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# The house is a machine for *everything*: the role of the built environment in group homes during the COVID-19 pandemic

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## ABSTRACT

*Objectives:* Individuals living in group homes during the COVID-19 pandemic faced unique challenges and health risks related to living in shared spaces. This study aimed to assess the experiences of living and working in a group home during the pandemic and to explore the role of the built environment.
*Study design and methods:* We conducted longitudinal working groups with group home residents with intellectual and developmental disabilities and serious mental illness, group home staff, and families/caregivers of residents from December 2020 through December 2022. Common themes highlighting ways in which group home residents, staff, and caregivers perceived the built environment to impact living in a group home during the COVID-19 pandemic were identified.
*Results:* Resonant themes centered around increased risk of COVID-19 infection, ad hoc spatial adaptations for infection control, space-related challenges due to isolation and quarantine requirements, and limited access to public spaces.
*Conclusion:* Group home residents and staff experienced multiple health and wellness challenges during the COVID-19 pandemic related to their surrounding built environment. Mechanisms to engage group home residents in modifications of their built environment may improve the effectiveness of infection control policies while acknowledging individual autonomy.
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## Introduction

One hundred years ago, Swiss-born architect and city planner Le Corbusier proclaimed in 1923 that 'the house is a machine for living in,' arguing for more efficient living spaces and the design of buildings that function as tools for living.[1] Living spaces, Le Corbusier argued, should be created to match the design of a space with its intended function, declaring 'styles no longer exist for us.' A house, accordingly, was for living, and thus the design of and furnishings within should be reduced to its most essential and elemental qualities to allow for living and nothing more.

The last three years of the COVID-19 pandemic have shed new light on what functions a house can provide. With people spending increased amounts of time indoors and with a newer understanding of how the virus spreads through air, there is a new appreciation for the design of living spaces.[2–4] Indeed, with many people working from home throughout the pandemic, Le Corbusier's adage may require an expanded interpretation. A house is not just for living but also for working, or simply existing during the pandemic. Indeed, a house has been a machine for *everything* during the pandemic. The multipurpose function of a house is particularly true for individuals living in group homes.

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A shift from institutional care to community-based care for individuals with intellectual and developmental disabilities (ID/DD) and serious mental illness (SMI) in the USA has led to an increase in these populations living in group homes.[5,6] Nearly 4 million individuals with ID/DD are estimated to live in congregate living settings in the USA.[7,8] Adaptations to the built environment can optimize living and the functional status of individuals with ID/DD. Design adaptations, such as ceiling height, room size, and the ability to alter rooms with portable walls, sight lines, lighting, and furniture placement and materials, stimulate the auditory, visual, and tactile senses to support learning and acceptable behavior.[9] For individuals with SMI, living environments that are small-scale, well-constructed, non-institutionalized environments can decrease the risk of disruptive behaviors.[10]

The COVID-19 pandemic introduced another concern for individuals in group homes, namely the spread of infection. Many countries around the world experienced outbreaks in group living environments during the first year of the pandemic, most notably in nursing homes, migrant worker residences, and student dormitories.[11–14] While nursing home outbreaks have received widespread media coverage in the USA, and leaders in design have begun exploring housing design adaptations to promote safer spaces and reduce the risk of disease transmission,[15] there has been relatively little focus on the impact of COVID-19 on group homes for individuals with ID/DD or SMI. Concerningly, individuals with ID/DD living in a group during the pandemic were similarly found to have an increased risk of COVID-19 infection and severe outcomes, including death.[16] Additionally, given the significant mental health impacts of COVID-19 lockdowns,[17] it is particularly important to understand the impact of pandemic-related stay-at-home requirements on individuals with SMI living in group homes, a population at high risk for depression and anxiety.

In this paper, we explored the experience of people with ID/DD and SMI living and working in group homes during the COVID-19 pandemic. We assessed the experience of individuals with ID/DD and SMI living in group homes, staff working in group homes, and family and caregivers of individuals with ID/DD and SMI in group homes. Participants identified unique features of group home living: challenges thatincreased the risk for infection and opportunities that facilitated resident safety and coping during the pandemic.

