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The Honorable Brad Wenstrup
Chairman
Select Subcommittee on the Coronavirus Pandemic
U.S. House of Representatives
Washington, DC 20515

The Honorable Raul Ruiz
Ranking Member
Select Subcommittee on the Coronavirus Pandemic
U.S. House of Representatives
Washington, DC 20515

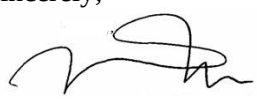
September 9, 2024

Chairman Wenstrup and Ranking Member Ruiz:

Regarding the pending Congressional hearing on lessons learned on COVID public health policies pertaining to nursing homes in the US, I am including a copy of a paper my colleagues and I recently published in ***Health Affairs.*** As the paper summarizes, the biggest determinants of nursing home residents' mortality due to COVID was whether the facility was located in an area with a high prevalence of the virus and the size of the facility which was largely related to the number of staff members entering the facility every day since more staff means more exposure from the local community in which staff live. Finally, since the virus was highly contagious and airborne, standard infection control practices associated with preventing contact from bacterial infections did not seem to help much. This became apparent in that facilities which historically performed better on traditional infection control practices were as likely to experience an outbreak of COVID as were facilities with poorer past performance.

In the first months of the pandemic, most attention was devoted to assisting hospitals since they were struggling to save people's lives. Hospital ICUs were full and there was an inadequate supply of ventilators, so once patients no longer needed that level of care or if they weren't sick with COVID, every effort was made to discharge them to make way for new patients succumbing to COVID. In many states, in the short term, this meant sending patients to nursing homes. Unfortunately, nursing homes were even less well prepared in terms of protective clothing, the availability of rapid testing results and the ability to isolate sick patients. Many nursing homes tried to establish "COVID wings" where their COVID positive cases were cohorted. However, since rapid testing wasn't available until many months later, asymptomatic patients may have been infecting others and no one knew until it was too late. Indeed, a review of the best scientific knowledge available in April and May of 2020, reveals that there were still substantial disagreements about how to keep patients safe. While one can disparage policies instituted in the early days having the benefit of hindsight, what is really needed is to begin the planning now to avoid an uncoordinated response when the next pandemic arrives.

Sincerely,



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ANALYSIS

Four Years And More Than 200,000 Deaths Later: Lessons Learned From The COVID-19 Pandemic In US Nursing Homes

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ABSTRACT **Nursing home residents and staff were disproportionately affected by the COVID-19 pandemic, drawing attention to long-standing challenges of poor infection control, understaffing, and substandard quality of care in many facilities. Evolving practices and policies during the pandemic often focused on these challenges, with little effect. Despite the emergence of best practices to mitigate transmission of the virus, even the highest-quality facilities experienced outbreaks, indicating a larger systemic problem, rather than a quality problem at the facility level. Here we present a narrative review and discussion of the evolution of policies and practices and their effectiveness, drawing on evidence from the United States that was published during 2020–23. The lessons learned from this experience point to the need for more fundamental and nuanced changes to avoid similar outcomes from a future pandemic: greater integration of long-term care into public health planning, and ultimately a shift in the physical structure of nursing homes. More incremental measures such as vaccination mandates, higher staffing, and balancing infection control with resident quality of life will avoid some adverse outcomes, but without more systemic change, nursing home residents and staff will remain at substantial risk for repetition of the poor outcomes from the COVID-19 pandemic.**

During the early months of the COVID-19 pandemic, in spring 2020, it became evident that nursing home residents were particularly vulnerable to SARS-CoV-2, the virus causing COVID-19, with nursing homes accounting for 40 percent or more of all COVID-19 deaths in the US.[1] A root driver of this vulnerability was the nature of the virus, which had particularly severe consequences among people with characteristics common among nursing home residents: advanced age and underlying health conditions such as diabetes and heart disease.[2]

The higher risk among nursing home residents was exacerbated by the congregate setting in which they lived. Most nursing homes house more than 100 residents, often with two or more residents per room, congregate meals and activities, and daily "hands-on" assistance from staff.[3] For an airborne virus that is easily spread, this setting presented high transmission risk, particularly before it was known that the virus could be spread asymptomatically.

