

VACCINATION MANAGEMENT SYSTEM

Pandeet Deendayal Petroleum University

Authors : Himanshi Panchal(himansi.pict19@sot.pdpu.ac.in)

Megha Morakhia(megha.mict19@sot.pdpu.ac.in)

Pushti Yadav(pushti.ypict19@sot.pdpu.ac.in)

Shrey Thakkar(shrey.tict19@sot.pdpu.ac.in)

Yagna Patel(yagna.pict19@sot.pdpu.ac.in)

Yashvi Thacker(yashvi.tict19@sot.pdpu.ac.in)

Abstract

Vaccine management System Using DBMS techniques stores and process all possible data that is required to make a system for vaccination management. Since it offers item-level visibility and counts more reliably, RFID sensors can help reach a larger number of patients by offering real-time solutions to vaccine monitoring problems. An aspect of IOT that can provide the vaccine management system with much-needed technical advancement and support is also used. The system includes data of vaccination centres, the doctors, the staff that will take care and manage the drives, the storage facilities, vaccine count, number of vaccines. Reliable references are curated and cited.

Keywords

Vaccination, RFID, IoT, Database, Stock, Vaccine Provider

1. INTRODUCTION

Vaccines are one of the most important and effective ways to prevent a large chunk of population against infectious diseases. The process of managing data required while Vaccinating is utterly chaotic and this bit of mismanagement can lead to chaotic situations.

We have created a Vaccine Management System using DBMS techniques. Our main objective is to build a database which stores and process all possible data that is required to make an app for vaccine management. We have precisely and carefully selected datatables of databases so that we can build an efficient database that can readily serve the purpose of the vaccine management system. We have tried to add an element of IOT which can provide much needed technological development and support to the vaccine management system. With the help of devices and sensors, we can enhance supply chain management by intelligently connecting people, process, data and things.

We have used RFID sensors which will help to reach more numbers of patients by providing real-time solutions to vaccine tracking problems because it provides item-level visibility and counts more accurately. Also, using RFID tags we can detect the temperature and liquid level of vaccine stored and then use them to administer vaccines to patients. Along with this we are also using temperature sensors which helps to maintain the record of patient's temperature and also vaccine storage temperature. Also we have discussed how to handle vaccines transportation and supply it to vaccine centers and also protect wastage of vaccines. We have also worked on the stock management and information portal which will help patients to get their queries solved using this portal.

In this paper, we have tried our best to tackle the challenges faced by various systems and have generated optimized solutions using appropriate methods.

1.1 Our Contributions

Our team has worked on providing an efficient vaccine management system using DBMS. The use of RFID sensors helps in providing a real-time solution to the vaccine tracking problems. The vaccine centers, hospitals, staff, doctors, administrators and management team can access all the data in an efficient manner which reduces the glitches and saves the time of a person. Our team has made sure to use the IOT based sensors which makes sure that the vaccine is stored in a suitable atmosphere with appropriate temperature. The vaccine providers get to know the exact details of each hospital and vaccine center which results in a optimum solution to the current scenario.

1.2 Paper organization

Section 2 of the paper are the survey of the literature referred. Section 3 of the paper is our proposed system and has framework, relational model and E-R model. Section 4 of the paper is our experimental analysis followed by conclusion and references.

