

# COVID-19 in Pediatric Long-Term Care: How Infection Control and Prevention Practices Minimized the Impact of the Pandemic on Healthcare Providers and Residents

Natalie Neu,<sup>1</sup> MariCris Nee,<sup>2</sup> Joseph Savitt,<sup>2</sup> Laura Schneider Connelly,<sup>2</sup> JieSue Choi,<sup>2</sup> and Linda Mosiello<sup>2</sup>

<sup>1</sup>Department of Pediatrics, Columbia University, New York, New York, USA and

<sup>2</sup>Sunshine Children's Home and Rehabilitation, Ossining, New York, USA

Children in pediatric long-term care (LTC) facilities are commonly infected with respiratory tract viruses as they have many high-risk co-morbidities and require significant interactions with the healthcare team. From previous studies, we know that infected staff can often be the source of transmission of infection to the children. If instituted quickly, infection control practices can help mitigate the spread of infection. We will describe how Sunshine Children's Home and Rehabilitation Center responded to federal and state infection control and prevention mandates in LTC for COVID-19. We will report our practice changes, staff and resident screening, and testing results as well as outcomes of the COVID-19-infected cases. The outcomes for COVID-19 infection among pediatric LTC staff and residents are in stark contrast to the data available for the adult providers and residents in adult nursing homes. Implementation and change in infection control practices and procedures resulted in much fewer cases of COVID-19 infection in our pediatric LTC residents.

**Key words.** COVID-19; infection control and prevention; pediatric long-term care; pediatric post-acute care.

Respiratory tract infections are the most common healthcare-associated infection identified in children in post-acute or long-term care facilities (LTCFs) [1]. Unfortunately, these infections are often transmitted unwittingly by healthcare staff [2]. During

the COVID-19 pandemic, post-acute care facilities were targeted as being high-risk facilities with high-risk populations. Many adult facilities experienced outbreaks as residents have an increased need for staff contact and also due to comorbid medical conditions that predispose these residents to infection [3]. Westchester County in New York State was one of the epicenters for the COVID-19 pandemic from March to June 2020. During this time, both federal and state agencies created a series of infection control mandates and guidelines to help curb the morbidity and mortality of this viral pandemic on post-acute care populations. While there are reports of adult populations and the COVID-19 experience, little has been reported for pediatric residents in long-term care facilities. Given that pediatric populations are even more dependent on care providers, one might consider that they are at heightened risk for hospital-acquired infections and COVID-19 [4]. New York State (NYS) has over 600 nursing homes; 9 of these are pediatric nursing homes, specializing in pediatric-only services [5]. According to the NYS Department of Health (DOH) data, approximately 37 500 nursing home staff members were infected with COVID-19 and, among infected nursing home residents, there were approximately 6432 fatalities [6].

This report illustrates the implementation of prevention and mitigation procedures at our 54-bed pediatric LTCF and the prevalence of testing for COVID-19 among staff and residents as well as the outcomes for infection in these populations.

## METHODS

### Pandemic Response Planning Committee

In March 2020, our pediatric LTCF's infection prevention and control (IP & C) team met with the administration, medical team, and nursing director and established a plan for our COVID-19 pandemic response. Our IP & C team consisted of a full-time IP & C Director (who is also Director of Education), Pediatric Infectious Disease consultant, Director of Nursing, Medical Director, nurse practitioner, and the Facility Administrator. The population was stable during the pandemic and closed to admissions. The Center houses 54 residents with a mean age of 10 years (range 1–21 years). Sixty-seven percent of residents are male and the length of stay averages 4.6 years (range 7 days–17 years). Invasive devices are common: 96% have feeding tubes, 56% tracheotomies, and 39% utilize ventilators.

### IP & C Policy Enhancements and Management

An IP & C respiratory season plan was implemented on November 1, 2019, and was designed to limit visitors to minimize resident exposure to community viral outbreaks. In addition, healthcare providers (HCPs) who were not vaccinated for

Received 20 July 2020; editorial decision 5 October 2020; accepted 10 October 2020; Published online October 10, 2020.

Correspondence: Natalie Neu, MD, MPH, Columbia University Medical Center, 630 W 168th St, PH4-468, New York, NY 10032, USA. (Nn45@cumc.columbia.edu).

