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## Special Article

## The Winter Respiratory Viral Season During the COVID-19 Pandemic



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## A B S T R A C T

The winter respiratory virus season always poses challenges for long-term care settings; this winter, severe acute respiratory syndrome coronavirus 2 will compound the usual viral infection challenges. This special article discusses unique considerations that Coronavirus Disease 2019 (COVID-19) brings to the health and well-being of residents and staff in nursing homes and other long-term care settings this winter. Specific topics include preventing the spread of respiratory viruses, promoting immunization, and the diagnosis and treatment of suspected respiratory infection. Policy-relevant issues are discussed, including whether to mandate influenza immunization for staff, the availability and use of personal protective equipment, supporting staff if they become ill, and the distribution of a COVID-19 vaccine when it becomes available. Research is applicable in all of these areas, including regarding the use of emerging electronic decision support tools. If there is a positive side to this year's winter respiratory virus season, it is that staff, residents, family members, and clinicians will be especially vigilant about potential infection.

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Winter is steadfastly upon us, bringing cooler temperatures. Because respiratory droplets spread farther and linger longer as the temperature falls, cooler weather brings a seasonal rise of several communicable respiratory infections; in addition, heated indoor spaces encourage closer physical contact and dry mucosal surfaces, leaving individuals more susceptible to increased air particles.<sup>1</sup> Until this year, influenza has been the most feared seasonal virus, as it causes 12,000 to 56,000 deaths in the United States each year.<sup>2</sup> This winter will be different, of course, because of the pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus, which has already claimed the lives of more than 1 million

people worldwide. In the United States, more than 75% of those deaths are in people 65 years of age and older.<sup>3</sup>

Before the Coronavirus Disease 2019 (COVID-19) pandemic, influenza was the most concerning viral respiratory infection for nursing home (NH) residents, with outbreaks requiring both treatment and prophylaxis, and even causing some buildings to close to outsiders for brief periods.<sup>4</sup> However, influenza is not the only respiratory virus that abounds in the community and frequents NHs in winter. Others, such as parainfluenza, rhinovirus, adenovirus, metapneumovirus, other coronaviruses, and especially respiratory syncytial virus (RSV), may also cause outbreaks.<sup>5</sup> Other than influenza, there are not yet vaccines or effective antiviral therapies for these infections. Making matters worse, in addition to these viral infections as a cause of pneumonia, they contribute to exacerbations of chronic obstructive pulmonary disease, and, in the case of influenza, may predispose individuals to secondary bacterial infections and cardiac morbidity.<sup>6,7</sup>

The winter respiratory virus season always poses challenges for NHs and assisted living communities. Overlaying the usual viral infection challenges this winter will be SARS-CoV-2. In this special article, we discuss unique challenges that COVID-19 will bring to the health and well-being of residents and staff in long-term care settings this winter. Specific topics include preventing the spread of

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respiratory viruses, promoting immunization, and the diagnosis and treatment of suspected respiratory infection. We also address several issues related to staff, including whether or not to mandate influenza immunization, availability and use of personal protective equipment (PPE), absenteeism, presenteeism (coming to work despite illness), work release for illness, and paid leave. In addition, we discuss strategies to help mitigate these challenges, some important differences between NHs and assisted living relevant to infection and COVID-19, and conclude with a brief consideration of a future SARS-CoV-2 vaccine.

### Preventing the Spread of Respiratory Viruses

Fortunately, we know more about COVID-19 than we did last spring when it first appeared. We know that it spreads primarily via droplets, and less commonly through fomite transmission and aerosolization.<sup>8</sup> However, the influence of heating systems that recirculate air on increasing the aerosol spread of SARS-CoV-2 is not yet clear. We know that masks and other PPE prevent the spread of SARS-CoV-2,<sup>9</sup> and because inadequate PPE has demonstrably increased the death toll in NHs, it will be critical to have access to ample supplies this winter.<sup>10</sup> It also will be necessary to have protocols for universal screening; to require that all persons wear face coverings and practice physical distancing; to test staff and residents for purposes of screening and when an outbreak is identified; and to isolate persons with a viral exposure or positive test.

