Canadian Journal on Aging / La Revue canadienne du vieillissement

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Digital Immunization Tracking in Long-Term Care and Assisted Living Facilities

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Policy and Practice Note / Note de politique et pratique

Cite this article: Wilson K, Wilson LA, Rusk KT, Henry JL, Denize KM, Hsu AT, & Sveistrup H. (2023). Digital Immunization Tracking in Long-Term Care and Assisted Living Facilities. *Canadian Journal on Aging / La Revue canadienne du vieillissement* https://doi.org/10.1017/S0714980822000538

Received: 25 March 2021
Accepted: 08 May 2022

Mots-clés:
vieillissement; technologies numériques; immunisation; grippe; soins de longue durée; maladie pneumococcique; vaccination

Keywords:
aging; digital technologies; immunization; influenza; long-term care; pneumococcal disease; vaccination

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Résumé

Les aînés, en particulier ceux qui vivent dans des établissements de soins de longue durée, ont subi une part disproportionnée des répercussions de la COVID-19. La vaccination a été essentielle dans les efforts pour surmonter ce problème, mais alors que nous commençons à émerger de cette pandémie, des questions demeurent. Comment protéger de manière proactive la santé des personnes qui vivent dans des établissements de soins de longue durée et des résidences avec services afin de prévenir la répétition d'un tel désastre? La vaccination, non seulement contre la COVID-19, mais aussi contre d'autres maladies évitables avec des vaccins, sera un élément clé de cet effort. Or, on constate actuellement d'importantes lacunes dans l'adoption des vaccins recommandés pour les personnes âgées. La technologie pourrait contribuer à combler ces lacunes. Nos expériences à Fredericton, au Nouveau-Brunswick, indiquent qu'une solution de vaccination numérique faciliterait une meilleure adoption des vaccins pour les personnes âgées vivant dans des résidences avec services ou des centres de vie autonome. Cette solution aiderait aussi les décideurs politiques à cerner les écarts de vaccination et à concevoir des interventions visant à protéger cette population.

Abstract

A disproportionate share of the health impacts of COVID-19 has been borne by older adults, particularly those in long-term care facilities (LTCs). Vaccination has been critical to efforts to combat this issue, but as we begin to emerge from this pandemic, questions remain about how to protect the health of residents of LTC and assisted living facilities proactively in order to prevent such a disaster from occurring again. Vaccination, not just against COVID-19, but also against other vaccine-preventable illness, will be a key component of this effort. However, there are currently substantial gaps in the uptake of vaccines recommended for older adults. Technology offers an opportunity to assist in filling these vaccination gaps. Our experiences in Fredericton, New Brunswick suggest that a digital immunization solution would facilitate better uptake of adult vaccines for older adults in assisted and independent living facilities and would help policy and decision makers to identify coverage gaps and develop interventions to protect these individuals.

The COVID-19 pandemic has had an enormous impact on health, social activity, and the global economy. Although the virus has affected populations around the world in different ways, a disproportionate share of the health impacts has been borne by older adults, particularly those in long-term care facilities (LTCs) (Canadian Institute for Health Information, 2021). In particular, as of June, 2020, during the first pandemic wave, Canada was considered the worst country among high-income nations for COVID-19 deaths in these institutions (Canadian Institutes of Health Research, 2020; Webster, 2021). In the time since then, older adults and residents of LTCs have continued to be at particularly high risk of death from COVID-19 (Comas-Herrera et al., 2021). Even as mortality risks have spread to other demographics, approximately 43 per cent of all COVID-19 deaths in Canada have still occurred among residents of LTC and retirement facilities (Canadian Institute for Health Information, 2021).

Vaccination against COVID-19 was a critical component of the strategy to protect residents of LTCs. As COVID-19 vaccines emerged, residents and workers in LTCs were prioritized for receipt of the vaccine and subsequent boosters (Canadian Institute for Health Information, 2021). As of April 8, 2022, more than 97 per cent of all adults in Canada over the age of 80 have received two doses of a COVID-19 vaccine and more than 85 per cent have received a booster dose (Public Health Agency of Canada, 2022). High rates of vaccination has played an essential

role in reducing rates of infection and death in LTCs during COVID-19's third and fourth waves, with cases and deaths declining by more than 90 per cent (Blackwell, 2021; Canadian Institute for Health Information, 2021).