Journal of the Pediatric Infectious Diseases Society 2020;XX(X):1–4

© The Author(s) 2020. Published by Oxford University Press on behalf of The Journal of the Pediatric Infectious Diseases Society. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com.

DOI: 10.1093/jpids/piaa122

influenza were required to wear masks beginning in November [7]. During the COVID-19 pandemic, this team regularly met to manage concerns and address the response to state and federal mandates as well as providing communication to HCPs and families. COVID testing was performed on residents (person) under investigation (PUI) for COVID-like symptoms or exposure. Staff who were PUIs were instructed to have testing performed at a local facility and could return to work only after negative results. Mandatory twice-weekly staff surveillance testing for COVID-19 was established after an NYS mandate on May 10, 2020. These tests were performed on-site and processed at a local laboratory with results returning within 48 h. Contact tracing, while part of the standard respiratory viral outbreak policy of the Center, was enhanced with specific contact tracing policies established for COVID-19. Contact tracing was coordinated with the NYS DOH. Additional policies were implemented for: visitor restrictions, surveillance of staff for COVID-19, resident activities, and social distancing within the facility among HCPs, staff, and residents (eg, lunchroom and charting stations).

#### **Training and Education**

Training and education of staff and families around COVID symptoms was performed. Furthermore, nursing staff performed an enhanced evaluation of residents, including twice-daily vital signs. Morning conference with an interdisciplinary team reviewed the clinical status of all residents daily. Nursing staff was trained on the appropriate personal protective equipment (PPE) for COVID suspected and confirmed cases which included the use of N-95 masks and face shields.

#### **Environmental Interventions**

Environmental considerations such as limitation of personnel, enhanced traffic control in the building, environmental cleaning, PPE supplies, and the supply chain was also addressed. In addition, a COVID-19 unit was established for residents.

This report was approved by St. Mary's Healthcare System Investigational Review Board.

## **RESULTS**

The NYS DOH and the Centers for Disease Control and Prevention released multiple guidelines and mandates for COVID-19 management for long-term care facilities. [Table 1](#) shows when we implemented changes in our infection control practices in comparison to the dates when guidelines were issued. Surveillance and management for suspected and confirmed COVID-19 cases in our residents and staff were based on internally developed algorithms adapted from the Centers for Disease Control, NYS DOH, and Infectious Disease Society of America and were updated based on changes from these organizations over time. During this time period, staff and

residents were tested for COVID-19 using the following criteria: fever > 100°F, cough, increased secretions, shortness of breath, fatigue, body aches, sore throat, loss of smell or taste, congestion or rhinorrhea, nausea, vomiting, or diarrhea. In addition, testing occurred for an exposure to a COVID-19-infected case, travel, or a visit to an acute care facility. Testing was performed immediately for symptoms and as soon as possible, eg, 2–14 days after other identified exposure history. [Figure 1](#) shows the prevalence of testing among symptomatic or PUIs by resident and staff during the time period and the number of those who tested positive. Of note using the above criteria for testing, 48% of tested staff were positive for COVID-19 compared with 0.09% of tested residents. Among staff members with COVID-19, only 1 was admitted to an acute care facility and eventually expired. From the beginning of the pandemic, the IP & C team required all infected and exposed staff to remain in isolation or quarantine for a minimum of 14 days. Prolonged quarantine was advised if there was a lack of resolution of symptoms and/or a positive re-test. The 2 pediatric COVID-19 cases were cared for at the facility and did not require acute care transfer.

#### **Outbreak Investigation and Timeline of Illness**

An outbreak investigation began on April 13, 2020, after a staff member was diagnosed with COVID-19. This staff member was asymptomatic on the date of work (April 6, 2020) but was admitted to a hospital on April 13, 2020. A review of potentially exposed residents revealed 3 residents with symptoms in the previous week including 1 with fever, 1 with diarrhea, and 1 with increased oxygen requirements. These 3 residents were transferred to the COVID unit and cared for by a specific nursing team. All of the other residents in the facility were placed on contact and droplet precautions until COVID testing results were received.