If other respiratory viruses circulate widely as is typical in winter, NHs and assisted living communities will need to have a workable plan for addressing new symptoms among residents, staff, and their family members. These plans should include a focus not only on airborne transmission and PPE, but also on hand washing and surface decontamination, because most respiratory viruses, other than influenza and SARS-CoV-2, are spread by touch rather than by inhalation.<sup>5</sup>

### Influenza and Pneumococcal Immunization

Vaccination continues to be a pillar of public health, protecting individuals and the larger community. Adverse events from existing vaccines are rare, and the cost of treating these events is minimal compared with the morbidity and mortality associated with vaccine-preventable diseases. Currently 2 respiratory vaccines are available to most NH residents: influenza vaccination and pneumococcal vaccination. The Centers for Medicare and Medicaid Services (CMS) mandate that NHs must offer influenza and pneumococcal vaccines to their residents.<sup>11</sup> Unfortunately, immunization rates for both of these infections reveal significant room for improvement,<sup>4,12</sup> indicating that NHs need better tracking and monitoring to ensure that residents are up-to-date on their vaccines. If residents are unsure of their vaccine status, it is advised that they be given the vaccine.

Many types of influenza vaccine are available, and high-dose influenza vaccines have been developed specifically to overcome immunosenescence common among older adults; for persons with allergies to eggs, recombinant and cell-based influenza vaccines offer a safe alternative.<sup>13</sup> Even when the seasonal influenza vaccine is not a particularly good match, these immunizations reduce both the incidence and the severity of the influenza, as well as help protect others through herd immunity.<sup>4</sup>

Currently, there are 2 pneumococcal vaccines licensed in the United States for use in adults: 23-valent pneumococcal polysaccharide vaccine (PPSV23) and the 13-valent pneumococcal conjugate vaccine (PCV13). In November 2019, the Advisory Committee on Immunization Practices changed their recommendations for these vaccines in older adults.<sup>14</sup> All adults older than 65 should continue to receive 1 dose of PPSV23, but recommendations for PCV13 now encourage shared clinical decision in adults older than 65 who do not

have an immunocompromising condition, cochlear implant, or cerebrospinal fluid leak. In 2017, the Infection Advisory Committee of AMDA – the Society for Post-Acute and Long-Term Care Medicine, published pneumococcal vaccination guidance for NHs, providing a detailed schedule as well as strong recommendations for administration of both PPSV23 and PCV13 to NH residents.<sup>15</sup>

In addition to influenza and pneumococcal vaccines for residents, the Advisory Committee on Immunization Practices recommends that all NH employees receive an annual influenza vaccination, including those who do not have direct patient care responsibilities.<sup>16</sup> However, whereas hospitals have mandatory vaccination policies, most NHs do not.<sup>17</sup> Consequently, only two-thirds of NH staff were vaccinated in 2017–2018. Mandatory vaccination policies increase influenza vaccination rates to nearly 100%,<sup>18</sup> and AMDA's Infection Advisory Committee recommends that all NHs adopt a similar mandatory vaccination policy.<sup>16</sup> The success of these policies relies on staff education, incentives, and making the vaccine readily accessible. In relation to education, the Centers for Disease Control and Prevention (CDC) provides numerous resources, as do state and local health departments. In terms of incentives, NH leadership might consider paid leave or other benefits to workers who receive a vaccination. Regarding accessibility, NH leadership may need to work with their local health department and health care system to provide free access to the vaccine, preferably on site and across all shifts, to promote staff participation.

### Diagnosis and Treatment of Suspected Respiratory Tract Infections

The diagnosis and treatment of suspected respiratory infections is a multifaceted process. It begins with recognizing symptoms of an acute infection, followed by recognition of respiratory tract involvement. Then, clinicians are alerted to a change in condition; they conduct a diagnostic evaluation, initiate supportive care, and consider whether bacterial pathogens are involved, which then leads to decisions about prescribing an antibiotic, and if so, what antibiotic to use, at what dose, and for what duration.<sup>19</sup>

