Chapter I
INTRODUCTION

Background of the Study

Barangay health centers serve as the primary healthcare access points in Philippine communities, especially in areas like Barangay Poblacion, President Quirino, Sultan Kudarat, where residents often depend on them for essential medical services. These centers play a critical role in preventive care, maternal and child health, immunization, and disease management. However, despite their importance, many still operate with fragmented, paper-based systems. Patient records are maintained manually, appointments are scheduled informally, and medicine inventories are logged without reliable tracking mechanisms. This manual approach leads to inefficiencies, lost or inaccurate records, missed appointments, and delays in service delivery.

Health workers, tasked with recording medical histories, tracking immunization schedules, and dispensing medicines, face challenges in retrieving accurate information promptly. Patients often endure long waiting times and miscommunication regarding appointments or follow-ups. Furthermore, the absence of real-time, centralized data limits the ability of barangay officials to identify trends, allocate resources effectively, and respond promptly to health issues in the community.

Studies have emphasized the transformative impact of digital health solutions in community settings. Marquez et al. (2022) found that mobile-based health information systems improve record-keeping, appointment management, and inventory monitoring while enhancing communication between patients and providers. Dela Cruz and Bautista (2021) also noted that mobile applications with immunization tracking, automated reminders, and real-time reporting significantly improve timely healthcare delivery in rural areas.

In Barangay Poblacion, the lack of an integrated digital system remains a major barrier to efficient healthcare delivery. Current processes fail to address communication gaps, real-time decision making, and organized data management limiting the center’s capacity to deliver timely, coordinated, and patient-centered care.

To address these gaps, the Health Connect: Web-based Health Monitoring Services for Barangay Health Center is proposed. This system will integrate centralized SMS/email notifications. Recognizing potential challenges such as digital literacy, internet access, and data security, the system will incorporate offline caching, user training, and encryption to ensure accessibility, usability, and trustworthiness.

Objectives of the Study

General Objectives

This study generally aims to develop and evaluate the “Health Connect: Web-Based Health Monitoring Services for Barangay Health Center of Barangay Poblacion, Pres. Quirino, S.K.

Specific Objectives

This study specifically aims to:

1. Develop a Web-based Health Monitoring Services that can manage barangay health worker’s account information.

2. Allow Nurse and Midwife to manage patient records, including personal details, medical history, and treatment information

3. Enable patients to schedule appointments and receive automated SMS notifications for appointment reminders

4. Develop a system for tracking and managing immunization schedules for both children and adults in the community.

5. Provide a data dashboard with graphical presentation to track;

5.1. Total number of appointments / Day / Week / Month

5.2. Total number of patients / Day / Week / Month

6. Generate reports such as;

    6.1. List of appointments

    6.2. List of patients

    6.3. Patient’s medical record

    6.4. Appointment Slip

7. Evaluate the system in form of;

    7.1. Accuracy

    7.2. Security

    7.3. Functionality

    7.4. Effectiveness

Significance of the Study

The result of the study may greatly benefit the following:

The Barangay Health Center - Implementing Health Connect offers the health center a more streamlined, data-driven operation. This reduces guesswork when allocating resources e.g., ordering supplies or scheduling staff and helps identify service bottlenecks early. At the same time, automated appointment slips and email reminders can lower no-show rates, optimizing slot utilization. However, it’s important to acknowledge upfront challenges: initial setup costs, reliable network/connectivity requirements, and ongoing maintenance. By assessing these honestly, the center can plan for contingencies (offline caching, periodic training refreshers) so the system truly boosts efficiency rather than becoming an extra burden.

The Barangay Health Workers - For health workers, Health Connect can cut down on repetitive administrative tasks such as manually writing patient histories or tracking immunization dates on paper freeing more time for direct patient care. The digital patient record module ensures that medical histories, treatment notes, and immunization schedules are consistently organized and easily retrievable. A realistic rollout plan should include hands-on sessions, quick-reference guides, and perhaps a “buddy” system pairing tech-savvy staff with others, to ensure confidence and minimize frustration.

