Improving Vaccine Clinic efficiency through the CANImmunize platform

Ananda Kuatsidzo, Kumanan Wilson, Sydney Ruller, Blake Daly, Roland Halil, Daniel Kobewka

Table of Contents

Improving Vaccine Clinic efficiency through the CANImmunize platform

Ananda Kuatsidzo[1*] MD; Kumanan Wilson[1, 2, 3*] MD; Sydney Ruller[3*] MSc; Blake Daly[2*] MBA; Roland Halil[4*] PharmD; Daniel Kobewka[1, 2, 3*] MD

[1]Division of General Internal Medicine The Ottawa Hospital Ottawa CA
[2]Bruyère Research Institute Ottawa CA
[3]Clinical Epidemiology Program Ottawa Hospital Research Institute Ottawa CA
[4]Department of Family Medicine Bruyère Academic Family Health Team Ottawa CA
[*]these authors contributed equally

Corresponding Author:
Daniel Kobewka MD
Clinical Epidemiology Program
Ottawa Hospital Research Institute
1053 Carling Ave
Ottawa
CA

Abstract

Our objective was to evaluate the CANImmunize digital solution and measure the impact on workflow and appointment booking at Bruyère Hospital.

Preprint Settings

1) Would you like to publish your submitted manuscript as preprint?

✔ **Please make my preprint PDF available to anyone at any time (recommended).**
Please make my preprint PDF available only to logged-in users; I understand that my title and abstract will remain visible to all users.
Only make the preprint title and abstract visible.
No, I do not wish to publish my submitted manuscript as a preprint.

2) If accepted for publication in a JMIR journal, would you like the PDF to be visible to the public?

✔ **Yes, please make my manuscript PDF available to anyone at any time (Recommended).**
Yes, but please make my accepted manuscript PDF available only to logged-in users; I understand that the title and abstract will remain v
Yes, but only make the title and abstract visible (see Important note, above). I understand that if I later pay to participate in <a href="http

Original Manuscript

Introduction

Running immunization clinics in any organization or health system requires detailed planning, coordination, and collaboration. Barriers such as long wait times, misinformation about the benefits of vaccination, time and locations of clinics, and inconsistent methods to record vaccination status all contribute to lower vaccination rates.[1, 2]

CANImmunize Inc is a Canadian technology company that created a digital solution for end-to-end digital vaccine management. The product was a solution that permitted centralized online booking across multiple clinics, digital pre-consent, clinic management, and provision of proof of vaccination records including integration with provincial registries and supported adverse event reporting.

Vaccine clinics are typically paper based which requires significant human resources. Paper-based data collection is time consuming, limiting the number of vaccinations that can be administered and making it difficult to track vaccination rates.[3] Our objective was to evaluate the CANImmunize product and measure the impact on workflow and appointment booking.

Methods

Setting and participants

We implemented CANImmunize between November 2020 and April 2021, at Bruyère Hospital in Ottawa, Ontario. We offered vaccination appointments to staff, their family, and patients of the Bruyère Academic Family Health Team primary care clinic. All staff and patients were sent information about how to download the app, create an account and sign up for an appointment.

Digital Solution

CANImmunize software consists of three components: CANImmunize web portal, ClinicFlow, and the CANImmunize app. The web portal allows patients to book their appointment, complete the

COVID-19 screening, provide consent for the flu vaccine, and subsequently uploads the vaccine receipt into Bruyère's Occupational Health and Safety System. ClinicFlow allows the immunizer to handle appointment scheduling by tracking appointments, cycle times, wait times, and total number of appointments per day. The CANImmunize app provides a permanent record of all immunizations for patients.

Outcomes

During the implementation of Clinic Flow, we measured the number of vaccinations, appointments, time spent per appointment, and staff subscriptions to the CANImmunize app. To determine change in the number of staff vaccine appointments and time spent by immunization clinic staff per appointment we used data from the previous year before ClinicFlow was implemented. We used staff hourly rate to calculate the cost savings per vaccination.

