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November 28th, 2017

## **NO SHOTS, NO SCHOOL: A SOCIAL JUSTICE FOCUSED PROPOSAL TO TRACK THE WORLD'S VACCINATIONS**

Many people have a “baby box” somewhere in their home with a few things from their infancy: maybe a tiny hat, or a little pair of socks, or an ink-colored print of baby feet. However, besides those sentimental items, there is one other thing that should be saved from infancy: a sheet of paper that records the dates of the essential vaccinations that children receive, many in the first weeks or months of their lives. This proof of vaccination is required, in many states, to go to daycare, to enroll in school, to play sports, and even to matriculate into college. However, baby boxes are much more likely to have a tiny hospital bracelet or a first rattle than a record of these life-saving doses of medication. It's easy to misplace that single piece of paper, particularly in an increasingly mobile society. Even half a century ago, it was much more common for Americans to grow up in a town, and then get married and raise their children in the same town, making it easier to keep track of medical records—adults may have had the same doctor for the majority of their life! Today, however, mobility is the norm: Americans not only often move away from their hometowns, they may also move several times throughout their adult life. It's very easy to lose that single sheet of paper through many relocations.

High rates of mobility is a particularly associated with low-income populations, which makes keeping track of their vaccination record extra challenging. Studies show that children residing below or near the poverty level have consistently lower vaccination rates compared with children living above the

poverty line. In a society where vaccination levels are at a record high, kids in poverty are still under vaccinated, which poses a risk to both themselves and their communities. Poverty and factors associated with poverty, such as housing stress, are the “most powerful and persistent barriers to timely immunization” (Klevens 3). These factors are also associated with a poor understanding of vaccine importance, which, in addition, leads to a lower vaccination rate and a higher risk of double vaccination.

This problem of tracking vaccination is also potent for Native Americans. The Native American population has more health issues and a disproportionate rate of infectious diseases compared to the rest of the United States population (Singleton 1). The life expectancy for Native Americans is almost five years less than the general US population (Indian Health Service 3). This is particularly pronounced for vaccine-preventable diseases, such as Hepatitis A and Hepatitis B: even just twenty-five years ago, the rates of these two diseases were ten times higher in the Native American population when compared to the general US population (Singleton 2). Large strides have been made in eliminating these disparities, but they still exist, mainly due to the high rates of poverty in the Native American population. The poverty rate for the American Indian populations is usually around 30%, double the average United States poverty rate of about 15% (Indian Health Services 4). Poverty, as discussed previously, is associated with lower vaccination rates. Sustained routine vaccination of all American Indian people is necessary to maintain population immunity, and protect the community from preventable diseases.

One of the barriers to keeping vaccination rates high in the Native American population is that the Indian Health Service and tribe-run clinics do not share patient data with each other (Friedman 2). They each have their own set of vaccination records, and patients who do not manage their own immunizations often end up missing vaccinations or being forced to get double vaccinated to ensure that they have gotten the immunizations that they need. Non-IHS doctor's offices also only keep records for a limited number of years, so if patients call looking for their records, the doctor's office may no longer have them on file. The burden falls on the individual to maintain his or her own data. There is also no national organization or immunization registry that keeps track of this information for consumers. Some states have a registry, but if a patient moves across state lines, or did not originally get their vaccinations in that state, this would not be of assistance to them. Some state registries also require citizens to "opt in," which does not guarantee participation. Since neither the national government nor the individual health services on the reservations keep track of vaccinations, it falls entirely on the individual to record this information for both themselves and their dependents.

A study conducted by the National Medical Association showed that many parents of young children do not know how many immunization doses children should receive; children with one or both parents with less than a high school education were at high risk of failing to complete the suggestion immunization series by the age of two. This study makes the argument that the burden of keeping track of immunizations should not fall solely on parents, and that a uniform

reporting system should be established, especially since the “only constant with vaccination requirements is change” (Yarboro 5).

The prevalence of smartphones, even among low-income populations, provides an obvious (and relatively simple) solution to this problem. I propose that an app should be developed that allows people to input the dates and locations of their vaccinations, as well as their children’s. This app would provide other features as well, including reminders when vaccinations are due, a registry of which immunizations are required for school in each state, and information on vaccines required for international travel. Essentially, it would allow adults to track vaccinations with as much effort as is required to send a text, which would hopefully minimize the number of double vaccinations that occur, as well as maximize the protection for Native American and low-income populations against preventable diseases.

Vaccination rates are also a problem for the more general population, so this app would have use beyond reservations or low-income communities. Vaccines are the most cost effective way of protecting children from infectious diseases, and stopping the spread of those diseases. Recently, pertussis has been the primary disease of issue. Pertussis, or, as it is more commonly known, whooping cough, poses a particular problem because of the high risk it poses to infant siblings of school-aged children. Babies cannot get the DTaP shot until the age of two months, so they rely on other’s immunity to keep them safe from the severe, potentially life-threatening complications, including apnea. Ensuring that all children are vaccinated protects not only them, but also their siblings.