The Patients - Patients stand to benefit from more convenient scheduling and clearer communication. With automated email reminders and printable slips, they are less likely to miss appointments, reducing anxiety and travel wasted. To address digital access and literacy: some patients may lack services and reliable internet. The study should explore fallback options (e.g., SMS reminders, phone calls, community kiosks) and include user education materials so the system is inclusive rather than exclusionary.

To the Researchers - Studying Health Connects implementation provides valuable insights into mobile health adoption in barangay settings. Researchers can evaluate usability, acceptance, record accuracy, to contribute evidence on what works and what doesn't in similar low-resource environments. Detailed evaluation of functionality, accessibility, security, and efficiency uncovers practical lessons: which features deliver the highest value, where connectivity or privacy concerns arise, and how training methods affect uptake. Findings can inform future iterations or scaling to other communities, and can be published as case studies or guidelines for digital health in grassroots contexts. Honest reporting of both successes and setbacks ensure others avoid repeating pitfalls.

To the Community and Policymakers - By demonstrating a working model in Barangay Poblacion Pres. Quirino, this study can influence policy decisions around digital health investments at the municipal or provincial level. Clear evidence of improved service delivery, patient satisfaction, and resource management can support proposals for funding similar systems elsewhere. Community leaders gain a concrete example of how technology can strengthen primary care, while also seeing the importance of addressing digital divides and data privacy policies. The study can spark dialogues on standards for barangay-level health data, interoperability with higher-level health information systems, and long-term sustainability plans (budgeting for maintenance, periodic upgrades, or integrating new modules).

To IT Developers and System Maintainers - The project highlights real-world requirements for building robust, user-friendly mobile health applications in resource-constrained settings. Developers learn about balancing feature richness with performance on low-end devices, designing intuitive interfaces for non-technical users, implementing offline-first strategies, and securing sensitive health data. Insights from the study such as common usability hurdles or integration pain points guide future development best practices. Maintaining the system over time also surfaces lessons on documentation, version control, and providing timely support. This significance encourages a culture of iterative improvement: collecting user feedback continuously and rolling out updates that address evolving needs without disrupting operations.

To Educators and Students - For those studying IT, public health, or related fields, Health Connect serves as a practical example of interdisciplinary collaboration: combining software development, healthcare workflows, user experience design, and evaluation research. Students can learn from the project lifecycle needs analysis, design, implementation, testing, deployment, and evaluation gaining hands-on understanding of challenges in community focused digital solutions. Educators might integrate case materials into curricula, prompting discussions on ethics (data privacy), accessibility, and sustainability in ICT for development. This real-world context enriches learning beyond textbook scenarios.

Scope and Limitation of the Study

This study will be focus on the design, development, implementation, and evaluation of a Web-Based Health Monitoring Services platform called Health Connect, specifically created for the Barangay Health Center of Barangay Poblacion, Pres. Quirino, Sultan Kudarat. The system aims to improve healthcare service delivery through a centralized mobile application tailored to the needs of barangay health workers and local residents. The scope includes the creation of a module for managing health worker accounts, as well as a comprehensive patient record system that stores personal details, medical history, and treatment information. It allows patients to schedule appointments through the Web-Based and receive automated SMS notifications for reminders.

Additionally, the application provides a user-friendly dashboard displaying graphical summaries of key data such as the Total number of appointments, patient count, and daily appointment records. Report generation features are included to produce lists of appointments and patients, patient medical records, and appointment slips. The study also involves evaluating the system's performance in terms of accuracy, security, functionality, and effectiveness. Evaluation will be conducted through a pilot deployment at the Barangay Health Center, with testing focused on the usability of the app in local contexts, including areas with low internet connectivity. The web-based is developed for website considering the accessibility needs of users with limited technical knowledge and devices.

