

**EDITORIAL**

## Early success of COVID-19 vaccines in nursing homes: Will it stick?

Over the last year, many nursing home (NH) residents, staff, and families have been devastated by the COVID-19 pandemic.<sup>1</sup> Now, there is some good news. In this issue of the journal, three articles support early effectiveness of the COVID-19 vaccine in reducing the incidence of SARS-CoV-2 infection and its complications in NHs,<sup>2-4</sup> and a research letter demonstrates that many NH residents have an antibody response to the vaccine.<sup>5</sup> Other journals have published similar antibody findings.<sup>6,7</sup> The question is, will these early successes stick?

The very rapid development of life-saving vaccines using new mRNA technology is one of the most remarkable scientific achievements for improving the care of older people in history. The collaboration between the federal government and two large pharmacy chains (the Pharmacy Partnership for Long-Term Care Program) was no less remarkable—effectively implementing vaccine clinics in thousands of NHs all across the United States and vaccinating close to 70% of NH residents and close to 40% of staff in those facilities in a period of less than 3 months. The Centers for Disease Control and Prevention continues to encourage NH residents and staff to get vaccinated.<sup>8</sup>

In a study involving 2501 NHs from the first 17 states to initiate vaccine clinics using the BNT162b2 vaccine found that at 6 weeks NHs that obtained the vaccine first had fewer resident cases (incidence rate ratio [IRR]: 0.64 [95% confidence interval [CI]: 0.48–0.86]); fewer resident deaths (IRR: 0.45 [95% CI: 0.31–0.65]); and fewer staff cases (IRR: 0.51 [95% CI: 0.42–0.62]).<sup>3</sup> In a second study involving 280 NHs belonging to a chain of NHs in 21 states, NHs that received one of the two available vaccines early had a predicted 2.5 fewer incident SARS-CoV-2 infections per 100 at-risk residents per week (95% CI: 1.2–4.0) compared to what would have been expected in the later vaccinated facilities. Over 5 weeks, the predicted reduction in new infections was 5.2 cases per 100 at-risk residents, and 5–8 weeks postvaccine clinic, early vaccinated facilities had a predicted 1.1–3.8 fewer hospitalizations and/or deaths per 100 infected residents

per day, and a cumulative, on average, difference of five events per 100 infected residents per day.<sup>2</sup> This same population was followed for up to 28 days after vaccination.<sup>9</sup> There were 18,242 residents who received at least one dose of mRNA vaccine; 14,669 (80.4%) received the Pfizer–BioNTech vaccine, and 3573 (19.6%) received the Moderna vaccine. Of these 18,242 residents, 13,048 also received the second dose of vaccine. A total of 3990 residents were unvaccinated. The incidence of both asymptomatic and symptomatic infection decreased over time among both vaccinated residents and unvaccinated residents, with most infections being asymptomatic. NHs that were located in counties with the highest incidence of SARS-CoV-2 infection had the most incident cases but still had large decreases, and no consistent patterns in the incidence of infection among residents relative to rates of vaccination among staff members were observed. These findings demonstrate the effectiveness of the mRNA vaccines in reducing the incidence of asymptomatic and symptomatic in NHs with access to the vaccine, which should be coupled with adequate personal protective equipment, staffing, and intensive infection control education and policies.

The third study published in the journal reports that the first COVID-19 vaccine dose was delivered within 1 week of availability and the second dose within 5 weeks to 50% of veterans residing in the 130 Department of Veterans Affairs (VA) Community Living Centers (CLCs). A retrospective longitudinal cohort analysis from October 1, 2020 until February 14, 2021 in these 130 VA CLCs revealed that relative to the index week, the risk ratio of SARS-CoV-2 positive tests in vaccinated residents relative to unvaccinated was significantly lower in week 4 (relative risk [RR]) 0.37, 95% CI: 0.20–0.68).<sup>4</sup> These findings are consistent with an earlier smaller study of two NHs where the estimated effectiveness of partial vaccination in preventing SARS-CoV-2 infection was 63% (95% CI: 33–79) and was similar when residents with past SARS-CoV-2 were excluded (vaccine effectiveness [VE] = 60%, 95% CI: 30–77).<sup>5</sup>