#### **Resident Case Descriptions**

Resident A, a 5-year-old with Walker-Warburg syndrome, had significant medical comorbidities, including tracheostomy with mechanical ventilation, gastric feeding tube, and a ventricular peritoneal shunt. Resident A was exposed to the COVID-19-positive staff member on April 6, 2020. Resident A presented with symptoms of elevated temperature (39°C) and tachycardia on April 10, 2020. Resident A was diagnosed with otitis media and started antibiotics on April 11, 2020 but did not receive COVID testing as the exposure was not known at that time. On April 13, 2020, his examination was improved but his temperature elevation persisted. He was tested with a nasal pharyngeal PCR COVID-19 (LabCorp SARS-CoV-2 NAA test) at that time due to his exposure to the positive staff. He subsequently showed mild respiratory symptoms consisting of increased tracheal secretions requiring frequent suctioning. On April 16, 2020, his COVID test was reported positive and further workup ensued. Other laboratory studies revealed a negative

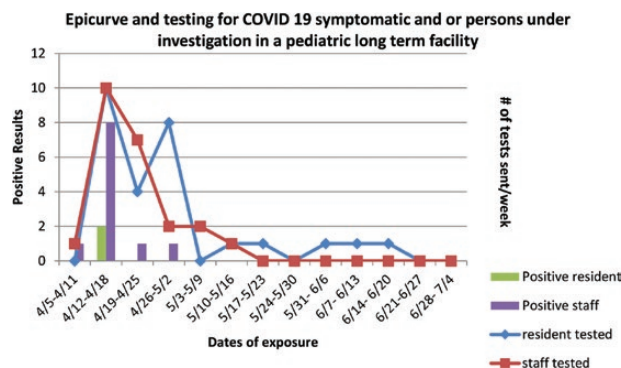
**Table 1. Dates for Pediatric LTC IP & C Policy Changes and Comparison with NYS Guidance for COVID-19 Management**

Topic	Date Implemented and Practice Change by Pediatric LTC	Date Guidance Issued by the NYS DOH
Visitor restrictions	<p><i>March 4, 2020</i></p> <ul style="list-style-type: none"> <li>- Parents and guardians only</li> <li>- Visiting hours 9a–5p only</li> <li>- Visitor screenings for influenza started in early October. Screenings modified to include COVID and travel review</li> </ul> <p><i>March 13, 2020</i></p> <ul style="list-style-type: none"> <li>- All visits stopped. Arrangements made for off-site communication with families (ie, Facetime, pictures, etc.)</li> </ul> <p><i>July 15, 2020</i></p> <ul style="list-style-type: none"> <li>- Pre-scheduled visits arranged</li> <li>- Face coverings required upon arrival. Changed to surgical mask if needed and gowns to also be worn</li> <li>- Temperature and symptom screenings for all</li> </ul>	<p><i>March 6, 2020</i></p> <ul style="list-style-type: none"> <li>- Modify visiting hours</li> <li>- Screen visitors for symptoms or potential exposures</li> </ul> <p><i>March 13, 2020</i></p> <ul style="list-style-type: none"> <li>- Suspend all visitations</li> </ul> <p><i>July 10, 2020</i></p> <ul style="list-style-type: none"> <li>- 10% of residents may have visitors</li> <li>- Screen visitors</li> <li>- Masks required</li> </ul>
Essential workers only	<p><i>March 4, 2020</i></p> <ul style="list-style-type: none"> <li>- Non-essential vendors suspended</li> <li>- Students, interns and volunteers suspended</li> <li>- Deliveries left at door and brought in by facility staff only</li> </ul> <p><i>March 9, 2020</i></p> <ul style="list-style-type: none"> <li>- Off-site school campus cancelled</li> <li>- Teachers allowed only at LTC campus building not offsite</li> </ul> <p><i>March 15, 2020</i></p> <ul style="list-style-type: none"> <li>- Staffing further minimized to direct care givers</li> <li>- On-site school stopped</li> </ul> <p><i>April 14, 2020</i></p> <ul style="list-style-type: none"> <li>- All therapies suspended</li> </ul>	<p><i>March 13, 2020:</i> NYS suspended school</p> <p><i>March 20, 2020</i></p> <ul style="list-style-type: none"> <li>- Facilities should revise how they interact with vendors and drivers</li> </ul>
Staff screening	<p><i>March 4, 2020</i></p> <ul style="list-style-type: none"> <li>- Staff screenings for influenza started in <i>early October</i>. Screenings modified to include COVID and travel review</li> </ul> <p><i>March 10, 2020</i></p> <ul style="list-style-type: none"> <li>- Staff temperatures added</li> </ul> <p><i>May 20, 2020</i></p> <ul style="list-style-type: none"> <li>- Staff testing conducted twice a week</li> </ul>	<p><i>March 6, 2020</i></p> <ul style="list-style-type: none"> <li>- Screen staff for respiratory symptoms</li> </ul> <p><i>March 13, 2020</i></p> <ul style="list-style-type: none"> <li>- Implement health checks for all HCPs, including temperature checks</li> </ul> <p><i>May 12, 2020</i></p> <ul style="list-style-type: none"> <li>- FAQ for staff testing requirement</li> </ul>
Mask mandate	<p><i>March 13, 2020</i></p> <ul style="list-style-type: none"> <li>- Staff without influenza vaccination required to wear a mask in the facility as of <i>mid-October</i>. Change made to ALL staff.</li> <li>- Masks to be worn except during staff meal breaks</li> </ul>	<p><i>March 13, 2020</i></p> <ul style="list-style-type: none"> <li>- All staff is to wear a facemask within 6 feet of residents</li> </ul>
Minimize community transmissions	<p><i>March 4, 2020</i></p> <ul style="list-style-type: none"> <li>- Essential clinic visits only.</li> </ul> <p><i>April 8, 2020</i></p> <ul style="list-style-type: none"> <li>- Staff cohorted to units</li> <li>- Staff required to change into uniform when entering the facility</li> </ul>	<p><i>March 11, 2020</i></p> <ul style="list-style-type: none"> <li>- Limit clinic visits (only essential visits)</li> </ul>

