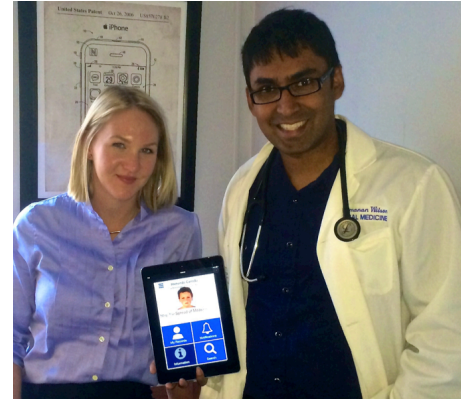


Development of a Mobile Application, ImmunizeCA, for the Management of Patient Immunization Records: A Discussion With Dr. Kumanan Wilson and Katherine Atkinson

Ariana Noel, MSc¹, Nischal Ranganath, BHSc^{1,2}

¹Faculty of Medicine, University of Ottawa
²The Ottawa Hospital Research Institute



ABSTRACT

Vaccinations have “saved more lives than any other health measure” over the past 50 years [1]. Currently, patient immunization records are managed using the yellow immunization card; however, a team of researchers at the Ottawa Hospital Research Institute (OHRI) has recently created a mobile application for all operating systems, inclusive of all provinces and territories, that conveniently stores patient data for every vaccination schedule [2]. The UOJM 2014 – 2015 Editor-in-Chief Team met with Dr. Kumanan Wilson (General Internist, The Ottawa Hospital) and Katherine Atkinson (Research Coordinator, OHRI) to discuss the development of the ImmunizeCA app [3], the first national immunization app to be endorsed by the Minister of Health, Rona Ambrose [4].

RÉSUMÉ

Au cours des 50 dernières années, la vaccination a « sauvé plus de vies que toute autre mesure de santé » [1]. Actuellement, les dossiers d’immunisation sont gérés à l’aide de la fiche jaune d’immunisation. Or, une équipe de chercheurs de l’Institut de recherche de l’Hôpital d’Ottawa (IRHO) a récemment créé une application utilisable sur tous les types de téléphone mobile et couvrant toutes les provinces et territoires. Cette application permet de sauvegarder facilement les données du patient pour tous les calendriers de vaccination [2]. L’équipe de rédaction en chef du JMUO pour 2014-2015 a rencontré Dr Kumanan Wilson, interniste général à l’Hôpital d’Ottawa, et madame Katherine Atkinson, coordonnatrice de la recherche à l’IRHO, pour discuter du développement de l’application ImmunizeCA [3], la première application nationale sur la vaccination qui a été approuvée par madame Rona Ambrose, ministre de la Santé [4].

What is ImmunizeCA and what was the rationale in developing the app?

Dr. Wilson:

This all started back in 2012. I was at the park and one of the moms expressed frustration with the yellow card for her kids, which she could never find [when] they needed to go to school. She asked me why we [could] do banking on our phones, but she couldn’t have her yellow card on her phone. I thought that was a great idea. That summer a [family friend’s] son, who was a first year engineering student, needed a summer job. So I said, “hey, here’s an idea” and he said, “sure”. I didn’t hear [back] from him for three months and then he sent me an email that he had it done. I took a look at it [and] I said, “wow this is pretty cool”. He did a really cool job with it, with a nice user-interface, and then we realized you could do way more than this. You could use [this app] as a way to com-

municate with patients [and] parents. We could notify people of outbreaks of vaccine preventable diseases and remind people of appointments, so we iteratively developed it from there. Then, [in] November 2012 we released [ImmunizeON for iOS] and there was a lot of interest by [both] the media and public health.

Can you tell us about the process of having ImmunizeCA accepted and endorsed by decision makers?