## Methods

### *Theoretical framework and eco-sociological model*

This study is informed by the theoretical framework of an eco-sociological model that posits that group homes do not exist in isolation but rather sit within a larger societal ecosystem. Group homes, along with nursing homes and other congregate living settings, are unique ecosystems that are guided by a combination of federal, municipal, and internal policies. In addition, ad hoc external policies that are either government-initiated or facility-initiated, or initiated at a combination of levels, such as has been the case during the COVID-19 pandemic, may impact how group homes operate and the lived experience of group home residents. At any given moment during the pandemic, therefore, multiple policy layers contributed to the living experience of group home residents (Fig. 1).

### *Participants*

We reviewed stakeholder working groups conducted with group home residents, staff, and family/caregivers from December 2020 to December 2022. The working groups were part of a larger study on improving COVID-19 outcomes in group homes that was reviewed and approved by the Mass General Brigham Institutional Review Board.[18] Seven separate working groups (WG) were formed that included one ID/DD group home resident WG, one ID/DD group home staff WG, one ID/DD group home caregiver/family WG, one SMI group home resident WG, one SMI group home staff WG, one SMI group home caregiver/family WG, and one joint ID/DD and SMI group home clinical staff WG (Supplementary Material). Working groups included five to eight participants who met every one to two months by video for 60–90 min to discuss their experiences related to living in, working in, or having a loved-one living in a group home during the COVID-19 pandemic. Eligible residents lived in, and eligible staff worked in a group home within six Massachusetts organizations serving adults with ID/DD and/or SMI. Family members and caregivers of eligible residents were eligible to participate. Verbal consent was obtained from all WG participants prior to participation. Participants received forty dollars per hour as remuneration for participation in each working group. All working groups were conducted in English and recorded with the consent of participants.

### *Data collection*

Information on the built environment was collected from all working groups throughout the study. Each working group session followed a similar format, beginning with an open discussion forum during which participants could express any challenges, concerns, or experiences related to living in a group home during the COVID-19 pandemic. In addition, to ensure participants reflected specifically on the role of the built environment in group homes during the pandemic, a discussion guide was developed that

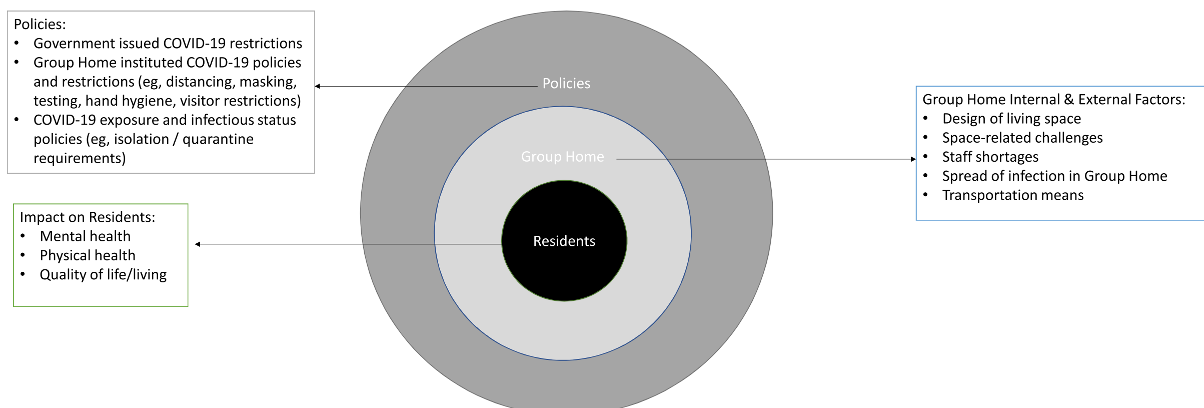


**Fig. 1.** Ecological model on the role of the built environment in group homes during the COVID-19 pandemic.

included a series of questions with probes and prompts specifically on the built environment (Supplementary Material). While the discussion guide included both open- and close-ended questions, participants became comfortable with other working group members throughout the course of the study and most often provided contextual and clarifying information in their responses regardless of question type. Built environment topics developed for the purpose of this study focused on the impact of the COVID-19 pandemic in group homes, including the use of shared living spaces and rooms, policies around settings for shared/private meals, use of the indoor and outdoor built environments, and use of technology to replace in-person activities. Built environment topics were informed by design theory, recent guidelines, findings, and science on COVID-19 and shared living spaces and underwent review by the interdisciplinary study team. The built environment discussion guide was used in each working group from November through December 2021. All discussions related to the built environment in working groups throughout the above study period were reviewed as part of this study.