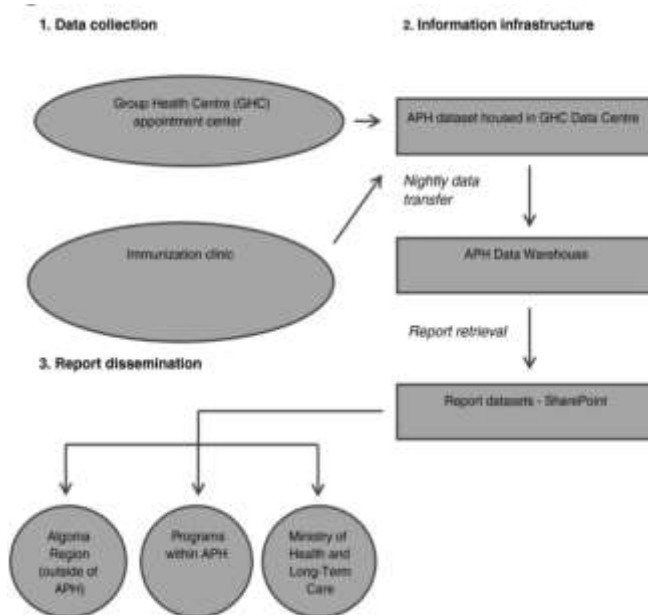
2. Literature Survey

2. LITERATURE SURVEY

2.1

Every year Influenza is responsible for around 2,000-8,000 deaths amongst Canadians. Vaccinations play a major role in preventing Influenza, it is also important to revaccinate annually because of the new mutations of the virus. This process and keeping the track requires efficient monitoring and maintenance systems. The literature we referred to had two systems that collected data and maintained it.

Algoma Public Health's electronic health record (EHR) was established in 2004 as a result of a partnership with Sault Ste Marie's Group Health Centre (GHC), which had adopted an electronic medical record (EMR) many years before. It shared the infostructure – information technology – that had been developed by GHC. Client information is collected from a variety of APH services, including influenza vaccination. The Image below shows the Data Flow.

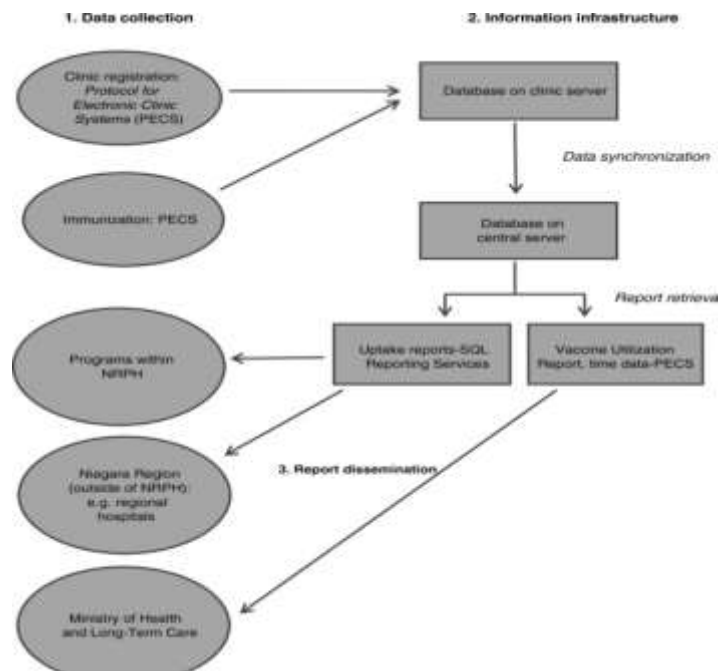


Data flow: Algoma Public Health (APH).

Users presented data entry and report access as easy procedures, while infrequent users can need to refresh their knowledge of the software. Following training, the majority of respondents said they felt immediately at ease with the system; annual refresher training is also available.

Developed in anticipation of the vaccine record-keeping needs that a pandemic would present, NRPH's Protocol for Electronic Clinic Systems (PECS) was designed through an internal collaboration between Niagara Region's ITS and NRPH. The following figure

illustrates the flow of data from immunization to report dissemination. PECS currently captures influenza immunization data only.



For both influenza and other routine immunizations, high-quality, individual-level vaccine coverage data is critical for assessing levels of safety in a population, analysing patterns in utilisation, clinic preparation, and participating in health promotion initiatives. These data can be obtained, processed, and implemented quickly using electronic systems like the ones mentioned in this paper.

Vaccines are one of the most important methods for preventing infectious diseases, tumours, allergies, and autoimmune diseases. There are a lot of the times where only

vaccines are not enough to generate autoimmune responses, hence vaccines adjuvants are used. Vaccine adjuvants are basically compounds that enhance the specific immune responses against coadministered antigens in vaccines. VIOLIN is the first web-based comprehensive vaccine database and analysis system that targets vaccine research. Despite the fact that extensive research has led to the discovery of numerous vaccine adjuvants, there is no web-based central resource that allows for the storage, annotation, comparison, and review of vaccine adjuvants and their applications in vaccine growth. To deal with this issue, **Vaxjo** is a web based Vaccine and Vaccine adjuvant database analysis system.