Dr. Wilson:

[Following the interest from users, media and public health regarding ImmunizeON], we approached the Public Health Agency of Canada (PHAC) in partnership with the Canadian Public Health Association (CPHA) [to see] if they would be interested in funding [the development of] a national version. They agreed as long as we made it for every province, [each one having] its own schedule; we also had to build it for three platforms and [make it] bilingual. That was a big challenge because ImmunizeON was only designed for parents of children born after August 2011 and it only

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had the pediatric immunization schedule for Ontario in it. Now [in ImmunizeCA], we have both pediatric and adult schedules as well as some travel guidelines for all 13 provinces and territories. We launched [the app] in March [for iOS, Android and compatible Blackberry devices] and we have [had] a lot of support. The federal minister of health [has] endorsed it. I think it's the first government endorsed, national immunization app (to the best of our knowledge). We've had a good response with 55,000 downloads since its launch [and] no major issues with [the ImmunizeCA app]. It was a relatively easy sell because everybody knows the current system isn't great.

How did you design the interface of ImmunizeCA to be user-friendly? Who were the partners involved in the development of the app interface (i.e. patients, physicians, nurses etc.)?

Design of the ImmunizeCA Interface:

Katherine:

As Dr. Wilson said, it was a mom's idea and one of the big things [that contributed to the user-friendly interface] was taking into consideration user feedback. We get so many emails from moms saying, "this is great, but I'd love it if you could add this, or tweak this", or we get a medical student asking "could we add in a field for TB tests?"

Dr. Wilson:

It was different in the old days when you'd have software that was less than optimal. You'd have a problem fixing it. You can't ever release the perfect product because you don't really know what the perfect product is; but the beauty of this is that you can release a product and get feedback. That's the key - listening and then iterating based on that. In particular, with the new [operating systems] (OS), they'll push the updates through and the user doesn't even see it.

We're also trying to create [a sense of] warmth to the app. One of the features of the app is rolling banners on the front page to get messages out that can be changed real-time. We [currently] have a story in there about a mom whose child had a heart transplant and can't be vaccinated. She's thanking parents for vaccinating their child and protecting her child. That's the type of messaging we can do there.

Disaggregation of medical information:

Katherine:

For healthcare professionals, it's relatively easy to manage the abundance of information. However, when working with the general public, such as new moms and parents, just imagine how incredibly difficult it would be to have your entire medical record on one app. With the ImmunizeCA app, we have received significant positive feedback that the app is focused specifically on

immunization. It is easy [for people] to know when to access the app and what information they'll find.

What do you have planned for future developments and additions to the ImmunizeCA app?

Dr. Wilson:

The ImmunizeCA app is not an official record, but providing information on [the app] is not a whole lot different [than] going on a website and filling in your [immunization] information. We are working through what it would take to make it an official record and we actually think that we can make this a central component to an immunization information system. The data filled in [the app] could be authenticated (through mechanisms such as a signature function) and that can be sent to a centralized system. It is not there [yet], but we would love if [the app] can move on to that next step.

[Several potential future developments to the app include:]

1. HealthMap

We are currently using data from the Council on Foreign Relations (CFR) for the outbreak alert feature in the app. The next update will feature HealthMap data instead of CFR. HealthMap is a digital surveillance system developed at Harvard University by John Brownstein's group [5]. It updates every hour, thereby providing users with more timely and accurate information. You will also be able to filter the alerts by infectious disease. With this update we'll also be changing where you can find the outbreak feature. This was based on analytics that shows us what information is being viewed most often and tells us how users flow through the app. It's a good way to help inform changes to make the product more user friendly.

2. Barcode scanning

We are exploring the capacity for smartphones to scan 2d barcodes [on vaccines] and upload the embedded information into an app. This [feature] could be helpful if Health Canada notices that a lot you received has a problem, [thereby allowing] a notification [to] be sent to your device to inform you to revaccinate or visit a physician. Barcode scanning may also assist in adverse event reporting.

How can the ImmunizeCA app and data pulled from app usage be used to study population health?