Diagnosing respiratory tract infections in NH residents is difficult,<sup>20</sup> as evidenced by a recent Delphi study that failed to reach consensus regarding the clinical criteria required to diagnose pneumonia.<sup>21</sup> Further complicating matters, a study of adults with community-acquired pneumonia suggested that viruses may be responsible for 23% of cases, with bacteria identified in only 11% of cases; no pathogen was identified in most cases.<sup>22</sup> Among NH residents, pneumonia carries with it a case fatality rate of at least 25%,<sup>23</sup> which may prompt clinicians to err on the side of antibiotic prescribing. This practice contributes to antibiotic overuse and subsequently to the growing problem of antibiotic resistance. Furthermore, delays in recognizing viral respiratory infections can lead to outbreaks in NHs, with increased mortality.<sup>24</sup>

SARS-CoV-2 only adds to these challenges, as this viral pathogen can cause infections that range from asymptomatic, to typical cold-like symptoms affecting only the upper respiratory tract, to involvement of the lower respiratory tract with a viral pneumonia leading to increased oxygen requirements that may progress to acute respiratory disease syndrome and death. Furthermore, the relatively prolonged incubation period of COVID-19 infections means that infected individuals shed virus for a longer time before developing clinically recognizable symptoms, and thus contributes to spreading SARS-CoV-2.

As with most other infections, older adults may experience both typical and atypical signs and symptoms of COVID-19 infection.<sup>25,26</sup> Typical signs include fever, cough, and increased oxygen requirements. For older adults, the threshold to recognize fever is lower than applied to younger adults,<sup>27,28</sup> with commonly accepted

definitions including any temperature  $>100.0^{\circ}\text{F}$  or repeated temperatures  $>99.0^{\circ}\text{F}$ .<sup>29</sup> An atypical sign of COVID-19 infection is confusion, and severe confusion may indicate delirium. Other atypical signs include diarrhea and vomiting. Typical symptoms of COVID-19 infection that older adults might report are shortness of breath, feeling feverish or chilled, feeling tired or fatigued, having a headache, or having muscle aches. Atypical symptoms include gastrointestinal complaints such as a loss of appetite or, nausea. Sometimes, these gastrointestinal symptoms precede the respiratory tract symptoms by a few days. A new loss of taste or smell can also indicate a COVID-19 infection.

Before the COVID-19 pandemic, a NH resident with a change in condition might undergo a focused evaluation for an acute infection. During the winter and spring months, that evaluation would reasonably include diagnostic testing for influenza. Now, NHs take a more proactive approach to identifying potential infections, actively screening their residents daily for signs and symptoms of COVID-19 infection. Any resident with a positive screen should undergo more thorough evaluation by a clinician, using a low threshold to initiate COVID-19 testing.

The specific test used to diagnose COVID-19 infections may vary depending on the types of tests available, the time required to obtain the results, and the sensitivity and specificity of the results.<sup>30</sup> In general, polymerase chain reaction (PCR)-based tests, which detect viral ribonucleic acid from a nasopharyngeal swab, are the most sensitive and specific. Test results may be available within 24 hours in some NHs, whereas others may have to wait several days for the results. Antigen-based tests are largely point-of-care tests with samples collected from the anterior nares; these results should be available within hours. When used for diagnostic purposes, a negative antigen test should be confirmed with a negative PCR test.

As NHs continue to grapple with the COVID-19 pandemic, these diagnostic tests are also being used to screen for COVID-19 infections. A single case of COVID-19 infection among staff or residents at a NH is considered an outbreak. During outbreaks, staff and residents should be tested for COVID-19 at least weekly until a 2-week period transpires without identification of new cases.<sup>31</sup> For NHs without an outbreak, residents do not typically undergo screening tests, whereas the frequency of staff screening depends on whether there are cases of COVID-19 in the building and the level of COVID-19 in the local community; for example, CMS recommends monthly testing if the community positivity rate in the past week was  $<5\%$ , and twice weekly testing if it was  $>10\%$ .<sup>32</sup> These recommendations are reasonable to apply to assisted living as well, but any such recommendations would come from state or local health departments because CMS does not regulate assisted living. In some instances, screening is also indicated for family members and other visitors, which may create a financial burden as it might for employees and employers.

For residents with symptoms of a respiratory infection and negative COVID-19 tests, influenza and RSV are the most likely causes of viral pneumonia. Because only a small amount of viral media is used for PCR testing for SARS-CoV-2, the sample can be retained and retested for influenza and/or RSV, sparing the resident from having to undergo a second nasopharyngeal swab, which can be uncomfortable.