Vaxjo is based on two HP ProLiant DL380 G6 servers that run the Redhat Linux operating system in a three-tier architecture. The queries are processed using PHP/SQL (middle-tier, application server based on Apache) against a MySQL (version 5.0) relational database (back-end, database server). Figure 1 demonstrates the Vaxjo workflow and system design.

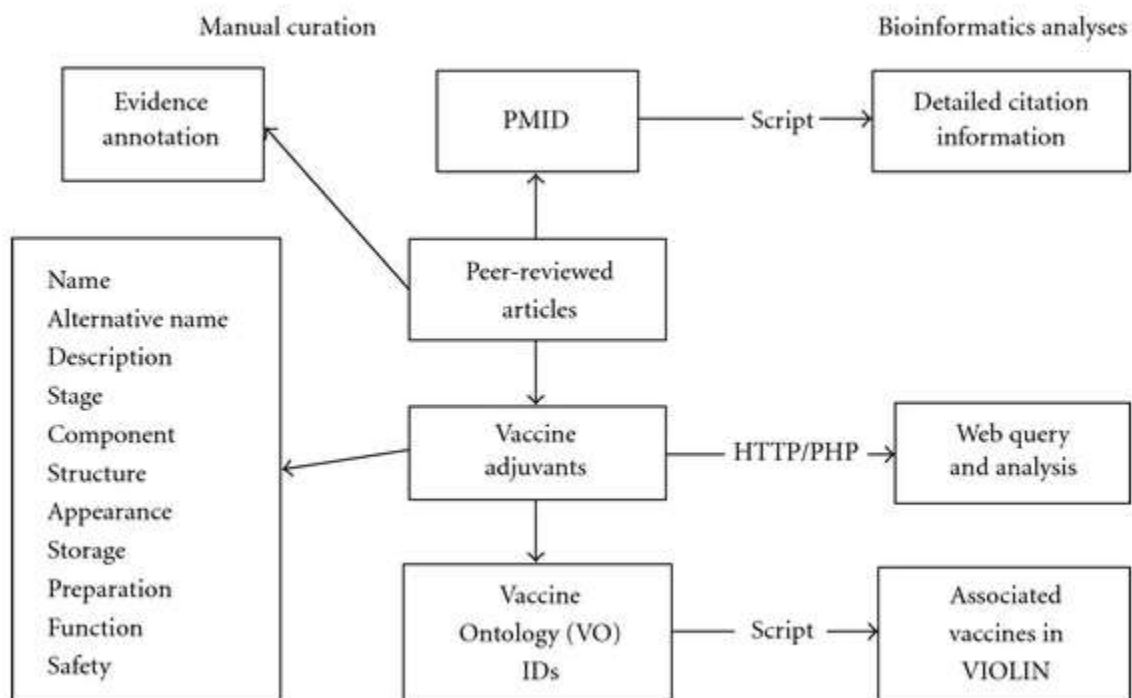


Figure 1

Vaxjo data curators and reviewers can also send and review curated vaccine adjuvant data through the Vaxjo data curation system, which is accessible via the web. Two servers are set up to backup each other's data on a daily basis. Vaxjo is a VIOLIN vaccine database and research integrated software. As a result, a researcher will classify a small tailored list of vaccine

adjuvants that can be used to enhance induction of desired immune responses and have the best chance of success using an efficient question, comparison, and review of the data stored in Vaxjo.

3. Proposed System

3.1 Framework

This system aims at making the overall process of vaccination database management easier, by making everything digital on an online platform that can not only be used for a specific vaccine company or a specific region, but it can be used globally and it provides an interface between the vaccine developing companies , the government and the consumers/patients.

The system includes a platform for the vaccine developing pharmacy companies to enroll their vaccines on the platform, with all the details of the company, of the vaccine along with details of its side effects and the compensation they provide for any kind of fatality it causes. This will help the vaccine to just enroll in a few steps to the platform and their product can be available in the global market. The government can also keep records of the pharmacy companies all at one place digitally.