### Data analysis

All working groups were transcribed using TranscribeMe software. Deductive coding was used to analyze the transcripts using a predefined coding frame grounded on existing literature, current design, and architectural theory, and formative discussions with group home residents, staff, and caregivers. All coding was done using Dedoose, a cloud-based data analysis package, with two coders reviewing all the raw data. Hierarchical framing was used to organize codes by respondent (group home resident, group home staff, caregiver, clinical staff) and theme. All transcripts were reviewed, coded, and grouped by theme independently by two study team members (CM and CC), with a third arbiter (NMO or KI) deciding on any disagreements.

## Results

Transcripts from 23 distinct stakeholder working group sessions were coded, providing a total of 324 coded excerpts and 375 codes, with several excerpts providing multiple codes. Nine unique topics were coded from the working group transcripts: *Infection Control, Permanent and Modifiable Infrastructure, Novel Adaptations, Policy and Food, Visitation, Recreation and Use of Outdoor Space, Technology and Communication, Transportation,* and *COVID-19 Created Need for Space*. After coding the manuscripts, a content analysis revealed key issues and themes. We identified themes, common across working groups, that we grouped as those primarily occurring inside the group home (Table 1), representing eight themes, and those primarily occurring outside the group home (Table 2), representing three themes. The quotes provided for each theme highlight the multiple ways in which working group participants perceived the built environment to have an impact on or be impacted by living in a group home during the COVID-19 pandemic.

The most frequently reported themes were: *spatial adaptations within group homes were required to optimize infection control* ($n = 75$), *group homes have unique space-related challenges with enacting & maintaining isolation/quarantine requirements* ($n = 46$), *having access to public spaces was important and helpful to group home residents during the pandemic* ($n = 45$), and *living in a group home increases the risk for COVID-19 infection* ($n = 22$). These recurrent themes underscored that individuals living and working in group homes recognized that not only did living in a group home environment present unique challenges during the pandemic, but that many challenges were directly related to the design of livable spaces within group homes and the adaptability of these spaces to conform to novel pandemic-related space and infection control needs.

Overall, responses showed understanding of the increased risk for COVID-19 infection and the difficulty of preventing the spread of a highly contagious infection in a group home setting during a pandemic. More broadly, participants discussed the impact of the group home living environments on the overall health of residents during the pandemic beyond simply limiting the spread of COVID-19. Stakeholder responses illustrated the substantial impact of living in a group home during the pandemic, including the harmful effects on health such as limiting physical activity levels and the deleterious impact on mental health. The responses also illustrate an understanding of how people perceive the group home spaces they live and work in, and group homes residents' negative reaction to changes in their living space.

Participants discussed the central roles of bedrooms, bathrooms, dining rooms, and outdoor spaces during the pandemic. Seemingly impromptu solutions to limit infection spread and maintain daily routines led to new policies pertaining to the use of space, both temporary and long term. Confinement challenges within shared living spaces were commonly reported, with varying concerns related to infection control, mental health and boredom, and policy adherence by families, residents, and staff, respectively. All working group participants emphasized the vital role of living spaces in group homes for populations with ID/DD and SMI.

## Discussion

Group home residents and staff experienced multiple challenges during the COVID-19 pandemic, including increased infection risk, disruption of routine activities, and built environment challenges that both limited the ability to properly protect against infection risk but could also be used creatively to adapt to unprecedented circumstances never previously experienced by group home residents and staff. The primacy of these design elements is directly related to and amplified by living in a group home setting, as compared to living in a private home. Group homes consist of a communal dwelling environment that co-houses multiple non-related individuals with varying levels of autonomy and dependence. Residents rely on having multiple outside staff, with varying outside exposure risks, enter and exit the dwelling every day to assist residents. Under these unique circumstances, many of the themes identified by stakeholders have in common an awareness and recognition that space matters. Living spaces, including the layout and size of the living spaces in group homes, are important for the ability to properly institute the recommended preventive measures during a pandemic. Examples include the presence of individual bedrooms and separate bathrooms, access to properly spaced seating in common areas and dining rooms, and proper ventilation. In addition to indoor living spaces, group home residents and staff also clearly understood and articulated the importance of having access to public spaces, both as a means for achieving social interaction, entertainment, and escape, but also as an important opportunity for the promotion of physical activity, and the overall impact that having a lack of or restricted access to outdoor spaces had on their physical and mental health. Public spaces represent important and essential venues in society for gathering, socialization, exchange of ideas, manifestation, and reflection.[19] Group home residents, like all individuals, clearly identified the harm to their psyche and health that they endured during the pandemic due to their decreased access to public spaces. With much recent emphasis placed on the importance of community integration for individuals with disabilities,[20] ensuring access to public spaces provides a key pathway for facilitating the integration of group home residents with their surrounding