As we begin to emerge from this pandemic, questions remain about the duration of protection offered by vaccines, the extent of their protection against new COVID-19 variants, and how best to protect the health of residents of LTC and assisted living facilities proactively. Vaccination, not just against COVID-19 but also against other vaccine-preventable illness, will be a key component of this effort. COVID-19 has highlighted the importance of robust vaccination strategies in safeguarding against disease outbreaks and reducing excess morbidity and mortality among this vulnerable population. However, there are currently substantial gaps in the uptake of vaccines recommended for older adults. Data suggest that pneumococcal and influenza vaccine rates are inadequate in these populations, despite the fact that older adults are at increased risk of severe illness from both of these conditions (Betsch et al., 2018). Although national targets strive for 80 per cent vaccination coverage among this population, data suggest that in 2018, only 70 per cent of older adults received an influenza vaccine and just 58 per cent had received a pneumococcal vaccine (Public Health Agency of Canada, 2019). Importantly, rates of influenza vaccine uptake among LTC staff are also inadequate, with Ontario reporting between 44 and 76 per cent coverage between 2010 and 2020 (Ontario Agency for Health Protection and Promotion [Public Health Ontario], 2020). These significant gaps are difficult to monitor and address because of the lack of systematic vaccination tracking in LTCs (Ofstead, Amelang, Wetzler, & Tan, 2017; Vogel & Duong, 2021).

Technology offers an opportunity to assist in filling these vaccination gaps. Digital tracking of immunization was an essential component of the COVID-19 vaccine roll-out, allowing residents and providers to track when a vaccine dose was administered and receive automated reminders of when to obtain a second or booster dose. Prior to the pandemic, CANImmunize Inc. and The Centre for Innovation and Research in Aging (CIRA) worked together to design a digital immunization solution that would facilitate better uptake of vaccines for older adults in assisted and independent living facilities in Fredericton, New Brunswick, Canada. This solution would allow staff and residents to enter their vaccination details, thereby providing the facilities with consistent, reliable vaccine coverage data that could facilitate efforts to promote vaccine uptake and improve series completion. We believe that digital solutions like these will play a critical role in protecting residents of LTCs from current and future vaccine-preventable illnesses as we emerge from the COVID-19 pandemic.

The Initial Challenge: Pneumococcal Disease

The initial partnership between CANImmunize and CIRA focused on optimizing uptake of adult pneumococcal vaccines by providing LTC and assisted living facilities with vaccine coverage data while also providing residents with automated reminders when it was time to receive a subsequent dose. Pneumonia is a leading cause of hospitalization and death in Canada, and older adults are among those most at risk (Stancu & Barratt, 2020). Pneumococcal disease is a major contributor to rates of community-acquired pneumonia and can result in severe disease outcomes, especially among those living in LTCs and other group settings (Betsch et al., 2018; Thomas, 2021). Vaccination is an effective tool in the prevention of pneumococcal disease and is strongly recommended in routine immunization schedules for adults in Canada who are over the age of 65 (National Advisory Committee on Immunization, 2020).

Unfortunately, insufficient vaccine uptake among older adults in Canada remains a major barrier to reducing pneumococcal disease. In addition to issues of vaccine hesitancy among older adults (Betsch et al., 2018), older adults living in LTCs often have less access to vaccination, as vaccine availability and policies may vary by institution (Stancu & Barratt, 2020). Moreover, many people do not know which vaccines they have actually received. Results from the 2016 Adult National Immunization Coverage Survey indicate that although 88 per cent of Canadians reported they were up to date on their recommended vaccinations, just 3 per cent were truly up to date (Public Health Agency of Canada, 2019). Interventions that improve awareness about recommended vaccines for older adults and that offer effective methods of tracking and monitoring vaccination are urgently needed. Although pediatric immunization registries have received considerable attention and investment in recent years (Guttmann, Shulman, & Manuel, 2011; Wilson et al., 2016), there is still a pressing need for vaccination data among older adults. By offering a means of digitally tracking rates of pneumococcal vaccine coverage in LTCs, the partnership between CIRA and CANImmunize aimed to address this data gap while also offering a convenient method of increasing vaccine uptake among residents.

New Challenges: Influenza and COVID-19

Although the initial focus of our partnership was on improving pneumococcal vaccine uptake, we recognized that similar challenges also exist with uptake of the seasonal influenza vaccine (CanAge, 2021). Older adults are at particularly high risk for complications from influenza; severe cases can contribute to worsening frailty, loss of independence, and catastrophic disability (Andrew, Gilca, Waite, & Pereira, 2019; Stancu & Barratt, 2020). In addition, adults over the age of 65 comprise the majority of those who die from influenza each year (Chung et al., 2020). As with pneumococcal disease, vaccination is highly effective in reducing morbidity and mortality associated with influenza, but uptake remains suboptimal (Public Health Agency of Canada, 2019).

The usual challenges associated with seasonal influenza have been compounded by the emergence of COVID-19 and its associated devastating impact on older adults. Although vaccination was extremely effective in reducing the morbidity and mortality associated with COVID-19, (Public Health Agency of Canada, 2022), lingering uncertainty about the vaccines' effectiveness against emerging variants and about the duration of protection requires ongoing vigilance. A robust vaccination strategy will be critical for protecting the health of older adults and, in particular, those in LTC assisted living facilities. Furthermore, should additional booster shots be required, having a centralized data collection and surveillance system will be paramount for ensuring uptake of boosters and monitoring vaccine coverage, safety, and effectiveness.