respiratory viral panel, a white cell count of 6900 cells/mm<sup>3</sup>, with 58% neutrophils and 39% lymphocytes, alanine transaminase was 462 units/L, aspartate transaminase was 299 units/L, and ferritin level was 320. C-reactive protein and D-Dimer were quantity insufficient. His examination remained normal although his oxygen requirement increased to 1–2 L to maintain an oxygen saturation of greater than 92%. Five days later, Resident A's liver function tests normalized, but his inflammatory markers remained elevated with a C-reactive protein of 54.15 ng/ml. Isolation was discontinued after 2 subsequent negative COVID-19 tests (April 25 and 27). Two weeks after the initial presentation (May 3, 2020), a fever recurred for 1 day. This was accompanied by an elevation in erythrocyte sedimentation

rate of 91 mm/h. Due to the concern for pediatric multi-system inflammatory syndrome, an electrocardiogram was performed, which revealed sinus tachycardia and nonspecific benign ST changes with normal troponin levels. An echocardiogram was performed which was normal. 3 months post-COVID-19 infection, Resident A had a sudden onset of hypothermia and developed increased intracranial pressure with resultant herniation and death. This death was likely due to his underlying medical condition.

The second resident, Resident B, was the roommate of Resident A, and also tested positive for COVID-19. Resident B is a 3-year-old, former 25-week premature infant with a past medical history is significant for hypothyroidism, adrenal



**Figure 1.** Epi-curve and testing for COVID-19 symptomatic and/or persons under investigation in a pediatric long-term facility.

neuroblastoma with subsequent radiation and chemotherapy, tracheostomy with nighttime mechanical ventilation and gastric feeding tube. Resident B was asymptomatic, except for 1 day of loose stool and required no further interventions. Resident B was tested on April 14, 2020 and resulted positive for COVID-19 on April 17, 2020. Resident B remained asymptomatic but stayed in the COVID isolation unit for 14 days as recommended for long-term care. Resident B diagnosed negative as shown by 2 tests performed 12 days later. Of note, these residents were in a 3-bedded room and the resident in the middle bed (Resident C) tested negative for COVID-19 (tested on April 14, 2020, and resulted on April 17, 2020). This resident remained asymptomatic throughout this period. This resident was different than the other 2 in that he used a tracheal collar with room air respiratory support and did not require mechanical ventilation. He remained in quarantine in his room for 14 days from his last exposure to his positive roommates and was not re-tested.