**Table 1**
Built environment themes occurring inside the group home during the COVID-19 pandemic.

| Theme | Working group participant and sample quote (Month, Year) |
| --- | --- |
| Group homes have unique space-related challenges with enacting & maintaining isolation/quarantine requirements | • *ID/DD Resident*: 'We are trying to prevent people from getting sick. And the only way you can do that is by social distancing. But how can you do that in a group home? You can't.' (December 2020)<br>• *Clinical Staff*: 'If they tested a whole house, the whole house was positive. There was no PPE. Nobody was masking …. People just stayed there. They didn't leave. They walked around the house unmasked. The staff. The clients.' (September 2021)<br>• *Clinical Staff*: 'They are not isolated. There's no way to keep any patient isolated right now. They're just moving around in the program. I mean, how do you control an SMI (serious mental illness) patient that refused to get isolated?' (September 2021) |
| Routine group home activities were disrupted during the COVID-19 pandemic | • *Clinical Staff*: 'We're not doing large meetings … we're meeting outside.' (May 2021)<br>• *Clinical Staff*: 'There have been more video meetings, less taking people out or meeting in public places, and fewer parties and gatherings.' (May 2021)<br>• *ID/DD Resident*: 'That's why I go home, because at home I have more freedom … here, they have to wear this mask.' (November 2021) |
| Living in a group home increases the risk for COVID-19 infection | • *ID/DD Resident*: 'Somebody in my house … had the virus. And it turns out that one person had spread basically to everybody else.' (December 2020)<br>• *ID/DD Resident*: 'It's hard to social distance everybody in a group home.' (December 2020)<br>• *ID/DD Caregiver/Family*: 'When everyone else goes home, you can take a mask off in your home, but he can't.' (August 2021)<br>• *SMI Staff:* 'They're going out to the community with no masks and then they come back into the program and let's say they do test positive, now they have just infected everybody else as well. So it's just putting everybody's health at risk.' (December 2020) |
| The designs of current group home living spaces were not adequate for prevention of COVID-19 transmission during the pandemic | • *ID/DD Caregiver/Family*: 'They have a communal living room … two of them (residents) shared a bathroom and our son didn't. So he lucked out. They do gather in the living room to eat meals and watch TV or play board games … so there is the possibility of the passage of COVID from one to another.' (January 2021)<br>• *SMI Staff:* 'Most of our residents on the second floor have pretty good mobility, and are able to get up and down the stairs … I think if we had COVID in the house, that would be a challenge with the stairs.' (January 2022)<br>• *ID/DD Caregiver/Family*: 'People don't distinguish between square feet and cubic feet. The 6 feet rule does not account for heights of ceilings … and air flow, which is so important in COVID transmission.' (December 2021) |
| Spatial adaptations within group homes were required to optimize infection control | • *ID/DD Staff:* 'One of my programs has a rotating schedule for everything, from who holds the remote to the front seat in the van, to who does the laundry, to who cleans up after dinner.' (January 2022)<br>• *ID/DD Staff:* 'We did not allow people to get together in the dining room. We created a space, each person had a seat where we placed the name of the person. And they all knew. My seat is here.' (November 2021)<br>• *ID/DD Staff:* 'They used to eat all at the dining table, but we … had to reduce it to two, to three. So the three will eat first, and the other will eat after so we can do the social distancing.' (November 2021) |
| Communal living in small spaces is challenging during a pandemic | • *ID/DD Staff:* 'One listens to a book and one listens to her music. But I's an apartment, so it's not that big. So we just keep them on opposite ends of the room so they can't hear each other. But it's like there's no amount of space that's big enough for the two of them anymore.' (January 2022)<br>• *ID/DD Staff:* 'Four of my six programs are in apartment buildings. It's very small, four walls. You don't even have an outdoor space. So I know a fair amount of individuals are also like, just get me out of here, I'll do whatever I got to do.' (December 2020)<br>• *ID/DD Caregiver/Family:* 'He was isolated and quarantined to a one room, so that's severely limited his built environment that he could use.' (December 2021) |
| There are multiple challenges to enacting and maintaining isolation/quarantine requirements in group homes | • *Clinical Staff:* 'They are not isolated. There's no way to keep any patient isolated right now. They're just moving around the program. They refuse.' (September 2021)<br>• *ID/DD Resident:* 'We're allowed to use spaces within the home. There's no restrictions, really, within the home. But if we go outside, we have to wear a mask.' (November 2021)<br>• *ID/DD Staff:* 'The challenge was difficult for some of these folks to actually follow all the safety protocol, like wearing a mask, washing their hands.' (December 2020)<br>• *ID/DD Staff:* 'Prior to the pandemic, things used to be different, but now people know not to just cluster together in one place.' (November 2021) |
| Some built environment and design elements within group homes can be protective during a pandemic | • *ID/DD Caregiver/Family:* 'Two roommates had COVID and recovered well in their separate bathroom situation.' (January 2021)<br>• *ID/DD Caregiver/Family:* 'Intuitively, we know it's better not to be in a building with a lot of people with elevators. Which, in some ways, is the definition of what a lot of group homes, especially psychiatric rehab group homes, are.' (December 2021)<br>• *SMI Caregiver/Family:* 'They had their own bathroom and their own bedroom, which they had to stay in.' (January 2021) |

