

## Utility of Rapid Antigen Tests in Nursing Homes

Few populations have experienced greater harms during the COVID-19 pandemic than residents of nursing homes. Before the introduction of SARS-CoV-2 vaccines, nursing homes accounted for just over 5% of all U.S. COVID-19 cases but represented more than a third of all deaths (1). Not all nursing home facilities have been equally affected; an analysis found that death rates were more than 3 times higher in facilities with the highest proportions of non-White residents than in facilities with the highest proportions of White residents (2).

Several factors have made nursing homes vulnerable to serious outbreaks, not only of COVID-19 but also of other diseases like influenza. Staff turnover is high, and personnel often rotate among several facilities, increasing the probability that a virus can be introduced. Also, providing care in nursing facilities often involves a high degree of contact between staff and residents, increasing the likelihood of exposures. The residents' advanced age and underlying medical conditions also leave them at high risk for serious illness and complications.

In an effort to prevent outbreaks of COVID-19 within nursing homes, facilities increased infection prevention practices and restricted visitors. States formed strike teams to respond to facility outbreaks rapidly, and they increased testing of residents and staff. Although such measures helped to reduce the number of nursing home deaths due to COVID-19, these facilities continued to report high numbers of cases and deaths through the fall of 2020.

Investigations of outbreaks can provide insights about why efforts to protect nursing home residents have been insufficient. For example, when researchers did universal testing in 11 long-term care facilities in Maryland that had had COVID-19 cases, they identified infections in 39.6% of patients who had not been tested in prior symptom-based targeted testing efforts by the local health department. Universal testing more than tripled the number of cases found at these facilities (3).

Throughout the pandemic, there have been calls for increased testing at nursing homes. Although several states have announced the intention to conduct universal testing, the outcome of these pronouncements is unclear. Reports suggest that implementation of increased testing at nursing homes has been slowed by the high cost of laboratory testing and the limited availability and operational challenges of point-of-care tests.

McKay and colleagues (4) show that rapid antigen tests have utility in nursing home settings to screen residents and staff. In a prospective evaluation involving 3 rounds of testing in 1 facility, they compared antigen test performance (using BinaxNOW) versus virus culture and real-time reverse transcription polymerase chain reaction (RT-PCR). As expected, the antigen test performed less well in late infection than RT-PCR. Of note, however, it performed very well compared with RT-PCR and virus

culture in early infection (percentage of positive agreement, 86% and 95%, respectively). These results provide additional support to the idea that antigen testing could be useful to identify people who are likely to be contagious and may transmit SARS-CoV-2, as well as the idea that rapid antigen tests can be a useful screening tool to limit infectious outbreaks. The rapid time to results, and thus public health mitigation, cannot be overstated. Once a result is obtained in less than a half hour, action can be taken to limit further contacts, and thus further spread of the virus. In the study, McKay and colleagues also found that false positives were not a significant problem.

These data are important. Although rapid tests have been widely distributed to nursing homes, the performance of these tools in this setting has not been demonstrated, and challenges in their implementation have been reported. In July 2020, the U.S. Department of Health and Human Services began sending rapid antigen tests to nursing homes for use in screening staff and residents (5). After receipt of these rapid antigen tests, several states blocked their use over concerns about high numbers of false-positive test results (6). Current guidance from the Centers for Disease Control and Prevention is that states should consider rapid test results to be presumptive, but that nucleic acid tests might be necessary before making some clinical decisions, including cohorting patients (7).

A better understanding of the performance characteristics of antigen tests in real-world settings is essential to facilitate their use. These data answer questions about the reliability of these tests in symptomatic and asymptomatic people and underscore the value of these tests as screening tools to identify contagious people. The data can inform the development of protocols for interpreting test results and for isolating patients.

Since the introduction of SARS-CoV-2 vaccines, COVID-19 deaths in nursing homes have fallen sharply. Between mid-December 2020 and the end of January 2021, nursing home deaths decreased by 66% (8).

But the use of vaccine does not end the concern about COVID-19 outbreaks in nursing homes or the need for testing in these settings. A Centers for Disease Control and Prevention study made the concerning finding that nearly two thirds of staff at more than 11 000 skilled-nursing facilities that provided onsite vaccinations through the Pharmacy Partnership for Long-Term Care Program did not receive vaccinations (9). Low vaccine coverage among staff could lead to continued outbreaks in facilities. Testing programs for COVID-19 in nursing homes are therefore likely to be important for some time. Given the vulnerability of nursing home populations to infectious diseases in general, the experience of COVID-19 antigen tests may point the way for the use of additional rapid testing to control outbreaks beyond COVID-19.

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