Nursing home case and death rates remained high during much of 2020, peaking in the late fall of that year. After a large drop with the availability of vaccines in early 2021, rates of infec-

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tions and deaths remained low for the first half of 2021 and fluctuated after that point (exhibits 1 and 2). The number of cases peaked again in January 2022 with the arrival of the highly transmissible Omicron variant. Fortunately, Omicron was less lethal, and perhaps because most residents had been vaccinated, case fatality rates in nursing homes were much lower with Omicron than with earlier variants.[4] In addition, in December 2021, a treatment (Paxlovid) became available that could also reduce the probability of death from a COVID-19 infection,[5] although it has been underused in nursing homes.[6] After February 2022, fewer than 500 residents per week died from COVID-19 nationally (exhibit 2).

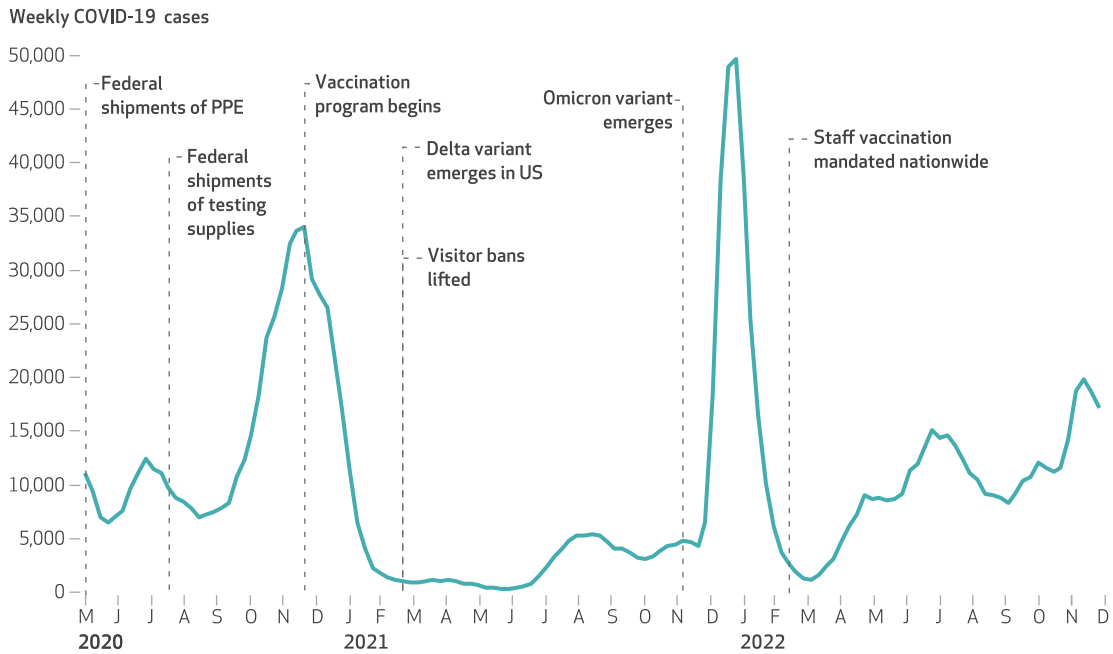
Now, more than four years after the first positive case of COVID-19 emerged in a nursing home in Washington State, followed by more than 200,000 deaths of residents and staff in long-term care facilities nationwide,[7] the lessons learned by policy makers and practitioners remain unclear. However, the research that has emerged offers insights into promising directions for policy and practice. In this article, we present a narrative review and discussion of the evolution of policies and practices and their effectiveness, drawing on evidence from the United States published during 2020–23. We organize our discussion by key types of salient practices and policies that emerged: infection control practices and policies, visitor bans, vaccination, and staffing. This framework is consistent with the conceptual model proposed in the 2022 National Academies report on nursing home quality, which included care practices, staff, and communication with families as direct drivers of resident outcomes and systemic factors such as state and national policy and the surrounding community as contextual inputs.[3] We synthesize this evidence with the goal of identifying key lessons for the future.

Infection Control And Outbreak Mitigation Practices

Infection control in nursing homes was under scrutiny long before the pandemic.[8] Regulatory deficiency citations for gaps in infection control were common, leading advocates to call for a mandated infection prevention specialist in each nursing home. Standard infection control practices included hand washing, cleaning and disinfecting of surfaces, prompt removal of soiled items, and antibiotic stewardship. Although these practices are necessary and helpful under normal circumstances, they were inadequate in fighting the airborne and often asymptomatic spread of SARS-CoV-2.