In light of these risks, some schools have increased or changed vaccine requirements. In 2014, Indiana implemented new vaccine requirements for their schools. Ten percent of students were missing records of these shots. Any student who did not have complete and up-to-date shot records was not allowed into the building. The demand for these necessary shots skyrocketed. In an attempt to restrict demand and retain vaccines for those who truly needed them, parents requesting the shot for their children were asked to verify that their children had not received the vaccination already. Children who did not have documentation of getting the newly required shots had to get the vaccine again, which presents a risk of double vaccination for a percentage of the population. This app would aid in situations such as this by providing an easy way to document not only which vaccinations have been given, but also where they were administered and a phone number for the clinic or hospital. If a new vaccine was required by a school district, it would be easy for parents to check whether each child had received the shot or not. This would help prevent children from being forced to miss school because of missing vaccines, and preclude avoidable double vaccinations.

## **LITERATURE REVIEW**

The use of electronic medical records has become the norm in healthcare systems around the country. The advantages of electronic storage of medical records are extensive: no issues with legibility, reduction of dangerous drug interactions by automated double-checks and contact with pharmacies, no need for physical storage space, easy back-up, and ease of access for research purposes. However, with increased convenience and access also come increased concerns about security and privacy. Even though the application being proposed isn't specifically electronic medical records, it poses the same concerns about storing sensitive information on a platform that can inadvertently be made public.

One of the best ways to protect patient information is to make sure that only authorized individuals are able to access the private information (Harman 3). The best way to do this is to ensure that only the correct users are authorized to view only the necessary information in order to sufficiently perform their jobs. For example, in a clinical setting, physicians and receptionists should have very different levels of access to patient information in order to maintain as much confidentiality as possible. In addition, which individuals access what information should be tracked and audited in order to discourage any providers with wide access from looking at records that are not pertinent to their practice (Harman 17). Security measures such as firewalls, antivirus software, and intrusion protection software would also help maintain privacy (Ozair 10).

While studies show that medical errors are significantly reduced by the use of digital medical records, there are not nearly as many standard or user-friendly

solutions for wide adoption of electronic medical records in the home. Studies also suggest that it is beneficial to have a device that allows them to carry their personal medical information in a digital format, as this allows timely and quick access to important medical information (Shetty 2). The patients who would benefit most from having digital access to their records are also often those who are least likely to have that access (Sulmasy 4). Poverty is associated with both a lack of internet access and health literacy, as well as general poor health (Sulmasy 4). This is a deadly combination. This app would provide a way to store vaccination information without an internet connection, of particular importance for low-income individuals and families.

Medicine has been profoundly affected by the availability of mobile devices. The concerns about using mobile devices in a clinical setting include protection of patient data, reliability for making clinical decisions, and a lack of oversight for standards of accuracy and confidentiality (Ventola).

Some of these concerns can be alleviated by the fact that patients would only be inputting their own medical information into the application: patients are able to do what they want with their medical information. Security issues could be minimized in an app-based platform by ensuring that only authorized users have access through a password-protected system. The password would be required to be highly secure (i.e. symbols and capital letters should both be used). The primary user would be able to designate other users who could access their vaccination information, such as a spouse or trusted friend. These users would have their own login, which would allow them to view the information, but not to edit it. Each

person's login would only permit access to their own vaccination information as well as those of dependents (also entered by the user), as well as the information from anyone who has granted them access. It would not, however, be a "social media" style app where individuals could search for other people. This would prevent the problem of people "going looking" for other people's information. Similar security measures of firewalls would be installed in the app to protect against hacking. Information would be stored locally on the device, not in the Cloud or on the Internet in order to minimize the problem of data being stolen.

### **APPS FOR MEDICAL RECORDS**

#### *MyMedical*

\$5/one time: Comprehensive medical record keeping for multiple people in one application. Medications are listed with dosage information, side effects, etc. Lab results can be tracked using the app's charting feature. It also allows medical records to be shared with a medical professional with a click. MyMedical is designed for emergencies, where a certain amount of information can be accessed without a password by a first responder. Data is stored on the device, not on a remote server.

#### *iBlue Button*

\$15/one time: Marketed as eliminating the need to fill out forms when going to the doctor, as the information can be stored in the app instead. Information can be scanned into the app with the camera, or imported from online medical records sites such as Aetna or MyMedicare. Data is stored on the device, not on a remote server.



### *MyChart*

Free: Allows of storage for more than one person. Advantages include the fact that it links directly to healthcare provider's servers (when supported) so the information is directly from the doctor's office. Advertised as allowing appointment scheduling and giving the ability to send the doctor non-urgent messages. Information is not stored locally.

### *Apple Health*

Included with Apple Devices: Focuses more on lifestyle factors, like sleep, mindfulness, and activity, but can also track blood pressure, weight, blood glucose, and test results. Health records can be imported into the app as well, and the app is advertised as being able to display often confusingly formatted medical jargon into a format that is readable and understandable. The app cannot request records as a background operation, and each new request is treated as a brand new document pull, to minimize the risk of hacking.