Models for Digital Immunization Tracking in LTCs and Assisted Living Facilities for the Post-COVID World

Technology offers an important opportunity to overcome the dual challenges of low vaccine uptake and the paucity of data on vaccine coverage among older adults. In the early stages of the COVID-19 vaccine roll-out, LTCs often lacked full information on whether

https://doi.org/10.1017/S0714980822000538 Published online by Cambridge University Press

their staff had been vaccinated, because most vaccinations were administered off site (Vogel & Duong, 2021). This meant that facilities had to rely on staff to bring physical copies of their vaccination receipts to work (Schmunk, 2021). Since then, provincial digital immunization registries have been developed for the COVID-19 vaccine, and these systems hold potential for tracking other vaccines recommended for older adults, including pneumococcal disease, influenza, tetanus/diphtheria/pertussis, and herpes zoster. Cloud-based digital vaccination records offer a convenient and accessible means of tracking vaccination coverage for both residents and providers. Moreover, given the widespread lack of awareness of one's own vaccination history, allowing individuals to manage their own immunization records in a convenient and accurate way both empowers residents and offers facilities improved immunization data.

As individuals receive vaccinations from a variety of providers over the course of their lives, digital vaccination records offer a comprehensive source of truth that will help to improve uptake of existing recommended vaccines and facilitate the roll-out of future vaccines. Shared account systems that allow caregivers or health care providers to manage immunization records together with or on behalf of residents may simplify the challenge of tracking vaccinations from multiple locations and providers. Thorough privacy policies and practices would be implemented prior to enabling this account sharing to ensure that no privacy breaches occur and that the accounts are being used and accessed appropriately. Only data necessary for the tracking of one's vaccination status would be collected, and only aggregate data would be used for policy and decision making. Residents and staff would be able to opt out of reporting their data to the province but, for their own protection, would be assumed to be unvaccinated in the event of an outbreak.

In addition to the improved coverage data that could be generated through these digital systems, digital immunization monitoring and tracking also offers a more flexible and less resource-intensive means of addressing and incorporating changing public health guidelines. Throughout the pandemic, guidelines about who should receive vaccine doses and when they should receive those doses changed rapidly and often (Atalick & Edwards, 2021; Boothby, 2021; Government of Ontario, 2021a; Canadian Press, 2021; Treble, 2021). Well-designed digital solutions have the potential to be quickly adapted to notify individuals when they become eligible for vaccination, even if eligibility changes, and additional booster doses can be added relatively easily. Moreover, when compared with non-digital reminders, digital vaccination reminders have been demonstrated to improve on-time vaccination rates and series completion regardless of vaccine, setting, or age (Atkinson et al., 2019). Digital reminders also mitigate many of the limitations associated with traditional reminders, such as maintaining up-to-date addresses and phone numbers. All of these factors will be critical to helping LTCs to prepare for future pandemics and mitigate the risks associated with existing vaccine-preventable illnesses.

Ethical and Policy Considerations

As the COVID-19 vaccine roll-out and the subsequent implementation of proof of vaccination requirements have demonstrated, there are important ethical and policy considerations associated with digital solutions. From a policy perspective, some governments may mandate vaccination tracking at LTCs (Government of Ontario, 2021b), while others may choose to leave these policies up to individual facilities. In either scenario, standardized vaccine terminology will be important to enable interoperability between digital systems and facilitate the flow of data from LTCs to government immunization repositories. Although the National Advisory Committee on Immunization would set recommendation for vaccination for older adults, ultimately it would be the responsibility of provinces and territories to determine policies for their jurisdiction. From an ethical perspective, mandating proof of vaccination can be warranted under circumstances in which it is determined that there is substantial risk to an individual, community, or society (Wilson & Flood, 2021). At a minimum, consent-based vaccination data collection would permit individual institutions to make decisions about how best to protect individuals who have not submitted proof of vaccination, in the event of outbreaks. Overall costs of digital solutions are variable; however, the potential exists for them to be cost saving by both reducing costs from manual tracking of records and by reducing outbreaks through digital reminder systems.

Conclusion

COVID-19 has been a tragedy for older adults. Although vaccination against COVID-19 has contributed to significant reductions in morbidity and mortality in LTCs, there remains a critical need for better immunization data, monitoring, and education among this population. As we emerge from the COVID-19 pandemic, we should not lose sight of the toll that other vaccine-preventable illnesses take on older adults across Canada, as uptake of recommended adult vaccines remains low. Technology offers an opportunity to create digital systems that can empower older adults to understand which vaccines they have received while also facilitating series completion and overall levels of vaccine uptake. Increased and higher-quality vaccination data will also help policy makers to better understand gaps in vaccine uptake and opportunities for intervention. As new variants and future pandemics emerge, digital vaccination tracking can help to identify those who are unvaccinated or under-vaccinated and facilitate proactive action to protect those who are most at risk.

Conflict of Interest Statement. KW is co-founder and board member of CANImmunize Inc. LW and KD are employees of CANImmunize Inc.

Funding. This study was funded by the Healthy Seniors Pilot Project, the Government of New Brunswick, and the Public Health Agency of Canada.

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