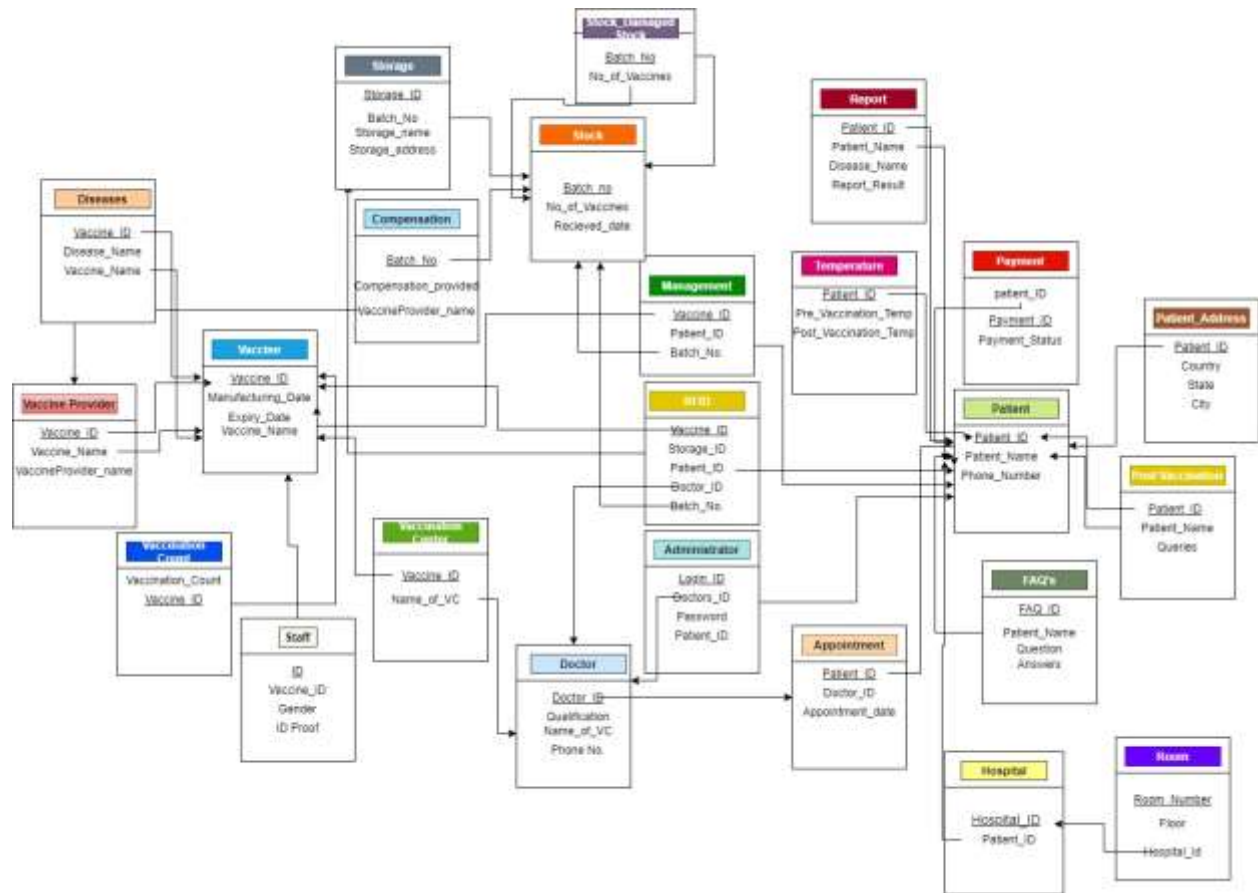
Our system manages the data of vaccination centres, the doctors, the staff that will take care and manage the drives, the storage facilities, vaccine count, number of vaccines used and the details of surplus stock and all the intricate detail that needs to be taken care of during vaccination drives and to ensure proper and efficient vaccination. The platform also lets users sign in with their details and id proofs (to authenticate users) and place a request for the diseases they have and their medical records, and the vaccines they will need for the same will be taken care by the doctors that are also registered on the platform. They will be given appointment dates, follow up check up dates as well on the platform itself. The user can place a complaint as well for any kind of fatality they face. The whole system will work using RFID technology wherever it is needed so as to maintain proper records of products, number of staff members and precisely store them.

