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Letter to the Editor

COVID-19 vaccine effectiveness in adults with developmental disabilities living in group homes

This report follows up on our initial description of drive-through vaccination for developmentally disabled adults.¹ In this report, we describe the mortality of a population of developmentally disabled adults in group homes in New York State before and during the implementation of a vaccination program. The impact upon mortality of the available three licensed COVID-19 vaccines is yet to be studied in developmentally disabled adults living in group homes.²

Patients with developmental disabilities are uniquely susceptible to COVID-19 based on congregate living conditions and noncompliance with masking and social distancing. They often have comorbidities such as recurrent aspiration pneumonia with resultant chronic lung disease, obesity, diabetes (insulin resistance), and concomitant mental health conditions, which are well recognized additional risk factors for severe COVID-19.³

COVID-19 exposure to residents of group homes is amplified due to the number of caretakers (3 shifts/day) and high vaccine hesitancy among caretakers.⁴ Group home staff continue to be exempt from vaccine mandates in New York State facilities as of this date in the presence of high levels of COVID-19 infection in the community.⁵ Developmentally disabled adults in congregate settings and their staff are designated the highest priority for COVID-19 vaccination due to the increased COVID-19 risk. One-third of COVID-19 deaths occurred in nursing homes, assisted living and congregate settings.⁶ Landes et al. (2020)⁷ reported a 6.4% mortality from COVID-19 among 543 developmentally disabled residents of group homes from March through October of 2020.

This report describes the change in COVID-19 mortality during the first year of infections (2020) compared to the succeeding year when mRNA vaccinations were implemented. The Pfizer/BioNTech product, Comirnaty[®], and the Moderna product, Spikevax[®], were primarily used for the vaccination program with a few residents receiving Janssen COVID-19 vaccine. Vaccinations began in January 2021 and were accomplished with home visits and a drive-through program by April 2021. Consent was obtained whenever possible from the patients themselves and when not possible from family or legally constituted surrogates. There were 63 residents whose consenting authority refused vaccination. This allowed the investigators to compare mortality rates between the vaccinated and unvaccinated residents in 2021 in a nonrandomized, observational 'real world' setting.

Study Subjects: Residents of group homes described in this report include people with uncomplicated intellectual disability (IQ < 70), people with developmental disability (low IQ and various

genetic conditions), people with both developmental disability and high-risk medical conditions (e.g., seizure disorder, cerebral palsy, obesity, diabetes, chronic lung disease) and people with developmental disabilities and psychiatric/forensic histories. Subjects' ages and sex distribution are displayed in Table 1.

Vaccine records were complete and there were no admissions to the homes during the observation period without COVID-19 vaccination information. Deaths for all residents during the 2 years of observation were reviewed by the authors. COVID-19 contribution to death was confirmed based on history, physical examinations in the hospitals, laboratory testing and imaging in the hospitals. Each death was reviewed on two separate occasions. One review was in the week following the death and again reviewed during the drafting of this paper. COVID-19 was considered to be a contributing cause of death if the pathologic process leading to death included worsening respiratory failure independent of aspiration events or new-onset cardiogenic shock without infarction. No gastrointestinal events led to death and no patient died of stroke during the observation period. Total census figures for December of each year were used for calculations — 679 residents for 2020 and 676 residents for 2021. Confidence intervals were calculated using Clopper-Pearson exact method (see Table 2).

The 8 deaths in 2021 had the following characteristics: four were unvaccinated, two had a single mRNA vaccine dose, and two had two mRNA vaccines 2 weeks or more before the COVID-19 diagnosis. Three unvaccinated patients died before the vaccine campaign began. One patient's family refused COVID-19 vaccination. Total COVID-19 mortality in 2021 in the entire resident population was 1.2%; however, the mortality among the unvaccinated was 9%. Total mortality in 2020 among group home residents was 3.2% when the circulating variants were primarily Alpha and Beta. Our data for analysis of vaccine effect is only based on 2021 data after vaccine was available and the primary circulating variant was Delta. The following can be calculated:⁸

Absolute risk reduction in 2021 once vaccine was introduced was 8.7%. The number needed to treat to prevent one death was 12. Lastly, the COVID-19 vaccine effectiveness at preventing mortality was 97%. We puzzled at the lower total mortality rate for all residents in 2020 compared to 2021 before vaccines were available. The CDC reported that a four-fold mortality increase was observed among unvaccinated persons when Delta variant emerged in 2021.⁹ Our experience of a three-fold increase in mortality is consistent with the CDC report and our small sample size.

Table 1
Age and sex distributions by year of study.

Year	Mean age (yrs) (% over 65 yrs)	Sex (% male)
2020	60 (47% over 65 yrs)	56
2021	63 (43% over 65 yrs)	56

Table 2
COVID-19 mortality by year.

Year	COVID-19 mortality [95% confidence interval]
2020	22/679 = 3.2% [2.0–4.9]
2021	8/676 = 1.2% all residents [0.5–2.3] 6/67 = 9% unvaccinated residents [6.3–24]

Our vaccine experience confirms the effectiveness of the mRNA vaccines that were administered to the residents. The US Centers for Disease Control provide ongoing monitoring of Vaccine Effectiveness and the most current data (Autumn 2021) shows between 80 and 90% effectiveness at preventing hospitalization.¹⁰ Iannou et al. (2021)¹¹ published the Veterans Administration elderly subset experience and reported 86% vaccine effectiveness against COVID-19 mortality up through June 2021. Often the cohort of residents of group homes has two or more comorbidities, so we expect a higher mortality rate as well as less vaccine efficacy based on population studies.¹² In addition, we implemented the use of monoclonal antibodies REGEN-COV® (bamlanivimab/etesevimab) and sotrovimab when we had consent and could obtain monoclonal antibodies in the community. We assume severe disease was prevented by their use. This ceased with the Omicron wave in 2021 as the supply of efficacious monoclonal antibodies rapidly dwindled. Consequently, the impact of monoclonal antibody treatment on overall mortality is likely to have been small. Among the potential biases impacting the observed difference in mortality between the vaccinated and unvaccinated residents, prioritization of vaccination for residents who require the most care may have skewed the observations. In addition, potential geographic variations in localized COVID-19 outbreaks may have corresponded to locations where vaccination acceptance was low. This is the first report of vaccine effectiveness in a population of developmentally disabled adults living in group homes and displays robust vaccine effectiveness against mortality from COVID-19.

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