

VAXONE: ONE PLATFORM FOR ALL VACCINATION NEEDS

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ABSTRACT

This paper presents "VaxOne: One Platform for All Vaccination Needs", an innovative web-based vaccine registration system designed for both humans and animals. The platform aims to simplify and digitize the vaccine booking process through a secure, user-friendly interface. Users can register using their Gmail accounts, with OTP verification enhancing account security. After authentication, users can search for cities, and based on the selection, choose between Human or Animal vaccination options. Each option redirects to a list of available hospitals within the selected city. Upon selecting a hospital, users can view the list of available vaccines and register for a specific vaccine with ease.

The system also includes a Vaccine Info feature integrated into the navigation bar, where users can search for any vaccine or disease, which redirects them to the corresponding Wikipedia page for accurate and updated information. The platform is developed using standard web technologies such as HTML, CSS, and JavaScript for the frontend, and PHP with MySQL for the backend. All user and booking data is securely managed and stored using the XAMPP local server. The systems clean design, logical navigation flow, and dual functionality make it a comprehensive solution for vaccine registration and information for both public healthcare and veterinary services.

Keyword: Vaccine Registration System, Human and Animal Vaccination, Gmail OTP Verification, PHP, MySQL, XAMPP Server, Vaccine Booking, City-Based Hospital Search, Vaccine Information System.

1. INTRODUCTION

Vaccination is one of the most impactful public health interventions in history, significantly reducing the burden of infectious diseases across the globe. Not only do vaccines help prevent the spread of harmful pathogens among humans, but they also play a critical role in animal health by safeguarding livestock, pets, and wildlife from life-

threatening illnesses. Despite this, managing vaccination schedules, maintaining records, and ensuring timely registration continues to be a logistical challenge especially in regions where digital infrastructure is limited or underutilized.

In the modern era of technology, where digital platforms have transformed sectors like education, finance, and commerce, the healthcare system especially vaccine management still relies heavily on manual entries, paper-based records, or disconnected portals. These outdated methods often result in data inconsistencies, registration errors, limited accessibility, and an overall lack of transparency for end-users. Moreover, in many parts of the world, there exists no unified system that caters to both human and animal vaccination needs under one digital platform. This leads to fragmentation of information, inefficiency in resource allocation, and poor user experience for those seeking essential healthcare services.

To address these long-standing issues, we propose VAXONE: ONE PLATFORM FOR ALL VACCINATION NEEDS, a modern web-based solution that integrates vaccine registration, information access, and city-based hospital navigation into a single, user-centric platform. The primary objective of VAXONE is to make the vaccination process more accessible, transparent, and efficient for all users whether they are registering themselves for a vaccine or seeking care for animals.

At the heart of the platform lies an easy-to-use registration process that begins with Gmail-based login authentication. To enhance security and ensure that only genuine users access the system, an OTP (One-Time Password) is sent to the users Gmail account during registration. Once verified, users can seamlessly access the platforms core functionalities without the need for any third-party installations or complex onboarding processes.

One of the defining features of VAXONE is its dual-option interface, which becomes available once the user selects a city. The interface clearly presents two categories: one for Human Vaccination and the other for Animal Vaccination. Upon selecting either category, the user is directed to a list of hospitals specific to the chosen city and category. Each hospital listing provides detailed information, including the name of the hospital and the vaccines it currently offers. This intuitive flow simplifies the user experience and reduces the steps needed to complete the booking process.

Beyond the vaccine booking system, VAXONE also includes a dedicated Vaccine Info feature in the navigation bar. This feature allows users to enter the name of any vaccine or disease, and upon submission, they are automatically redirected to its corresponding Wikipedia page. This ensures users always have access to reliable and updated information about vaccines, side effects, and their benefits, empowering them to make well-informed healthcare decisions.

From a technical standpoint, VAXONE is developed using well-established and widely supported web technologies. The frontend is crafted using HTML for structure, CSS for styling, and JavaScript for dynamic user interactions and animations. On the backend, PHP handles the server-side logic and database operations, while MySQL serves as the database engine for storing user data, hospital lists, available vaccines, and booking records. The entire system is deployed and tested on the XAMPP local server environment, which provides a stable and secure platform for development and offline data management.