Despite its wide scope, the study is limited to the implementation and evaluation of the system within Barangay Poblacion, Pres. Quirino. Integration with municipal or national health information systems is not covered. Dashboard analytics are limited to basic counts and visualizations, without advanced data mining or predictive modeling. While the app offers offline caching for select features, full offline functionality with automatic data synchronization is beyond the scope. The platform is designed for web application.

Definition of Term

The terms are defined theoretically and operationally in the study

Account Management - refers to a system module that allows barangay health workers to securely create, edit, and maintain their personal and professional information within the web-based health monitoring services. This ensures controlled access to patient records and system functionalities.

Appointment Scheduling - refers to a system feature that enables patients to conveniently select their preferred consultation date and time via the mobile application. The system automatically sends SMS notifications to patients confirming and reminding them of their appointments.

Barangay Health Worker (BHW) - refers to an accredited frontline healthcare provider in Barangay Poblacion Pres. Quirino responsible for delivering community health services, maintaining patient records, managing immunizations, and utilizing Health Connect for efficient service delivery.

Barangay Health Center - refers to primary healthcare facility providing consultations, maternal care, chronic disease management, and immunizations.

Data Dashboard - refers to a visual, graphical feature of the system that presents the total number of appointments, total patient daily, weekly, and monthly to assist barangay health workers in monitoring health center operations.

Evaluation Tools - refers to a set of criteria and assessment tools within the system designed to measure the accuracy, security, functionality, and effectiveness of Health Connect based on user feedback and system performance

Immunization Schedule Management - refers to a system module designed to record, track, and manage immunization schedules for both children and adults in the barangay. It ensures timely vaccination by providing alerts and status updates through the system.

Patient Medical Record Management - refers to a core feature of the system that enables barangay health workers to input, store, and manage detailed patient information including personal details, immunization records, and treatment information.

Report Generation - refers to the automated function of Health Connect to produce comprehensive reports such as lists of appointments, patient records, appointment slips, and immunization records for documentation and decision-making.

Scheduling and Notification System - refers to a component of the system that allows patients to book appointments and automatically delivers SMS notifications to their registered mobile numbers regarding their confirmed appointment date, time, and reminders.

System Administrator - refers to the individual authorized to manage and oversee the technical operations of Health Connect, including user account management, data integrity checks, troubleshooting, and implementation of security protocols.

System Evaluation - refers to the process of reviewing the Health Connect system's operational performance based on parameters such as accuracy, security, functionality, and effectiveness, to identify areas for improvement and system updates.

Transaction History - refers to a chronological digital record within Health Connect that captures all activities performed by health workers and patients, including registrations, appointments, immunization records, and consultation logs.

Chapter II
REVIEW RELATED LITERATURE OF THE STUDY

This chapter presents to a review of related literature and studies.

Related Readings

Garcia-Dia et al., (2020).

Using text reminders to improve childhood immunization adherence in the Philippines. Computers, Informatics, Nursing, 35(4), 212–218. In this comparative study conducted in rural Philippine communities, researchers found that sending text message reminders (with or without accompanying images) to parents significantly improved compliance with scheduled measles–mumps–rubella vaccinations. They report that “text messaging with or without pictures is a feasible and useful tool in immunization compliance for childhood immunization”. Relevance: Demonstrates that simple mobile SMS reminders can boost immunization adherence in under-resourced barangays, suggesting Health Connect could incorporate automated vaccine reminders to help parents keep up with immunization schedules.

Ridad et al., (2020).

Acceptability testing of a mobile application to improve immunization status monitoring and compliance in selected barangay health centers in Iligan City. International Journal of Trend in Research and Development, 4(5). This pilot project developed an Android app for health workers in ten barangay health centers, aimed at tracking childhood immunization. The app was rated extremely easy to use and highly beneficial by nurses and midwives, with participants "very satisfied…with its performance," and the authors conclude the app "proved to be promising in improving monitoring of immunization status and compliance". Relevance: Shows strong end-user acceptance of a Philippines context immunization app and improvement in record-keeping – a direct parallel for Health Connect's goal of using mobile tools to enhance immunization tracking and coverage at the barangay level.

