive SARS-CoV-2 NP swab specimens for RT-PCR in facility residents and employees

Period	Residents		Employees plus contract staff		Total tests	
	Number of screening tests	Tested positive	Number of screening tests	Tested positive	Number of screening tests	Tested positive
April 7	105	5 (4.8%)	176	10 (5.7%)	278	15 (5.4%)
April 22	86	4 (4.7%)	175	5 (2.9%)	250	9 (3.6%)
May 6	85	1 (1.2%)	173	1 (0.6%)	241	1 (0.41%)
					769	25 (3.3%)



universal prevalence testing showed most of the positive patients were asymptomatic. During the time between prevalence testing there were symptomatic patients, they were tested and were negative. LTC facility staff need to be extremely vigilant to any changes in the residents and refer for testing immediately. Staff need to be screened as frequently as twice a day for symptoms including fever in addition to molecular testing at intervals of at least 14 days. Staff must follow strict infection control guidance set by the CDC to prevent the spread of the disease. LTC facility staff are usually underpaid compare to hospital staff and they are usually employed at multiple facilities. If possible, LTC facility staff should only work at a single facility during a pandemic. There is a higher possibility of exposure when they work at other facilities that may not have the same standards for the use of PPE and screening of employees. As well as being at high risk at a community level, LTC employees may increase their risk when they move around from facility to facility.

The cohort unit for exposed and new admissions was an effective way to separate and screen higher risk individuals for the 14-day incubation period. Keeping these patients on isolation and with dedicated staff would make contact tracing for exposure identification easier.

Organizational leadership remained supportive and effective with communication to all HCP during every stage of the containment process. We did not limit our practices to our facility. Our outreach and sharing of information extended to the LTC facilities within our community. We worked closely with our local EMS agencies to track daily transports of LTC patients and ED encounters to identify potential outbreaks early. Hospital leadership communicated directly with facility administration when COVID-19 positive patients were encountered. In some instances where the rate of infection was increasing, sending in a strike force to the LTC facility enabled us to identify risk and share best practices to contain the virus spread. This allowed timely intervention, tracing and focused testing at these LTC facilities to identify asymptomatic carriers, both residents and staff. Hospital leadership maintained open ongoing communication with these LTC facilities to assist with infection control deficiencies and provide resources when needed. As we can see in this particular program evaluation, communication and close contact with area LTC facilities, quick action and close vigilance contained a potential outbreak. A successful containment strategy includes regularly scheduled point of care prevalence testing, organizational leadership that promotes strict compliance to infection control guidelines, diligent occupational health programs, and continuous screening of their residents and HCP.

CONCLUSIONS

We instituted a structured prevalence testing programmatic protocol and infection control best practices for a facility during the pandemic in hard hit area. We did so by implementing strict infection control measures as well as periodic prevalence testing of residents and staff for COVID-19 by collection of a NP swab specimen for RT-PCR for SARS-CoV-2 at 14-day intervals. Over 6 weeks, we were able to contain the spread of the disease shown by the

prevalence decreasing from 5.4% to 3.6% to 0.41%. Overall the facility has conducted 769 tests of which only 3.3% have tested positive. We also worked closely with our local EMS agencies to track daily transports of LTC patients and ED encounters to identify potential outbreaks early. Hospital leadership communicated directly with facility administration when COVID-19 positive patients were encountered. This allowed timely intervention, tracing and focused testing at these LTC facilities to identify asymptomatic carriers, both residents and staff. Hospital leadership maintained open communication with these LTC facilities to assist with infection control deficiencies and provide resources when needed. By following specific testing protocols and strict infection control guidelines as well as close involvement of the regional acute care ED leadership, this model has proven to slow the spread of COVID-19 in a facility to less than local community conversion percentages. Point prevalence testing and infection control best practices are paramount to the containment of an outbreak. Direct and open communication with staff, close relationships with area hospitals, dynamic infection prevention and control measures are needed to quickly contain an outbreak.

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