The design of VAXONE prioritizes not only functionality but also visual appeal and user experience. The interface is responsive, mobile-friendly, and includes animated transitions, glowing buttons, and clearly organized cards for vaccine listings all of which contribute to a smooth and professional user journey.

In summary, VAXONE is not just a vaccine booking system it is a comprehensive digital platform that bridges the gap between users and vaccine providers, across both human and veterinary healthcare. By offering a secure, centralized, and visually appealing environment, VAXONE holds the potential to improve vaccine accessibility, enhance data transparency, and support the broader public health mission of immunization for all.

2. LITERATURE REVIEW

The increasing importance of vaccination in disease prevention and global health has led to the development of various digital platforms aimed at improving vaccine accessibility and tracking. Numerous studies and real-world implementations have explored different approaches for vaccine registration, data management, and awareness. However, most existing systems are either limited to human healthcare or are region-specific, often neglecting veterinary vaccination needs and lacking integration between services.

A previously developed system by Bafana et al.(2025) utilized Java to create a platform for scheduling vaccinations for both humans and animals. In contrast, the VAXONE system is designed with a focus on enhanced security and usability, incorporating Gmail-based OTP login and dynamic city wise hospital and vaccine listings, built entirely

using PHP and MySQL technologies. In the study by Patil et al. (2020), a mobile-based vaccine reminder system was developed to help parents track their children's immunization schedules. The system proved effective in increasing vaccination rates in rural areas, but it primarily focused on pediatric immunization and lacked flexibility for other use cases such as adult or animal vaccination. Similarly, Kumar and Sharma (2019) explored a web-based application for tracking COVID-19 vaccination records during the pandemic. While the system offered real-time data tracking and online slot booking, it was designed solely for COVID-19 vaccines and did not support multi-disease or multi-species vaccinations.

Another notable example is the Co-WIN portal, introduced by the Government of India, which enabled citizens to register for COVID-19 vaccines and obtain digital certificates. While successful in handling large-scale registrations, the platform was designed with a single disease in mind and lacked support for veterinary applications or a flexible search mechanism for different diseases and vaccines. It also had limited features for accessing external information sources like vaccine-related articles or disease knowledge bases.

Chatterjee et al. (2021) presented an integrated health information system that utilized RFID-based tracking for vaccine supply chains. This system improved transparency and logistics management but was primarily intended for administrative use and not accessible to the general public for personal vaccination registration. Moreover, it did not include any front-end features like Gmail login authentication, OTP verification, or intuitive user navigation.

In the field of veterinary healthcare, few digital platforms exist. A case study conducted by Singh et al. (2022) examined an animal vaccination tracking system used in select agricultural regions. Though it successfully reduced instances of missed livestock vaccinations, the platform was offline and heavily dependent on manual data entry. Additionally, it was not integrated with any online registration or educational modules for end-users.

Most of the reviewed systems also lacked a feature to dynamically provide vaccine or disease information through external sources like Wikipedia, which is essential for improving public knowledge and dispelling vaccine misinformation. Education plays a critical role in vaccine uptake, and systems that fail to offer real-time, verified information often fall short in meeting user needs.

From the comparative analysis of existing platforms, it is evident that a gap exists in the availability of a unified, web-based system that supports vaccine registration for both humans and animals, integrates secure user authentication, enables real-time hospital and vaccine selection based on cities, and offers an informational module for vaccine-related awareness.

VAXONE aims to fill this gap by bringing together the strengths of various systems while addressing their limitations. It combines modern web technologies, a flexible UI/UX, secure Gmail-based login, OTP verification, and vaccine categorization by location and type (human/animal). Furthermore, the integration of external knowledge sources like Wikipedia makes it more than just a registration platform it becomes a learning and awareness tool for the public.

3. METHODOLOGY

3.1 Backend Development with PHP

The backend of VAXONE was developed using PHP, which serves as the backbone for all server-side operations. PHP handles dynamic content rendering, form processing, and user session management. One of the most important features implemented was Gmail-based registration with OTP (One-Time Password) verification. When a user enters their email address during sign-up, a randomly generated OTP is sent to their Gmail. This OTP is validated through PHP scripts to ensure secure authentication and prevent unauthorized access.

Once verified, users can access the platform's core features, including selecting their city, viewing categorized hospital options for human or animal vaccinations, and registering for available vaccines. PHP was also used to control the routing logic that determines the flow between pages based on the user's interactions and choices.