Gonda et al., (2021).

PHax Track: An Android-based immunization tracker mobile application for Makati City health institutions. Universitas Journal, 9(1). This study evaluated the PHax Track app (for recording vaccinations and adverse event reports) among Makati City health workers and patients. The authors report very high acceptability, usability, and effectiveness scores (mean ≈3.7–3.8 out of 4) for the app, with feedback that it was user-friendly and fulfilled its purpose. Users did note minor technical issues and the need for internet connectivity as limitations. Relevance: Confirms Filipino healthcare providers and caregivers find immunization apps useful when deployed locally. The high satisfaction suggests similar acceptance could be expected for Health Connect's immunization module, though attention to offline functionality and technical support is needed.

Castillon et al., (2024).

Strengthening public child healthcare: Development of an immunization management information system for a local community in Southern Mindanao, Philippines. Journal of Health Research and Studies, 3(1), 68–79. This engineering study reports on an Immunization Management Information System built for Mindanao health centers, featuring a centralized database, web/mobile interface, and SMS reminder functionality. The authors found that the system "streamlines and enhances the management of immunization records and processes" at the health center. In practice, it automated tasks like vaccine inventory tracking and sending caregivers text reminders for upcoming shots. Relevance: Provides a model for an integrated immunization registry in a Philippine barangay setting. Health Connect could similarly employ a central database with digital records and SMS alerts to ensure timely vaccinations, mirroring this system's reported improvements in service delivery.

Onigbogi et al., (2025).

Mobile health interventions on vaccination coverage among children under 5 years of age in low- and middle-income countries: A scoping review. Frontiers in Public Health, 13, 1392709. This recent scoping review synthesized 27 studies of mHealth for child vaccination in LMICs (many using SMS reminders). The conclusion was clear: “The results from most studies suggest an improved uptake of vaccination with mobile health interventions.” Specifically, SMS reminder systems in diverse settings consistently raised vaccine coverage rates. Relevance: Offers broad evidence that mobile reminders and tracking tools increase immunization uptake. This supports Health Connect’s overall approach: a Filipino barangay health app that reminds and records vaccinations is likely to achieve higher immunization rates, as seen in analogous mHealth programs worldwide.

Related Literature

Perspectives on telemedicine across urban, rural and remote areas in the Philippines during the COVID-19 pandemic

Dans et al., (2024). In a mixed-methods survey, Filipino telemedicine users and non-users identified benefits (reduced COVID exposure, lower costs, convenience) as well as barriers (limited devices/infrastructure, patient/provider readiness). Both groups emphasized that substantial investment and training are needed for telehealth to bridge rural health gaps. Relevance: Indicates that for initiatives like Health Connect’ s, improving connectivity, technical support and training are crucial to foster telehealth adoption and equity in rural/remote PH areas.

Patient satisfaction with telemedicine in the Philippines during the COVID-19 pandemic: a mixed methods study

Noceda et al., (2023) This study surveyed patients using Philippine telemedicine services. Most respondents were satisfied, finding telehealth “safe, efficient, and affordable”. However, they also reported challenges (costs, internet reliability, and concerns about clinical quality). The authors recommend strengthening infrastructure and provider training to sustain rural telehealth usage. Relevance: Confirms that Filipino patients appreciate telehealth’s convenience, but highlights the need for robust support and quality assurance in community settings lessons directly applicable to Health Connect’ s user engagement and service design.