In addition to diagnostic testing for respiratory viral pathogens, several cutting-edge health information technology and testing strategies may improve the diagnosis and management of winter respiratory illnesses in NH residents.

- For pneumonia, evidence strongly suggests that electronic decision support may improve clinician decision making.<sup>33</sup> Integrating clinical decision support in the electronic health record improves evidence-based infection-related decisions.<sup>34</sup> The REDUCE trial demonstrated that incorporating a pneumonia evaluation decision tool into the electronic health record

reduced antibiotic use for adults in outpatient care.<sup>35</sup> NH clinicians and staff could benefit from a similar intervention targeted toward NHs, including antibiotic prescribing reports, an evidence-based decision tool, and patient-facing advice and education.

- Viral testing panels are not yet available in most NHs, but studies have shown that nasal swab-based diagnostic panels for common respiratory viruses are highly feasible and can often make a specific diagnosis.<sup>36</sup> Greater use of this technology, especially if results return rapidly, along with rapid antigen testing for both COVID-19 and influenza A/B, would markedly reduce the ambiguity and anxiety associated with respiratory illness in NHs.
- Regarding COVID-19, mobile technologies such as the COVIDApp can help guide clinicians through the COVID-19 diagnosis and management process.<sup>37</sup> This technology and other clinical decision support can incorporate new diagnostic testing such as the use of pro-calcitonin and rapid respiratory viral panels or lung ultrasonography.<sup>38,39</sup>

Decision support tools must use guidelines that especially consider the changes in physiology of older adults and their unique features of respiratory illness, such as a lower definition of fever. In addition, the value of pulse oximetry in monitoring respiratory infections argues for it being incorporated into vital sign evaluation in symptomatic patients.

Technological support may improve the appropriate diagnosis and management of respiratory infections in NHs, but may increase costs and require significant resources in time and manpower that are already stretched thin.<sup>9</sup> A recent study of the efficacy of the American Testing Guidance for Nursing Homes demonstrated that mass testing and retesting can effectively block transmission of SARS-CoV-2 when implemented with other infection prevention and control measures<sup>40</sup>; however, the costs of implementation are unclear.

Antibiotic stewardship remains critical this winter. Current evidence suggests that only 8% of hospitalized patients with COVID-19 have demonstrable bacterial or fungal coinfections, yet in one study, 72% of patients received antibiotics.<sup>41</sup> Antibiotics are not recommended for mild cases of COVID-19. Even before COVID-19, antibiotic use for respiratory infections in NHs often failed to meet minimum criteria for prescribing. In our own study of 31 NHs, only 2% of antibiotics given for respiratory infections in a 3-month period adhered to the minimum criteria for prescribing.<sup>42</sup> Our research also found that NH residents receive an average of 1 prescription every 3 months.<sup>43</sup> At any one time, more than 10% of NH residents are taking antibiotics, and up to 75% of these antibiotics are inappropriately prescribed.<sup>44–46</sup> Because constitutional symptoms often promote inappropriate antibiotic prescribing, they present an opportunity for quality-of-care assessment.<sup>47</sup> Consistent with the focus of CMS on antibiotic stewardship over the past years,<sup>48</sup> the core elements of antibiotic stewardship (leadership, accountability, drug expertise, action, tracking, reporting, and education<sup>49</sup>) can all be applied to COVID-19 management. Although barriers exist in reducing antibiotic resistance,<sup>50</sup> infection preventionists in NHs can track infections and monitor outbreaks of all infections, and provide real-time notification to physicians if antibiotic prescribing starts to rise.<sup>51</sup>

### Important Differences Between NHs and Assisted Living

Although issues related to preventing the spread of respiratory viruses, promoting immunization, and the diagnosis and treatment of suspected respiratory infection are relevant across different types of long-term care settings, special mention is warranted regarding assisted living. In the United States, assisted living provides supportive care to more than 800,000 residents.<sup>52</sup> Most residents pay for their care privately, whereas most NH residents receive Medicaid.<sup>53</sup>