community. Consideration by group home agencies for future pandemic preparation should include approaches for maximizing safe environments for sleeping, toileting, dining, and common area utilization, as well as, include plans for maintaining access to outdoor spaces, including identifying ways to promote safe use of public spaces, including during infectious disease outbreaks.

The themes identified by group home staff and clinicians also demonstrated the need for innovation, as group home staff realized early on during the pandemic that they needed to adapt rapidly to evolving COVID-19 precautions and changing policies, at times by developing on the fly adaptations. While public health recommendations directed shared living facilities including group homes

**Table 2**
Built environment themes occurring outside the group home during the COVID-19 pandemic.

| Theme | Sample quotes |
| --- | --- |
| Using transportation helped residents to understand and process the pandemic | • *ID/DD Staff:* 'I had to take them out for a ride, drove them to their usual bowling alley to see that the place was closed … just to make sure that they saw that the place was closed.' (December 2020)<br>• *ID/DD Staff:* 'Sometime when we get there, we have to drive around before we find a spot. The whole place was empty. So when they see that … they are able to come to terms with the situation.' (December 2020) |
| Having access to public spaces was important and helpful to group home residents during the pandemic | • *ID/DD Staff:* 'The weather was nice … we used to do a lot … like go for a walk … just for them to see the environment. The environment is very important.' (December 2020)<br>• *ID/DD Staff:* 'I remember a few months back, it was very stressful having just to stay indoors and not go anywhere. Now, at least they can go to the YCMA and all those paces. A lot of places are opening. They can go bowling …. it's really helping them on their behaviors.' (July 2021)<br>• *ID/DD Caregiver/Family:* 'Their use of their outdoor spaces has been limited for a variety of reasons, but primarily also staffing shortages. So they are not able to do their outdoor activities − day programs, work. And now because of isolation, their use of their outdoor space gets limited even more.' (December 2021) |
| Group home residents carry additional burdens that even group home staff do not share | • *ID/DD Staff:* 'You guys the staff are allowed to go out there, do whatever you guys want, and you come back here to stay with us. And we are not allowed to visit our family. We are not allowed to go out there to have fun. We are not allowed to do anything. When the staff come in and doing what I do, everything that they want out there and they come back here and when they come here, some of them bring Corona to us. I don't think it's fair.' (December 2020)<br>• *SMI Staff:* 'We work and go home, we work and go home. I think, though, when it comes to the residents, the residents go out in the community.' (December 2020)<br>• *ID/DD Caregiver/Family:* 'When everyone else goes home, you can take a mask off in your home, but he can't.' (August 2021)<br>• *ID/DD Caregiver/Family:* 'When we go home after we've been outside wearing our masks everywhere … you look to the relief of taking off your mask, and he doesn't get that.' (December 2021) |

on which preventive and control measures to take during the pandemic (e.g. social distancing, hand hygiene, isolation/quarantine), the recommendations did not provide proven steps, recommended approaches, or even general guidance to group homes on how to institute and achieve the safety measures. It was left up to the group home agencies and the individual group homes to develop, test, and adapt various approaches to enacting these public health measures, which varied across group home agencies. Additionally, the response at the group home level were often limited and impacted by the physical infrastructure of the building and built environment. Similar to other congregate dwelling facilities that are closed to residents but not staff, the COVID-19 pandemic highlighted a need to adapt residential policies ad hoc in order to meet health and safety recommendations and maximize resident health.[21]