EXHIBIT 1

Confirmed COVID-19 cases among US nursing home residents, by week, May 2020–December 2022



SOURCE Authors' analysis of data from the Centers for Disease Control and Prevention National Healthcare Safety Network. **NOTES** A visitor ban was implemented in March 2020, but it is not shown in this figure because data are not available before May 31, 2020. PPE is personal protective equipment.

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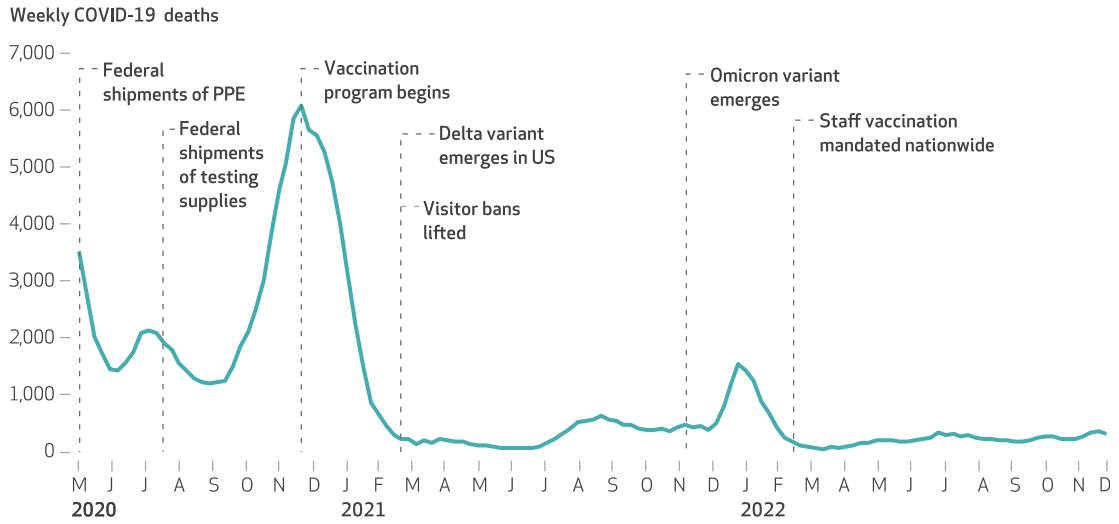
EXHIBIT 2

COVID-19 deaths among US nursing home residents, by week, May 2020–December 2022



SOURCE Authors' analysis of data from the Centers for Disease Control and Prevention National Healthcare Safety Network. **NOTES** A visitor ban was implemented in March 2020, but it is not shown in this figure because data are not available before May 31, 2020. PPE is personal protective equipment.

Key additional COVID-19-specific practices that emerged and evolved in nursing homes during the first few months of the pandemic included testing, cohorting (physically separating COVID-19-positive residents from others in a separate area of the facility, ideally with separate staff), and the use of personal protective equipment (PPE).[9,10] Testing to cohort COVID-19-positive people was challenging because rapid antigen tests did not become available until the fall of 2020, and molecular (polymerase chain reaction) tests were in short supply. The results often were not available for days, which greatly reduced their utility. At that time, the recommendation by the Centers for Disease Control and Prevention (CDC) was to test residents only after they became symptomatic. This proved to be too late, as successful cohorting depended on fast, reliable, and early testing before the virus could spread. As the supply of tests increased, nursing homes began testing all residents and staff at regular intervals, or at least at the first sign of an outbreak, followed by cohorting. Often, an entire floor or wing of a facility was designated for temporary housing of infected residents. However, the complexities of altering established work assignments or trying to match residents and staff in terms of seropositivity was daunting. Finally, the masking of residents (although generally difficult to enforce) and the wearing of PPE (masks, gowns, gloves, and eye protection) by staff became recommended practices, but from May to July 2020, more than one in five nursing homes reported a severe shortage of PPE.[11] All three of these practices—testing, cohorting, and use of PPE—were complicated by supply shortages.

INFECTION CONTROL POLICIES The policy response to this crisis in nursing homes included improving infection control practices, using regulatory levers.When the first documented case of COVID-19 domestic transmission appeared at a nursing home in Washington State and became an outbreak, regulators immediately inspected infection control practices in the facility. Standard annual Medicare and Medicaid inspections were suspended with the declaration of the public health emergency in March 2020 and then resumed five months later with a special focus on infection control practices.[12] In parallel, the Centers for Medicare and Medicaid Services (CMS) implemented a prior requirement that each nursing home contract with at least a part-time infection control specialist.[13] However, this regulatory focus on infection control was based on practices to prevent surface and droplet transmission and not airborne transmission.