Immunosenescence among older adults can interfere with antibody response to viral infection and vaccines.<sup>10,11</sup> The mRNA COVID vaccine trials did not

This editorial comments on the articles by Mor et al, Moore et al, Rudolph et al, and Domi et al.

include older NH residents, raising questions about whether the planned vaccination regimen would achieve the desired effects in this population. Two studies have now demonstrated that many NH residents do produce antibodies in response to the SARS-CoV-2 virus and vaccine. In a study of 49 NH residents of average age 84 with multiple comorbidities who acquired the virus, 43 of 44 surviving residents had a detectable IgG response on first testing, as did 35 (87.5%) of 40 at 3 months and 23 (65.7%) of 35 at 6 months.<sup>6</sup> In a study of 102 NH residents, production of antibody to the spike protein in response to the COVID-19 vaccine was associated with prior infection and antibody to the 2-N protein. All 36 residents who met these criteria were seropositive for S-protein IgG after one vaccine dose versus 29 (49.2%) of 60 residents without a prior positive viral test.<sup>7</sup>

As optimism grows about turning the corner on this pandemic, and NHs begin to relax screening and testing procedures and allow more visitors; we must continue to encourage vaccination of NH residents, staff, and families. The Federal Partnership for Long Term Care has ended and transitioned to the Federal Retail Pharmacy Program with the potential for a less concerted national focus on ready access to COVID-19 vaccines within NHs. As increasing numbers of new residents are admitted for post-acute and long-term care, NHs are still vulnerable to unvaccinated, asymptomatic infected individuals starting a new outbreak, whether it be to the original virus or a more virulent variant. For example, a SARS-CoV-2 variant is now prevalent in NHs in England.<sup>12</sup> Moreover, some facilities' staff vaccination rates remain below 40%.<sup>13,14</sup> Thus, recent reports of postvaccination infections in NHs are not surprising and warn us of what can happen in other NHs.<sup>15,16</sup> We cannot forget that a NH provided one of the first signals of the devastation that COVID-19 would cause in the United States.<sup>17</sup> Nor can we forget all of the factors that have made the pandemic a "perfect storm" in our NHs,<sup>1</sup> and the rapidity with which COVID-19 can spread through a facility resulting in high mortality rates.<sup>18</sup> A simulation study has suggested that frequent viral testing and immunity-based staffing may reduce viral transmission in NHs.<sup>19</sup> This should be kept in mind if repeat outbreaks become more frequent.

While we hope these early positive results from the vaccine portend lasting protection both within and outside NHs, we must continue to closely monitor and support ongoing vaccination of NH residents and staff, as well as other infection control measures, to ensure that the early success of the vaccines in NHs will stick.

## ACKNOWLEDGMENTS

## CONFLICT OF INTEREST

None.

## AUTHOR CONTRIBUTIONS

Joseph G. Ouslander: Writing. Debra Saliba: Editing and Writing.

## SPONSOR'S ROLE

Not Applicable.

Joseph G. Ouslander MD, AGSF<sup>1</sup>  
Debra Saliba MD, MPH, AGSF<sup>2</sup>

<sup>1</sup>Charles E. Schmidt College of Medicine, Florida Atlantic University, Boca Raton, Florida, USA

<sup>2</sup>Gerontological Research, UCLA/JH Borun Center, Los Angeles, California, USA

## Correspondence

Joseph G. Ouslander, MD, AGSF, Charles E. Schmidt College of Medicine, Florida Atlantic University, 777 Glades Road, Building 71, Boca Raton, FL 33431, USA.  
Email: jousland@health.fau.edu