Many group home residents faced an option in the early months of the pandemic of whether to continue to live in a group home or return to live with family. For residents who remained in group homes, they encountered not only an increased risk of infection, but many also experienced a loss of autonomy and faced isolation from their families. Group home residents and staff discussed experiences that underscored the importance and challenges of maintaining resident autonomy during an emerging infectious disease outbreak. The built environment is an important element of group home living that can facilitate or limit autonomy. Restricted resident use of personal and shared living spaces during the pandemic resulted in a perceived sense of limited autonomy. Ensuring resident participation when creating policies, including ad hoc policies focused on infectious disease containment, can help to promote autonomy by ensuring that any modifications in, or use of, the built environment represent the values, identity, and aesthetic preferences of the group home residents.

This study has several notable strengths and limitations. A main strength of this study was the inclusion of multiple stakeholder working group types and participants that allowed us to triangulate the qualitative themes through data obtained from multiple perspectives, including group home residents, support staff, clinical staff, and families and caregivers. In addition, we ran working groups and collected in-depth information longitudinally throughout the pandemic, with two years of data included in these analyses. While clearly differentiating feedback as topical for SMI or ID/DD would allow for a more tailored understanding of the challenges encountered by each population during the pandemic, as staff often work across both SMI and ID/DD group homes, we were unable to decisively categorize responses as SMI vs ID/DD specific. As our study was limited to group homes within Massachusetts, our findings may not be generalizable to group home experiences across the USA. Families and caregivers who participated as stakeholders may be highly motivated and may not be representative of all group home resident caregivers. Nevertheless, our family and caregiver working group participants included family members as well as court-appointed caretakers, offering a variety of viewpoints. While the concerns of group home staff, residents, and caregivers may have changed over time during the pandemic, this study focused on understanding the full scope of concerns expressed throughout the course of the COVID-19 pandemic, with qualitative data therefore analyzed as comprehensive cross-sectional data that rather than assessing for any changes over time.

The findings from this study underscore the need for additional government-supported housing policies that recognize and address the unique physical and mental health needs of group home residents and staff during health crises, including infectious disease outbreaks. Specific policies around resident isolation, safe use of common and public spaces, rooming and dining processes, ventilation, and external staff exposure restrictions may mitigate infection risk during future pandemics. In addition, publicly funded design initiatives could engage architects and other design professionals to reconceive and design group home spaces that are more adaptable and health-enhancing. Finally, more research is needed on the impact of group home level factors, including differences in design and autonomy of group home staff, on the health outcomes of group home residents.

In conclusion, group home residents experienced disproportionate health risks during the pandemic due to the infrastructure or their shared living spaces while also experiencing increased risk of infection and poor health outcomes because of their history of ID/DD or SMI. This double-risk scenario was perceived as profound and pervasive by group home residents, staff, and caregivers, and merits attention and proactive planning to properly mitigate risk for future pandemics.

## Author statements

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*Ethical approval*

Ethical approval for this study was received from the Institutional Review Boards of Mass General Brigham and Massachusetts Departments of Developmental Services (DSS) and Mental Health (DMH).

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*Competing interests*

Dr. Skotko occasionally consults on the topic of Down syndrome through the Gerson Lehrman Group. He receives remuneration from Down syndrome non-profit organizations for speaking engagements and associated travel expenses. Within the past two years, Dr. Skotko received annual royalties from Woodbine House, Inc., for the publication of his book, Fasten Your Seatbelt: A Crash Course on Down Syndrome for Brothers and Sisters. Within the past two years, he has also received research funding from F. Hoffmann-La Roche, Inc., AC Immune, and LuMind Research Down Syndrome Foundation to conduct clinical trials for people with Down syndrome. Dr. Skotko is occasionally asked to serve as an expert witness for legal cases where Down syndrome is discussed. Dr. Skotko serves in a non-paid capacity on the Honorary Board of Directors for the Massachusetts Down Syndrome Congress and the Professional Advisory Committee for the National Center for Prenatal and Postnatal Down Syndrome Resources. Dr. Skotko has a sister with Down syndrome. All other authors declare they have nothing to disclose.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2023.08.012.

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