FINANCIAL AND IN-KIND ASSISTANCE TO IMPROVE INFECTION CONTROL In addition to regulatory oversight, nursing homes received financial and in-kind assistance from the federal government and states. Almost $10 billion was allocated to nursing homes under the 2020 Coronavirus Aid, Relief, and Economic Security (CARES) Act through the Provider Relief Fund and the Paycheck Protection Program, with ad-

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ditional funds from the American Rescue Plan Act of 2021.[14] Unlike other types of providers, nursing homes received $2 billion of this assistance in the form of a quality incentive program designed to tie assistance to performance.[15] CMS disbursed these payments to the facilities it judged to have lower numbers of COVID-19 cases and deaths relative to infection levels in the surrounding community. However, subsequent research showed that although some infection control practices were associated with receipt of these payments, the county rate—and not the facility rate—of infection largely determined which nursing homes were rewarded, contrary to intent.[16] The absence of a reduction in infections at the facility level in response to these incentives was consistent with a false premise that nursing homes had the tools to counter an airborne virus when it was prevalent in the community.

In-kind federal assistance to nursing homes was aimed at relieving shortages of COVID-19 testing materials and PPE in summer and fall 2020, amid continued supply-chain issues. In May 2020, the Federal Emergency Management Agency began shipping a two-week supply of PPE to all nursing facilities nationwide. However, these shipments were plagued with problems, ranging from PPE that never arrived to PPE that was outdated or unusable.[17,18] In-kind assistance with testing supplies faced similar challenges. In mid-August 2020, the federal government distributed point-of-care testing to facilities in hotspot counties. However, by September 2020, fewer than 17 percent of nursing homes in these counties had a test turnaround of less than one day.[19] Even if helpful in some facilities, these shipments were temporary stopgaps that did not solve longer-term challenges of securing critical supplies.

State and local assistance varied widely, from assistance with obtaining PPE to deployment of emergency "strike teams" or the National Guard to alleviate staff shortages during outbreaks. About half of the states increased their Medicaid payment rates to nursing homes, sometimes tied to staff salaries.[14] In the absence of federal guidance, states also experimented with policies aimed at relieving hospital overcrowding, such as mandating that nursing homes accept COVID-19-positive patients discharged from the hospital or sending such patients to regional "hubs" for postacute care.[20] As it became clear that the virus could not be geographically contained and that every nursing home needed to be prepared for an outbreak, these experiments were discontinued.

EVIDENCE ON INFECTION CONTROL PRACTICES AND POLICIES A substantial body of evidence has emerged about the facility characteristics associated with resident cases and deaths.[21] Perhaps the most surprising finding was that rigorous studies found that prior performance on infection control practices was unrelated to COVID-19 infection rates and mortality.[22–25] This was also true of quality in general.[25–28] In contrast, the strongest and most consistent facility-level determinants of COVID-19 outcomes were facility size and location: Large facilities with many staff members entering the building each day were more at risk, as were facilities in counties with high COVID-19 prevalence.[21] Early in the pandemic, race was also strongly correlated with the number of cases and deaths, but this effect was largely explained by facility size and location.[29] These findings indicate that even high-quality nursing homes with good infection control procedures were at risk in virus hot spots, consistent with almost 100 percent of facilities experiencing an outbreak in the first year of the pandemic.[30]

Beyond facility-level correlates, evidence on the effectiveness of specific infection control practices is limited; given the urgency and variability with which new practices were implemented, careful research designs were not prioritized. For example, there is a dearth of rigorous research connecting the use of PPE to the mitigation of outbreaks in the nursing home setting. One exception is a recent study suggesting that facilities that used rapid testing for staff had lower numbers of COVID-19 cases and deaths, especially before vaccines became available.[31] Nonetheless, a general consensus emerged that frequent testing, use of PPE, and isolation of COVID-19-positive residents were foundational infection control measures.[32]

Visitor Bans

In addition to evolving infection control practices, nursing homes were essentially locked down as of March 2020, based on federal guidance,[33] with the elimination of congregate meals and activities as well as a ban on visitors except in very limited circumstances. At the onset of the ban, any measures to reduce outbreaks were thought to be worth the associated harms. However, as the pandemic continued, the wisdom of isolating older adults, many with cognitive impairment, became less clear. Several strong studies revealed that staff were the primary vectors bringing the virus into facilities,[24,34,35] and there was no evidence that well-controlled visitation and personal care provided by family would further increase the risk for infection transmission. Studies also revealed the unintended human costs of isolation, linking it to depression and anxiety, weight loss, functional decline, and ear-

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lier death.[36,37] In recognition of these human costs, seventeen states implemented "Essential Caregiver" programs, allowing regular visitation of nursing home residents by a designated friend or family member to help with care. A study of these programs showed reduced resident death rates.[38] In March 2021, the federal guidance banning visitors was lifted.