Results

Over the study period, there were 1286 appointments booked and 2213 vaccines administered to staff and their families. Appointments could have more than one person, for example a staff member and their two children would be one appointment but would result in three vaccines being administered. Each vaccine administrator reported a decrease in time required to administer the vaccination from 15 minutes with the paper-based format to 10 minutes with the digital platform resulting in a total time savings of 107.2 hours (1286 appointments x 5 min).

In addition, vaccine clinic staff reported a decrease in clerical time to upload staff vaccine data to the database from 5 mins per staff to 0 mins. This change resulted in a clerical time savings of 79.3 hours (952 staff x 5 mins = 4760mins). A total of 952 Bruyère staff were vaccinated with 174 individuals signing up for CANImmunize after their immunization appointment.

Discussion

Productivity improved with time and cost savings after the implementation of CANImmunize. Booking through the app, completing consent forms prior to visits, easy patient registration and automatic uploading of vaccination records saved staff time and money. Automated uploading of records improved accuracy vaccination-rate tracking.

The World Health Organization (WHO) described digital health as a safe and cost effective way to use information technology to improve access to health care.[4] Our study results are consistent with these findings. During the COVID-19 pandemic several booking systems were launched globally, these systems became increasingly important as the complexities of the vaccine schedule increased due to the need for multiple doses and boosters. As we move forward, digital solutions to health problems are going to be increasingly important.[5, 6] Vaccines will continually be promoted and administered to older populations where uptake has been historically low.[7-9] As such, well developed software that can facilitate administration of these vaccines is essential.

Key lessons learned during our pilot included the importance of scheduling and family bubbles to improve throughput efficiency while maintaining social distancing, as well as the importance of ease of use amongst non-technically proficient individuals. These elements were incorporated into the broader population wide release of the platform and contributed to its relative success.

Conclusions

We found that digital vaccine clinic booking in a health care facility improved efficiency while facilitating accurate and comprehensive record keeping.

Conflicts of Interest

Kumanan Wilson is a co-founder and Chief Scientific Officer of CANImmunize Inc.

Funding

References

1. Guillari, A., et al., *Influenza vaccination and healthcare workers: barriers and predisposing factors.* Acta Biomed, 2021. **92**(S2): p. e2021004.

2. *Vaccine uptake in Canadian adults 2019.* 2022 [cited 2023 May]; Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/2018-2019-influenza-flu-vaccine-coverage-survey-results.html.

3. O'Leary, S.T., et al., *Provider Attitudes Regarding Vaccine Tracking Systems in Pediatric Practices.* Academic Pediatrics, 2016. **16**(1): p. 34-41.

4. *Global strategy on digital health 2020-2025.* . 2021; Available from: https://apps.who.int/iris/bitstream/handle/10665/344249/9789240020924-eng.pdf.

5. Gentili, A., et al., *The cost-effectiveness of digital health interventions: A systematic review of the literature.* Front Public Health, 2022. **10**: p. 787135.

6. S, R.N.K., et al., *Digital Health Solutions to Control the COVID-19 Pandemic in Countries With High Disease Prevalence: Literature Review.* J Med Internet Res, 2021. **23**(3): p. e19473.

7. Gaitán-Rossi, P., et al., *Barriers to COVID-19 vaccination among older adults in Mexico City.* International Journal for Equity in Health, 2022. **21**(1): p. 85.

8. Zhang, D., et al., *Vaccine Resistance and Hesitancy among Older Adults Who Live Alone or Only with an Older Partner in Community in the Early Stage of the Fifth Wave of COVID-19 in Hong Kong.* Vaccines (Basel), 2022. **10**(7).

9. Kasting, M.L., et al., *Factors Associated With the Intention to Receive the COVID-19 Vaccine: Cross-sectional National Study.* JMIR Public Health Surveill, 2022. **8**(11): p. e37203.