## SUMMARY

The COVID-19 pandemic had a significant impact on many residents in LTCFs, but the residents at our pediatric center were minimally impacted due to our pre-emptive approach to infection prevention and control. Our prior experience with the management of respiratory viral outbreaks and our IP & C team experience likely impacted our success in the management of the COVID-19 pandemic [8]. As other authors have indicated, having a response plan, standardized models for care and open communication with acute care facilities as well as the Department of Health is critical for decreasing the spread of this infectious disease and thus decreasing the public health burden [9]. IP & C expertise in outbreak management along with our collaboration with acute care infectious disease expertise allowed our team to anticipate changes needed in our IP

& C plan to minimize the impact of this viral infection on our residents. The use of diagnostic modalities such as viral testing significantly helped to identify cases and track contacts leading to a decrease in transmission of this viral infection. Pediatric LTCFs also may be uniquely protected from COVID-19 transmissions as they have higher staffing ratios compared to adult care facilities where it has been noted that Medicaid status, racial and ethnic minorities, and lower staffing ratios contributed to the infections and deaths in the adult nursing homes [10]. Finally, the IP & C program also included continuous training by various modalities, ie, 1:1 training, group sessions, written and audiovisual reminders, and return demonstration. Daily huddles aided in supporting staff with the various changes that occurred as new information emerged regarding the COVID-19 virus. Education tools created a resource for staff to use at work and at home. In summary, the COVID-19 pandemic has been a challenge for IP & C teams in LTCFs but with a flexible team approach, we were able to contain the impact of this infection on our residents and staff. As in the past, lessons learned during this time will be used to address outbreaks in the future for the health and safety of our residents in pediatric LTC.

## Notes

**Potential conflicts of interest.** All authors: No reported conflicts of interest. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

## References

- Saiman L, Maykowski P, Murray M, et al. Incidence, risks and types of infections in pediatric long-term care facilities. *JAMA Pediatr* 2017; 171:872–8.
- Wilmont S, Neu N, Hill-Ricciuti A, et al. Active surveillance for acute respiratory infections among pediatric long-term care facility staff. *Am J Infect Control* 2020. doi: 10.1016/j.ajic.2020.06.190.
- Kimball A, Hatfield K, Arons M, et al. Asymptomatic and presymptomatic SARS-CoV-2 infections in residents of a long-term care skilled nursing facility- King County, Washington, March 2020. *Morb Mortal Wkly Rep* 2020; 69:377–81.
- McMichael T, Currie D, Clark S, et al. Epidemiology of COVID-19 in a long-term care facility in King County, Washington. *N Engl J Med* 2020. doi:10.1056/NEJMoa2005412.
- Ulberg J. Benchmark Letter. Published on June 18, 2015. Available at: [https://www.health.ny.gov/facilities/long\\_term\\_care/reimbursement/nhr/benchmark/2020-02-06\\_benchmark\\_letter-july.htm](https://www.health.ny.gov/facilities/long_term_care/reimbursement/nhr/benchmark/2020-02-06_benchmark_letter-july.htm). Accessed July 16, 2020.
- New York State Department of Health. Factors associated with nursing home infections and fatalities in new york state during the COVID-19 global health crisis. Published on July 6, 2020. Available at: [https://www.health.ny.gov/press/releases/2020/docs/nh\\_factors\\_report.pdf](https://www.health.ny.gov/press/releases/2020/docs/nh_factors_report.pdf).
- Prevention of Influenza Transmission by Healthcare and Residential Facility and Agency Personnel. New York state public health law sections 225, 2800, 2803, 3612, and 4010, title 10 (health) of the Official Compilation of Codes, Rules and Regulations of the State of New York, amendment 2.59; 1/12/2013.
- Murray M, Jackson O, Cohen B, et al. Impact of infection prevention and control initiatives on acute respiratory infections in a pediatric long-term care facilities. 2016; 37:859–62.
- Kim G, Wang M, Pan H, et al. A health system response to COVID-19 in long-term care and post-acute care: a three-phase approach. *Infect Control Hosp Epidemiol* 2020; 68:1155–61.
- Yue L, Temkin Greener H, Gao S, et al. COVID-19 infections and deaths among Connecticut nursing home residents: facility correlates. *J Am Geriatr Soc* 2020. doi:10.1111/jgs.16689.