## **CONCLUSION**

Although other options exist, the application suggested in this proposal is still necessary. None of these apps are targeted directly at a user-friendly way to track solely vaccinations in a way that allows the records to be used for proof of vaccine for schools and day cares. They also are not designed to remind users when they or their children are in need of boosters or new immunizations.

The next step in this project is finding someone who is willing and able to code and develop the app for public use. The goal would be for the app to be free (not low cost) so that it could be accessible to all, especially low-income individuals and families, who need it most. It should have the dual functionality of tracking vaccinations as well as reminding guardians when children are in need of new shots, and should be in a format that is recognized as official by public schools. It would be additionally helpful if it had a “scan-in” feature where, on a smart phone, a picture could be taken of vaccination records and they would be automatically uploaded into the application. Technology is an intrinsic part of daily life and an essential component of the future of healthcare, and creating ways that technology can help those who are most in need of improved health outcomes is the best way to be stewards of this most beneficial tool.

## **REFERENCES**

- Barker, L, et al. “Vaccination coverage of American Indian/Alaska Native children ages 19 to 35 months: findings from the national immunization survey, 1998-2000.” *American Journal of Public Health*, vol. 93, no. 12, Dec. 2003, pp. 2046–2048., Accessed 29 Aug. 2017.
- “Disparities | Fact Sheets.” Indian Health Service, Apr. 2017, [www.ihs.gov/newsroom/factsheets/disparities](http://www.ihs.gov/newsroom/factsheets/disparities). Accessed 3 Sept. 2017.
- Downing, Kendall. "Missing vaccines leads to missing school for kids in many districts." *Fox 59*. N.p., 17 Sept. 2014. Web. 25 Aug. 2017.
- Friedman, Misha. “For Native Americans, Health Care Is A Long, Hard Road Away.” NPR, NPR, 13 Apr. 2016, [www.npr.org/sections/health-shots/2016/04/13/473848341/health-care-s-hard-realities-on-the-reservation-a-photo-essay](http://www.npr.org/sections/health-shots/2016/04/13/473848341/health-care-s-hard-realities-on-the-reservation-a-photo-essay). Accessed 29 Aug. 2017.
- Harman, L B, et al. “Electronic Health Records: Privacy, Confidentiality, and Security.” *AMA Journal of Ethics* , vol. 14, no. 9, Sept. 2012, pp. 712–719.

- "Immunizations for Native American Children." *Pediatrics*, vol. 104, no. 3, 3 Sept. 1999, Accessed 27 Aug. 2017.
- Ozair, F F et al. "Ethical Issues in Electronic Health Records: A General Overview." *Perspect Clin Res*, vol. 6, no. 2, Apr. 2015, pp. 73-76
- Singleton, R, et al. "Impact of immunizations on the disease burden of American Indian and Alaska native children." *Archives of pediatrics & adolescent medicine*, U.S. National Library of Medicine, May 2009. 29 Aug. 2017.
- "Importance Of Back-To-School Vaccines." *Vaccine Weekly* 19 Aug. 2015: 98. *Business Insights: Essentials*. Web. 24 Aug. 2017.
- Klevens, R M. "U.S. children living in and near poverty: risk of vaccine-preventable diseases." *Am J Prev Med* 20.4 Suppl (2001): 41-46. Web. 25 Aug. 2017.
- McConnochie, K. M., and K. J. Roghmann. "Immunization opportunities missed among urban poor children." *Pediatrics* 89.6 Pt 1 (1992): 1019-026. Web. 2 Apr. 2017.
- Popovich, M L, et al. "Immunizations: The First Step in a Personal Health Record to Empower Patients." *Medical and Care Compunetics*, vol. 137, 2008, pp. 286-295., Accessed 31 Aug. 2017.
- Shetty, R. "Portable Digital Personal Health Record: To Bridge the Digital gap in Medical Information Storage of Individual with Personal Health Records in Flash Drives." *The Internet Journal of Health*. 2006 Volume 5 Number 2.
- "State Vaccination Requirements." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 29 Jan. 2016,. Web. 24 Aug. 2017.
- Suryadevara, M, et al. "Community-Centered education improves vaccination rates in children from low-income households." *Pediatrics*, vol. 132, no. 2, 8 July 2013, pp. 319-325. 27 Aug. 2017.
- Sulmasy, L S. "Ethical Implications of the Electronic Health Record: In the Service of the Patient." *ACPOnline*, CrossMark, 20 Mar. 2017. Accessed 1 Oct. 2017.
- "Vaccine Information for Adults." Centers for Disease Control and Prevention, Centers for Disease Control and Prevention, 25 Jan. 2013, [www.cdc.gov/vaccines/adults/vaccination-records.html](http://www.cdc.gov/vaccines/adults/vaccination-records.html). Accessed 29 Aug. 2017.

Ventola, C Lee. "Mobile Devices and Apps for Health Care Professionals: Uses and Benefits." *P T*, vol. 39, no. 5, May 2014, pp. 356–364.

Yarboro, T L, et al. "The Need for a Standard National Immunization Record ." *Journal of the National Medical Association*, vol. 83, no. 5, 19 July 1989, pp. 409–414., Accessed 31 Aug. 2017.