3.2. Database Design and Integration

A robust MySQL database was designed to manage all critical data user credentials, hospital information, available vaccines, and registration records. The database structure follows normalization principles to avoid redundancy and

ensure data integrity. Relationships were carefully established between tables using foreign keys for efficient data access and management.

Each city is linked to specific hospitals, and each hospital is mapped with the vaccines it offers. Data queries and updates are securely handled using PHP in conjunction with prepared statements, which protect the platform against SQL injection attacks. The entire system operates on a XAMPP local server, which provides a stable and isolated development environment for testing and implementation.

3.3. Vaccine Info Search Module

To enhance user awareness and education, the system includes a Vaccine Info module accessible from the navigation bar. This feature allows users to search for any vaccine or disease by entering its name in a text field. When submitted, JavaScript dynamically constructs a URL that redirects the user to the relevant Wikipedia page. This approach ensures that the information provided is always up-to-date, credible, and user-accessible without requiring manual content updates on the platform itself.

The purpose of this module is to empower users with reliable, real-time information, helping to reduce misinformation and improve public understanding of vaccines for both humans and animals.

3.4. Frontend Development with HTML, CSS, and JavaScript

The platform's frontend was crafted using HTML for structure, CSS for styling, and JavaScript for dynamic interactivity. The interface was designed to be clean, modern, and responsive across all devices. Key sections include:

- A visually appealing homepage with a category selection feature for Human and Animal vaccine pathways.
- A city search page, where users can choose their location before viewing hospital and vaccine options.
- Intuitive buttons, cards, and transitions to guide users through each stage of the registration process.

Animations and hover effects were added using JavaScript and CSS transitions to create a smooth, interactive experience. The layout emphasizes usability, ensuring that even first-time users can easily navigate the platform.

4. Results

The VAXONE platform was successfully developed and tested in a local environment using XAMPP. The user interface is simple, modern, and easy to navigate. As shown in the attached screenshots, the system allows users to:

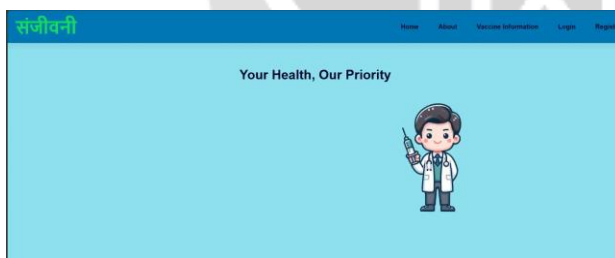


Fig 4.1. Home page



Fig 4.2. Register using Gmail



Fig 4.3. OTP verification page.

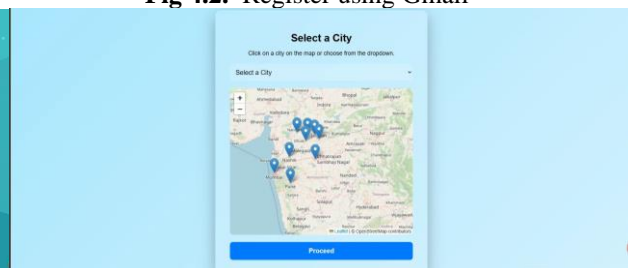


Fig 4.4 Search for cities



Fig 4.5. Animal and Human section

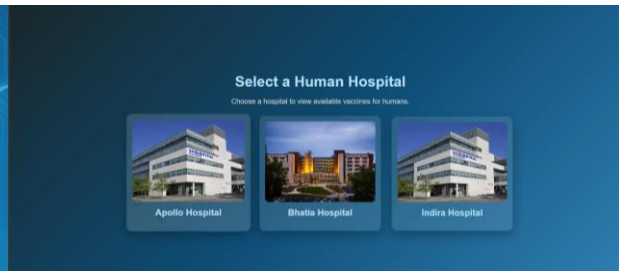


Fig 4.6. List of available hospitals

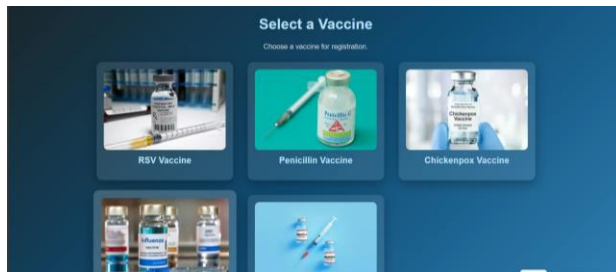


Fig 4.7. Vaccines available in that hospital.

