

Chapter 4

Towards the Development of IT–Enabled Immunization Monitoring Framework

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ABSTRACT

In this chapter, the authors present a system that uses smart immunization and develops structures to allow collaboration between parents, healthcare workers, and government agencies to cooperate at a grass-roots level to help spread immunization, collect and upload demographics, and allow for its multi-instance analysis. This system will enhance the spread of vaccination and reduce vaccine hesitancy. Information is coagulated and presented as statistical results that are presented in an engaging visualization form. Further, a reminder system has been set up to enable automated email service for parents by reminding them of proper and timely vaccinations. It collates the immunization data to present usable demographics for timely interventions, as may be necessary. The immunization perspective is retrained by easy storage and retrieval and quick remedial measures to contain the spread of vaccine-preventable diseases and reduction in child mortality. Statistical analysis has been done to predict immunization spread among different regions and detect any possible epidemic.

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INTRODUCTION

Vaccines have proven their mettle in reducing the occurrences of many diseases. This has helped protect children from a multitude of life-threatening diseases. But along with vaccination, its progress monitoring is also of immense importance as many vaccines must be administered over a period of time, having varied doses, and other parameters. The monitoring of immunization records critically reduces the influence of vaccine-preventable diseases.

Improvements in mobile communications and multimedia technologies have fuelled solutions to mobile and smart healthcare solutions such as accessibility, affordability, a reminder system, behavior and statistical analysis. Such systems can assist in ensuring that vaccination targets, set by government healthcare agencies, are achieved. The inability of attaining such pre-set immunization targets can cause the breakdown of healthcare in community. Herd immunity is very important to reduce the risk of an outbreak. It ensures that a large percentage of the community is thoroughly vaccinated. This helps in providing protection for vulnerable individuals who are unable to get vaccinated, such as children such as neonates or immune-compromised individuals. Surveillance of immunization records and their maintenance can aid in asserting and observing the growth of immunization with the community. It can also help in identification of compromised zones and hence help in quick action. This work highlights the coverage of vaccination, impact of immunization performance, its growth rate and convergence of procedures by all healthcare stakeholders.

Immunization coverage in India is not as adequate as it should be for a rapidly developing nation. This has led to many challenges for public health agencies. Complete eradication of vaccination-preventable diseases is still lagging due to a lack of such monitoring. Diligent monitoring of immunization records allows government authorities, healthcare personnel, and general public to take swift corrective and preventive measures in cases of fluctuating vaccination estimates. The timely revelation of an inconsistent vaccination rate, for instance, an unexpected fall in usage of flu vaccines, can prompt the deployment of campaigns for flu vaccination campaigns & such necessary actions.

Addressing such important issues has led to the proposal of a generic system that can handle storage and retrieval of a child's medical case history along with the mandated vaccination records and their schedule. Indian Academy of Paediatrics, 2014, provided numerous updates in the immunization schedule for children aged 0 through 18 years. The various stakeholders of immunization include doctors, healthcare workers, and parents who are considered in this application. Each stakeholder has certain privileges. Such an application can have widespread use by government monitoring agencies. Not only generic mobile phone users but also smart-phone users have increased considerably in the Indian subcontinent. SMS service and timely reminders via emails can be incorporated in this application to make it more user-friendly for parents till the time the child's vaccination coverage is incomplete. Capture and storage of immunization records in a region can help in reducing the dispersal of paper-based record keeping. This, in turn, can help in understanding statistics such as the spread of vaccination, its rate, its impact on society and its acceptance by public. Immediate medical assistance of a needful child or even a particular geographic zone becomes more efficient, hazard free and subjective treatment to

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