Katherine:

The app addresses several reasons why people tend not to vaccinate including: logistical challenges, misinformation (believing that vaccines are not necessary and that outbreaks are rare), and concerns about safety. Logistical [coordination is challenging because] the schedules are complicated, and presenting them to users chronologically might be easier [to understand]. [The app]

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can also sync with your OS calendar, so you can create an event to let you know about upcoming appointments. The app also answers many frequently asked questions about vaccines (i.e. is it safe to vaccinate while pregnant? Do vaccines cause autism?).

Based on this, we hypothesized that the app may be able to impact people's beliefs and attitudes toward immunization. To test this, we recruited a group of pregnant women, administered a pre-survey examining their vaccination attitudes, information sources as well as mobile usage. Then they have their child and use the app for 6 months. Now, we're doing a follow-up survey to see if using the app has any impact. We're not sure what the results are going to look like, but it should be interesting.

We're also currently doing a study evaluating the app launch and the effect of different promotional strategies on uptake and usage. This will provide insight on what dissemination strategies are most effective in driving awareness and uptake of new apps.

What are some challenges associated with implementing the immunizeCA app?

Dr. Wilson:

You build an app, that's one thing, but then you have to get people aware of it. The other is, even if you're aware of it, are you going to download it? That's why we study the pregnant moms – to get a mobile readiness index. Who is more likely to download an

app (early adopters)? That's part of it as well – the psychology of who will actually use this stuff, so it's been interesting.

What next steps would you like to see regarding patient access to health information and decision support?

Dr. Wilson:

One of the reasons the app is important is that the vaccines are no longer administered at one source. There are now multiple providers such as flu clinics, pharmacies, schools, etc. There is no single source [of immunization] at the health provider level. The app allows you, as a patient, to be empowered to manage your own health information. The app makes this feasible at the push of a button and the patient can share that information with the healthcare provider. Feedback that has been received is that there is often a discrepancy between patient's knowledge of the vaccines they have received and what is presented in the yellow card. If the health information can flow between patient and healthcare providers, be validated, and reside in a registry or source of record – it would be an ideal way for the app to evolve.

Do you have any other recommendations of patient-centered apps for decision support or disease management?

Dr. Wilson:

An interesting idea would be a blood donor app [that can] empower individuals to get the right information by [entering their] blood type and receiving notification on when you can donate. [The app can also help target individuals on] a personal level, by including stories on those individuals who have benefited from the transfusion within the community. The focus is on public health and not healthcare. The focus is on a community level, rather than a personal health level. As a result, it creates a sense of community by empowering individuals and allowing for feedback within the system.

What direction would you like to see Canada take with regards to patient portals and EMRs?

Dr. Wilson:

[The] big picture is to empower individuals to manage their own health information. [For example], when a patient comes to the ER from another hospital, information such as their medication [and] their medical history is significantly lacking and can result in delay of care. If you can control your own health information in a simple manner, it would enhance the quality of care tremendously.

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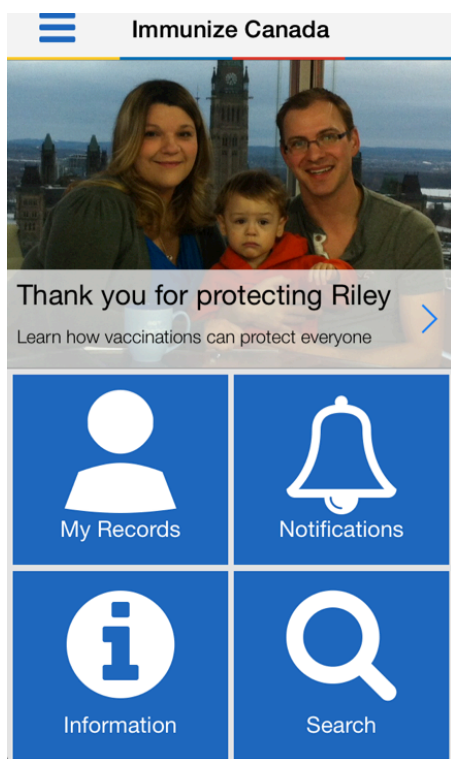


Figure 1. Screenshot of the Immunize Canada mobile application interface

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