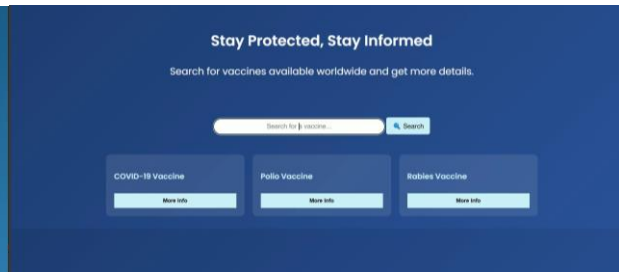


Fig 4.8. User can search for any vaccine Info.

5. ADVANTEGES AND APPLICATIONS

VAXONE serves as a practical solution for managing public and veterinary vaccination records, enhancing digital health education, supporting rural and urban communities, and inspiring future healthcare technology models.

5.1. Advantages of VAXONE

- **Unified System:** It is the first web platform that combines vaccination services for both humans and animals under one system.
- **Information Access:** Includes a vaccine info search feature that redirects users to trusted sources like Wikipedia for reliable and up-to-date information.
- **Secure Login:** Uses Gmail-based registration with OTP verification to ensure data privacy and authorized access.
- **Location-Based Services:** Allows users to search by city, view available hospitals, and choose vaccines specific to each location.
- **User-Friendly Interface:** Built with a clean and interactive design, making it easy to navigate for users of all ages.
- **Educational Value:** Helps spread awareness and accurate knowledge about vaccines and diseases, supporting informed decision-making.
- **Flexible Technology Stack:** Developed using HTML, CSS, JavaScript (frontend), PHP, and MySQL (backend), making it easy to deploy and scale.
- **Local Server Support:** Runs efficiently on XAMPP for development and testing purposes.

5.2. Applications of VAXONE

- **Public Health Management:** Useful for government bodies to manage vaccine bookings and data efficiently.
- **Veterinary Healthcare:** Assists animal hospitals in tracking and registering animal vaccinations.
- **Educational Institutions:** Acts as a learning tool for students and educators in understanding vaccines and healthcare systems.
- **Community Access:** Serves both rural and urban populations by offering a centralized vaccine platform.
- **Digital Health Projects:** Can be adapted as a model system in other health-tech or e-governance applications.

6. CONCLUSION

In today's world, where health has become a global priority, having a system that simplifies access to vaccines is more important than ever. While many platforms exist, most focus only on human health or are limited to specific diseases. There has been a single place where users can register for both human and animal vaccines and also get reliable information all in one place. VAXONE fills that gap. It's a smart, easy-to-use platform that brings everything together. Whether someone wants to register for a vaccine for themselves or for their pet, VAXONE makes the process smooth and secure. The Gmail login and OTP verification add a layer of safety, while the city-based hospital and vaccine selection helps users quickly find what they need. One of the best parts of this system is the Vaccine Info feature. Instead of searching through random websites, users can get direct access to verified information through Wikipedia. This helps build trust and awareness, especially in areas where vaccine myths are still common. Built using HTML, CSS, JavaScript, PHP, and MySQL, and tested locally on XAMPP, the platform is not only functional but also ready to be scaled or customized. It's designed with real people in mind, easy to understand, simple to use, and helpful at every step. In short, VAXONE is just a tool, it's a step forward in making healthcare more connected, inclusive, and informative for everyone.

7. FUTURE SCOPE

- **Real-Time Data Synchronization:** Integrating VAXONE with live servers and public health databases can enable real-time updates on vaccine availability, hospital slots, and registration confirmations.
- **Mobile Application Development:** Creating an Android and iOS app version of VAXONE will improve accessibility, especially in rural and remote areas where mobile usage is higher than desktop usage.
- **Multilingual Support:** Adding regional language support will help break language barriers, allowing users from different backgrounds to easily use the platform.
- **Digital Vaccine Certificates:** Generating downloadable vaccine certificates with QR codes for both human and animal vaccinations can be added to enhance verification and portability.
- **Integration with Government Systems:** Partnering with local and national health departments can turn VAXONE into an official vaccine management solution, improving healthcare infrastructure and outreach.

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