## REFERENCES

- Ouslander JG, Grabowski DC. COVID-19 in nursing homes: calming the perfect storm. *J Am Geriatr Soc*. 2020;68:2153-2162.
- Mor V, Gutman R, Yang X, et al. Short term impact of nursing home SARS-CoV-2 vaccinations on new infections, hospitalizations and deaths. *J Am Geriatr Soc*. 2021. <https://doi.org/10.1111/jgs.17176>
- Domi M, Leitson M, Gifford D, Nicolaou A, Sreenivas K, Bishnoi C. The BNT162b2 vaccine is associated with lower new COVID-19 cases in nursing home residents and staff. *J Am Geriatr Soc*. 2021. <https://doi.org/10.1111/jgs.17224>
- Rudolph JL, Hartronft S, McConeghy K, et al. Proportion of SARS-CoV-2 positive tests and vaccination in VA community living centers. *J Am Geriatr Soc*. 2021. <https://doi.org/10.1111/jgs.17180>
- Britton A, Jacobs Slifka KM, Edens C. Effectiveness of the Pfizer-BioNTech COVID-19 vaccine among residents of two skilled nursing facilities experiencing COVID-19 outbreaks—Connecticut, December 2020–February 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70(11):396-401.
- Moore J, Groves T, Pilkerton CS, Ashcraft AM, Shrader CD. Geriatric antibody response to COVID-19. *J Am Geriatr Soc*. 2021. <https://doi.org/10.1111/jgs.17210>
- Blain H, Tuailon E, Gamon L, et al. Spike antibody levels of nursing home residents with or without prior COVID-19 3weeks after a single BNT162b2 vaccine dose. *JAMA*. 2021;325(18):1898-1899.
- Centers for Disease Control and Prevention. Frequently asked questions about COVID-19 vaccination in long-term care facilities. <https://www.cdc.gov/vaccines/covid-19/toolkits/long-term-care/faqs.html>. Accessed May 11, 2021.
- White EM, Yang X, Blackman C, Pfeifer RA, Gravenstein S, Mor V. Incident SARS-CoV-2 infection among mRNA-vaccinated and unvaccinated nursing home residents. *N Engl J Med*. 2021. <https://doi.org/10.1056/NEJMc2104849>

10. Fulop T, Pawelec G, Castle S, Loeb M. Immunosenescence and vaccination in nursing home residents. *Clin Infect Dis*. 2009;48:443-448.
11. Goodwin K, Viboud C, Simonsen L. Antibody response to influenza vaccination in the elderly: a quantitative review. *Vaccine*. 2006;24(8):1159-1169.
12. Krutikov M, Hayward A, Shallcross L. Spread of a variant of SARS-CoV-2 in long-term care facilities in England. *N Engl J Med*. 2021;384:1671-1673.
13. Harrison J, Berry S, Mor V, Gifford D. "Somebody like me": understanding COVID-19 vaccine hesitancy among staff in skilled nursing facilities. *J Am Med Dir Assoc*. 2021;22(6):1133-1137.
14. Unroe KT, Evans R, Weaver L, Rusyniak D, Blackburn J. Willingness of long-term care staff to receive a COVID-19 vaccine: a single state survey. *J Am Geriatr Soc*. 2021;69:593-599.
15. Teran RA, Walblay KA, Shane EL, et al. Postvaccination SARS-CoV-2 infections among skilled nursing facility residents and staff members—Chicago, Illinois, December 2020–March 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70(17):632-638.
16. Cavanaugh AM, Fortier S, Lewis P, et al. COVID-19 outbreak associated with a SARS-CoV-2 R.1 lineage variant in a skilled nursing facility after vaccination program—Kentucky. *MMWR Morb Mortal Wkly Rep*. 2021;70:639-643.
17. McMichael TM, Clark S, Pogosjans S, et al. COVID-19 in a long-term care facility—King County, Washington. *MMWR Morb Mortal Wkly Rep*. 2020;69:339-342.
18. Blackman C, Farber S, Feifer RA, Mor V, White EM. An illustration of SARS-CoV-2 dissemination within a skilled nursing facility using heat maps. *J Am Geriatr Soc*. 2020;68(10):2174-2178.
19. Holmdahl I, Kahn R, Hay JA, Buckee CO, Mina MJ. Estimation of transmission of COVID-19 in simulated nursing homes with frequent testing and immunity-based staffing. *JAMA Netw Open*. 2021;4(5):e2110071. <https://doi.org/10.1001/jamanetworkopen.2021.10071>