Cognitive impairment affects 70% to 90% of assisted living residents, and 42% have moderate or severe dementia.<sup>54,55</sup> For this reason, and because assisted living does not provide health care, family members are more involved in monitoring their relatives' well-being and medical status than are families of NH residents.<sup>56</sup> Visitor restriction due to COVID-19 therefore removes an important potential source of early infection detection during the winter virus season. Detection is also hampered because these settings are not required to have a medical director or nurse, although roughly one-half do have a registered or licensed nurse on site.<sup>55,57</sup> More so, not all states have infection control policies for assisted living,<sup>58</sup> suggesting that risk may be increased once a virus is brought into the community. These and additional differences are summarized in a recent JAMDA editorial.<sup>59</sup>

### Supporting Staff During the Winter Virus Season

Current gaps exist in the safety of long-term care staff, and these gaps will continue to plague NHs and assisted living communities during the winter. The U.S. Department of Labor's Occupational Safety and Health Administration issued a notice on NH worker safety, including tips for employers to keep staff safe, such as reducing intra-staff exposures by limiting crowding in break rooms, in-service meetings, and other group gatherings; making sufficient PPE available; and continually monitoring the PPE supply.<sup>60</sup> Earlier in the pandemic, approximately 20% of NHs reported having less than a 1-week supply of masks and gowns, and more than 15% reported staffing shortages<sup>61</sup>; recent data suggest that NHs have not closed the PPE gap.<sup>62</sup>

In light of this statistic, long-term care providers must develop plans to accommodate staff shortages, as reports indicate that staff shortages persist as well.<sup>51</sup> Plans must include preparing for potential loss of staff due to illness or exposure to COVID-19. Based on CDC recommendations, the Families First Coronavirus Response Act (FFCRA) included provisions for worker paid leave.<sup>63</sup> The law was intended to encourage employers to permit their sick employees to stay home. However, it deliberately excluded private businesses of 500 employees or more, and provided broad exemptions to employers of emergency responders and health care workers. Although the House has passed revisions of the act to remove these exclusions, the legislation has currently stalled in the Senate, and the provisions in the FFCRA are expected to expire at the end of 2020. These limitations may encourage staff to work while sick, which would expose others to infection, or, alternately, have these low-paid workers incur financial loss to protect the residents. Emergency staffing plans should therefore be developed to account for significant staffing shortages, including communication with the local health department and outreach to other local long-term care providers and hospitals.

### When a COVID-19 Vaccine Becomes Available

Being mindful of challenges and implementing mitigation efforts for both residents and staff may lessen the toll the winter respiratory viral season will take on long-term care residents. Indeed, many experts are predicting that social distancing for COVID-19 will result in a mild influenza season.

It is unknown whether a COVID-19 vaccine will become available this winter. If so, important questions include adverse effects of the vaccine and whether it will have immunogenicity for chronically ill older adults. Current evidence suggests that mRNA vaccines appear safe and immunogenic in older populations,<sup>64</sup> but whether such is the case remains a significant concern. The question about cost was recently answered, as the U.S. government announced plans to provide and administer COVID-19 vaccines to long-term care residents across the country with no out-of-pocket costs.<sup>65</sup> Although specific plans for distribution of vaccines is unknown, NH and assisted living

residents should receive priority. Immunizing staff will further protect this vulnerable population but must be affordable and accessible. Because of public concerns about vaccine safety and anti-vaccination resistance, public health efforts to promote the widespread uptake of an effective vaccine should start in each NH and long-term care community as soon as a vaccine appears imminent, to prepare staff and residents for the coming vaccination drives in the spring and summer.<sup>66</sup>

### Implications for Practice, Policy, and Research

The winter respiratory virus season always poses challenges for long-term care settings, and those challenges will be exacerbated with the new wave of COVID-19; as such, they present numerous implications for practice, policy, and research. As summarized in this article, practice must focus on preventing the spread of respiratory viruses, promoting immunization, and the diagnosis and treatment of suspected respiratory infection. Policies must consider whether to mandate influenza immunization for staff, the availability and use of PPE, supporting staff if they become ill, and the distribution of a COVID-19 vaccine when it becomes available. Research is applicable in all of these areas, and should build on what is already known about the prevention and treatment of respiratory viruses in long-term care, including the use of emerging electronic decision support tools. If there is a positive side to this year's winter respiratory virus season, it is that staff, residents, family members, and clinicians will be especially vigilant about potential infection.

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