Vaccination Of Residents And Staff

The emergence of effective vaccines against COVID-19 in late 2020 became a significant turning point for nursing home operators, residents, and their families. In concert with the Pharmacy Partnership for Long-Term Care Program, the vast majority of nursing home residents were fully vaccinated against COVID-19 (early variants) by spring 2021.[39,40] This was accomplished by holding day-long vaccine clinics at which a pharmacy partner would visit and administer vaccines to all willing residents and staff. Most residents were receptive. Until this program, despite changing policies and practices over time, rates of COVID-19 infections and deaths in nursing homes were closely correlated with community prevalence and deaths.[35,41] The vaccination campaign was associated with a dramatic drop in resident deaths, breaking this strong correlation for the first time (exhibit 3).

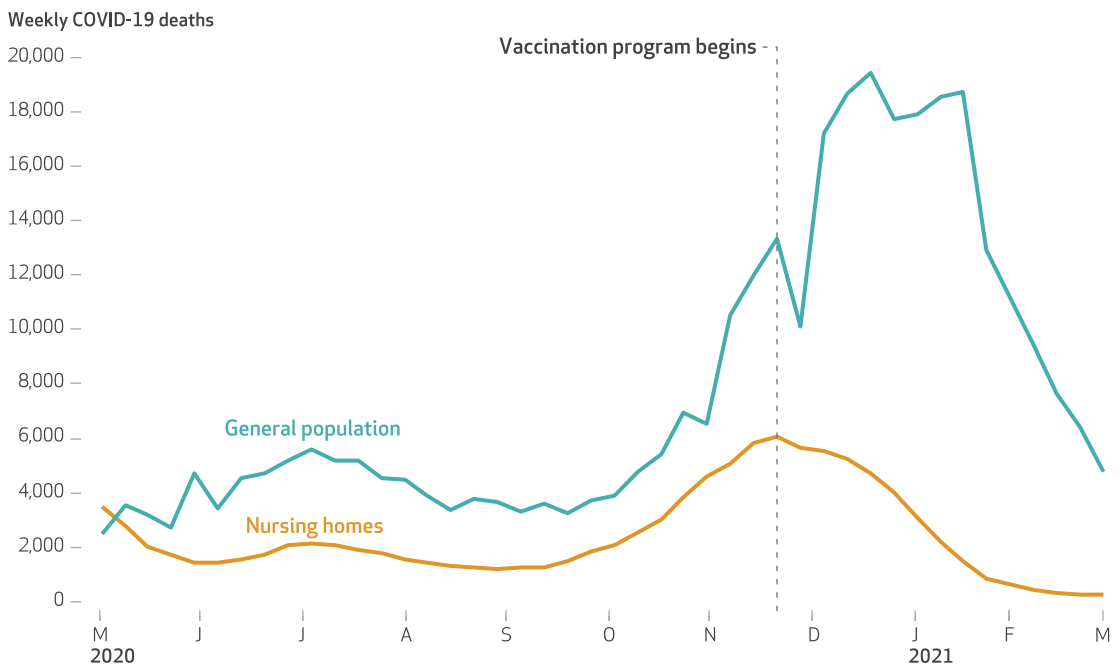
Getting staff vaccinated, although critical, proved to be more challenging because of vaccine hesitancy or resistance,[39] compounded by limited access to vaccines by staff working night shifts.[42] By August 2021, only 63 percent of nursing home staff, on average, had received a COVID-19 vaccination.[43] Despite educational campaigns, on-site access to vaccine clinics, relaxation of PPE requirements for vaccinated staff, and even financial bonuses, staff vaccination rates did not dramatically increase while vaccination was voluntary. Individual facilities and chains were reluctant to mandate vaccinations because they feared that staff would move to competitors that did not have mandates.