The system offers to also store temperature of the patients while getting vaccinated and at the time of follow up using temperature guns that are directly linked to the system and store the temperature details for the person who is also identified using the RFID tag which has been allotted. However, this system is also capable of storing other IoT based devices which are used in medical checkups with doing very little modifications as per the need at that time. It also has an FAQ,s section to answer the general questions of the users. The system stores information of

the exact room number of the exact hospital in which the patient will be vaccinated or the doctor's duty is allotted. The system has everything needed for the most efficient and digital vaccination drives.

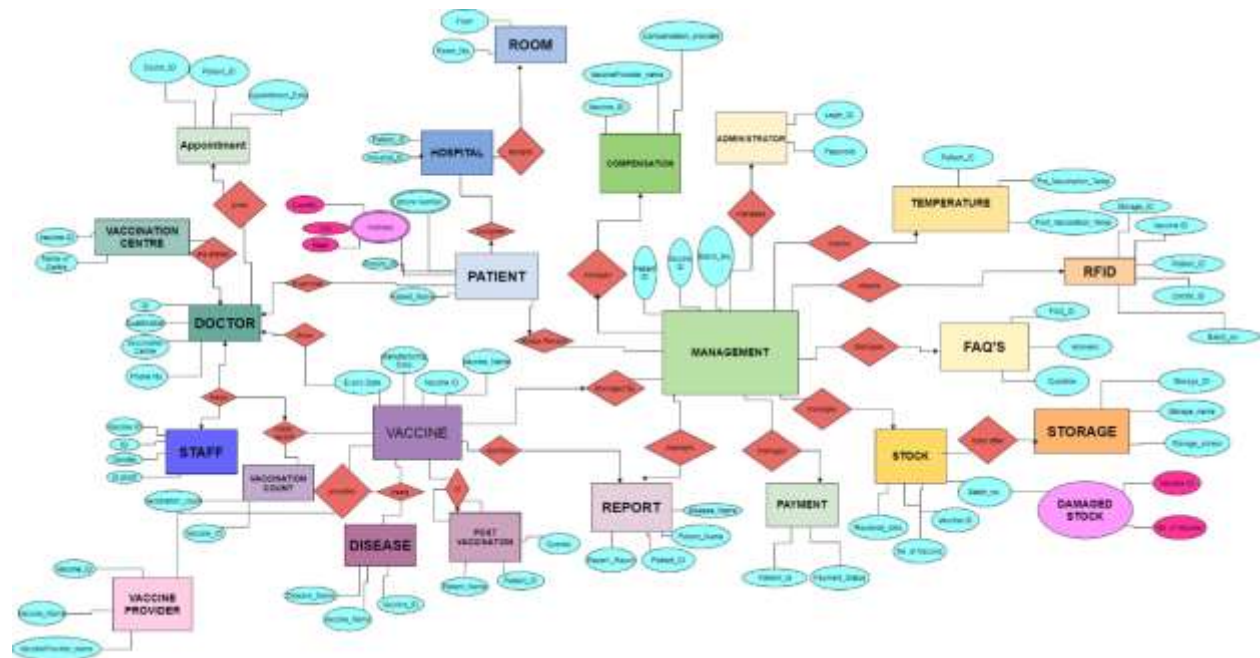
3.2 Relational Model

The following figure shows Relational Model



3.3 Entity Relationship Model

The following figure shows our Entity Relationship Model



4. Experiment analysis

SR NO.	FEATURE	TABLES
1	Vaccine Tracker	Diseases, Vaccine Provider, Vaccine Count, Compensation, Vaccination Center, Doctor, Vaccine, Management
2	Disease Tracker	Diseases, Vaccine Count, Report
3	IOT	RFID, Temperature
4	Stock Management	Stock, Stock_Damaged Stock, Storage
5	Information Portal	Post Vaccination, FAQs, Patient, Patient_Address, Hospital, Appointment, Room, Administrator, Staff
6	Payment Gateway	Payment

5. Conclusion and Future Work

The main aim of this system is to make the overall process of vaccination easy and optimum.

We are working on making an efficient front end model for this backend system which properly fits the global requirements of vaccination.

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