Twelve states mandated vaccination among staff during the summer and fall of 2021. A federal mandate requiring vaccination for all health care workers, including health care workers in nursing homes, was issued on November 5, 2021,[44] and, after the resolution of multiple legal challenges, was implemented on March 15, 2022.

After the federal mandate was in force, staff vaccination rates nationally increased to 88 percent.[43] One study indicated that on average, a 10-percentage-point increase in staff vaccination rates would have prevented more than 20,000 resident deaths nationwide in 2021.[45] Thus, research reinforced that the staff vaccination man-

EXHIBIT 3

Comparison of US COVID-19 deaths in the general population and in nursing homes, by week, May 2020–March 2021



SOURCE Authors' analysis of data from the Centers for Disease Control and Prevention National Healthcare Safety Network merged with community COVID-19 prevalence data from USAFacts.org.

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date achieved higher rates of staff vaccination than voluntary efforts, which in turn reduced COVID-19 cases among residents and saved lives.[45–47]

Once the Omicron variant emerged, the original two-dose regimen of the Pfizer-BioNTech or Moderna vaccines alone was less effective in preventing nursing home deaths. Vaccine boosters became available in fall 2021, and bivalent boosters targeting Omicron became available in fall 2022,[48] but the staff vaccination mandate did not include boosters, and the federally organized partnership vaccination campaign was not repeated for booster shots. As a consequence, rates of both residents and staff completely up to date on COVID-19 vaccination (including appropriate boosters) fell substantially, similar to slow take-up of booster shots in the general population.[49] This drop in full vaccination after late 2021 coincided with multiple surges in COVID-19 cases and deaths in nursing homes (exhibits 1 and 2), in contrast to the lull experienced in the spring and summer of 2021 after the first vaccination campaign.

Staffing Levels

Given the central role that nurses and other direct care staff play in nursing homes, inadequate staffing in nursing homes has long been considered a barrier to quality.[3] During the pandemic, chronic staffing shortages were exacerbated by staff contracting COVID-19, quitting to avoid contracting COVID-19 and potentially infecting family members, or needing to be home with children attending school remotely.[50] At the same time, the pandemic led to more demands on staff time to implement the best practices described above. Accordingly, multiple studies found that higher staff-to-resident ratios marginally reduced case fatality rates during an outbreak.[23,28,51–53] However, the magnitude of these effects was generally small compared with the effects of facility size and community prevalence of COVID-19. In addition, more staff meant more traffic into and out of a facility, increasing the likelihood of an outbreak to begin with.[52,54] Staff living in crowded communities, taking public transportation, and often working in multiple facilities became the dominant transmission vector, especially when staff members were asymptomatic.[24,34] Thus, despite the importance of adequate staffing for nursing home quality, there is little evidence that low staffing was a primary cause of nursing home resident mortality from COVID-19.[21]

Lessons Learned

Perhaps the most important lesson to be drawn from the COVID-19 pandemic in nursing homes is that common assumptions about the nursing home sector (including that low-quality, profit-seeking nursing home operators failed to follow appropriate procedures, leading to bad outcomes[55]) did not offer a sufficient narrative to explain the COVID-19 trajectory in nursing homes. Given that even the highest-quality homes experienced outbreaks and that performance on infection control standards was not predictive of outbreaks, this was not just a "bad apples" problem of low quality in some facilities. Rather, COVID-19 was a novel challenge that revealed systemic problems, requiring systemic solutions.

The absence of a "bad apples" problem means that traditional approaches to quality improvement would not have solved the challenges associated with COVID-19. Several major types of policies fall into this category. First, focused policy efforts to improve infection control practices during the pandemic were likely necessary but not sufficient. Additional training and inspections by regulators may have avoided some transmission of COVID-19 and may be important in avoiding transmission of other common pathogens in nursing homes, but these efforts likely had only marginal effects on the total COVID-19 death rate. Even dramatic improvements in infection control, including those that risk unintended harms for residents, may do nothing to avoid deaths in the next pandemic. Similarly, efforts to improve nurse staffing levels, although essential to mitigate long-standing quality deficits in the industry, are not a panacea. Proposed regulations by the Biden administration to substantially increase nurse staffing levels, for example, have the potential to lead to meaningful improvements in quality. However, research indicates that higher staffing levels would have had a relatively small impact on COVID-19 deaths.[24]

POLICY RESPONSES THAT WORKED Turning to what did work, it should be noted that evaluations of policies and practices during the pandemic were facilitated by the CDC mandating weekly data reporting directly from nursing homes on cases and deaths (and eventually vaccination rates) as of late May 2020. Although the evidence on best practices is still sparse, these data enabled essential analysis and monitoring as the pandemic unfolded.

Perhaps the single most successful policy with respect to nursing homes during the pandemic was the Pharmacy Partnership for Long-Term Care Program, which was effective in getting the vast majority of nursing home residents vaccinated and resulted in the dramatic drop we

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Common assumptions about the nursing home sector did not offer a sufficient narrative to explain the COVID-19 trajectory in nursing homes.

observed in nursing home deaths. A close second is that mandating (not just encouraging) staff vaccination was effective in increasing staff vaccination rates, which in turn was associated with a meaningful drop in resident deaths. After these organized federal efforts ended, resident and staff vaccination rates fell, and resident deaths increased. A clear lesson for this and future pandemics is that these policies worked.

ROLES OF COMMUNITY PREVALENCE AND PLANNING The evidence on facility-level predictors of adverse COVID-19 outcomes also offers clues as to potential systemic solutions. First, area-level prevalence of COVID-19 was a consistently strong predictor of outbreaks and deaths in nursing homes. This implies that nursing homes are embedded in their communities and that residents' health outcomes are difficult to separate from the health of the community, especially in the case of an airborne, highly transmissible virus. This connection to the community points to important, more systemic solutions that could make a meaningful difference in preparedness for the next pandemic. Although nursing home managers need to have appropriate disaster plans, nursing homes cannot be viewed as completely independent actors that can protect residents even in the absence of a strong public community health system. In addition, nursing homes, and long-term care in general, need to be much better integrated into local, state, and federal disaster planning.[56] Much of the public health focus during the early days of the pandemic was on hospitals; nursing homes were left to fend for themselves in terms of acquiring PPE and testing materials. This was by design, as public health plans often do not consider long-term care as part of the health care system,[56] to the detriment of nursing home residents and staff.

STRUCTURAL CHARACTERISTICS OF FACILITIES The second consistently strong predictor of adverse COVID-19 outcomes in nursing homes was facility size, with larger facilities at higher risk. Although data on room occupancy are hard to come by, many larger facilities also have multiple residents per room, amplifying the risk for transmission.[57] In the short run, these structural characteristics would be difficult to change, but this may be an opportune time to rethink the physical structure of nursing homes. At this time, much of the nation's nursing home capital stock is reaching its maximum lifespan and will need to be replaced. In addition to issues such as improving ventilation in nursing homes (which has attracted far too little research and policy attention, perhaps because of a lack of data), the size and room occupancy of nursing homes are changeable in the longer run. Long before the pandemic, advocates called for building smaller, more homelike settings with private rooms for people who need a nursing home level of care. Although the main impetus for private rooms is to improve quality of life, an added benefit is infection control. Models such as Green House, which combine smaller settings with alternative, less institutional staffing roles, have attracted wide appeal and seem to have fared somewhat better during the pandemic.[58] However, these models have not been replicated on a large scale, in part because of skepticism about cost. Given constrained public funding, a meaningful move toward smaller nursing homes with private rooms would likely require additional funding and political will. However, improvements in quality of life as well as reduced risk for death in the next pandemic may well be worth it.

SHORTER-TERM SOLUTIONS These longer-run systemic solutions—improving public health planning and reducing the size and room occupancy of nursing homes—are difficult, but they will provide the largest payoff in terms of avoiding deaths in nursing homes for the next pandemic. In the shorter run, there are solutions that can make a small difference. Organized vaccination programs (such as the partnership program) and mandating vaccinations for staff are effective, once a vaccine exists. Surveillance testing, which requires the availability of tests, is often effective in identifying infections early enough to prevent further transmission. Best practices for infection control need to consider the adverse consequences of social isolation for residents; the use of rapid tests can facilitate social interaction to minimize these consequences.

Higher staffing levels and better infection control, as difficult as they are to achieve, are easier than the more systemic solutions of better public health planning that includes long-term care and

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rethinking the capital stock of the industry. Those easier solutions are well worth pursuing in the short run, but they alone will not prevent similar outcomes during the next pandemic. For that, more fundamental reform of the public health system and the prevailing physical plant of most nursing homes is needed. ■

The authors thank Soham Sinha for research assistance. To access the authors' disclosures, click on the Details tab of the article online.

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