Factors influencing the acceptance of telemedicine in the Philippines

Ong et al., (2022) Using the UTAUT2 behavioral model with 533 Filipino respondents, this study identified key drivers of telemedicine adoption. It found that actual usage behavior was the strongest predictor of intention to use telemedicine, with factors like performance expectancy (perceived usefulness), effort expectancy, social influence, and resistance to use significantly affecting uptake. Relevance: Offers a theoretical understanding of what motivates Filipino users to adopt telehealth. Health Connect’ s can leverage these insights (e.g. emphasizing usefulness and ease-of-use, enlisting community influencers) to improve adoption of mobile health tools in barangays**.**

Barangay Integrated Management System with Mobile Support.

Lim (2022). This study developed a mobile-enabled barangay management system that lets residents set appointments and file complaints online, integrating barangay health center and office data. Expert evaluation found the system highly usable and efficient, enabling fast management of resident profiles, public information, supplies, complaints, and appointments. In short, the mobile app greatly improved service speed and reduced the need for in-person visits at the barangay office/health center. Relevance: Demonstrates that a smart mobile app can streamline barangay health center operations (e.g. scheduling visits remotely) – a design goal shared by Health Connect – by making services faster, more convenient, and less reliant on face-to-face interactions.

“Padayon”: A new digital health model for diabetes and hypertension in rural Philippines.

Paluyo *et al.* (2022). This early-stage BMJ Innovations report describes an offline-capable mHealth program (“Padayon”) where community health teams (public health nurses and barangay health workers) used mobile apps to screen and monitor patients with diabetes and hypertension. The authors report that the “innovative use of community health teams equipped with ‘offline-first’ mHealth apps” enabled Padayon to meet its targets and improve clinical outcomes – in particular, significant reductions in patients’ systolic and diastolic blood pressure and random blood sugar levels. Relevance: Shows that locally designed mHealth solutions (even with limited internet) can effectively support rural barangay health services and improve patient outcomes. These findings underscore the value of Health Connect’s mobile approach for empowering barangay health workers and patients in low-connectivity Philippine settings.

Related Studies

Patient Perspectives on Utilizing a Mobile Medical Clinic in Rural Philippine Communities

Weiner et al., (2024). This qualitative study evaluated ABC-MMC, the first mobile primary healthcare clinic for chronic disease care in rural Pampanga barangays. Focus groups (N=57) found the mobile clinic was “well-received by rural Filipino communities,” improving access for hypertension/diabetes management. Relevance: Demonstrates high community acceptance of mobile clinic services in underserved barangays, providing lessons on engagement and continuity of care relevant to Health Connect' s outreach design.

Implementing a mHealth-Based Patient and Nurse Educational Program to Reduce Wound Infection in Rural Philippines

Henarejos et al., (2022). In this surgical mission study, rural Filipino patients received mHealth-supported wound care education and follow-up via a secure mobile app. Between two mission years, surgical site infection (SSI) rates fell sharply from 28.8% to 9.7%. Relevance: Shows how a mobile health follow-up program can dramatically improve postoperative outcomes in low-resource rural settings, underlining Health Connect' s potential impact on infection control through telemonitoring and patient education.

A Community-based Survey to Assess Risk for One Health Challenges in Rural Philippines using a Mobile Application

Kim et al., (2022). This BMC One Health study conducted a large household survey (6,055 households in rural Laguna) using a tablet-based mobile app (the OH App). The authors note that "mHealth technology can provide an opportunity to systematically assess potential One Health problems in rural communities with limited internet connection”. Relevance: Demonstrates the feasibility of deploying mobile apps for wide-scale health data collection and monitoring in Philippine barangays, suggesting similar tools could support Health Connect’ s community health surveillance and needs assessments.

Stakeholder Perceptions towards a Mobile Application for Community-led Monitoring of Tuberculosis Services in Metro Manila, Philippines

Tamayo et al., (2024). This qualitative study (Acta Medica Philippina) examined a pilot mobileapp for TB service monitoring in an urban community setting. Both patients and TB healthcare providers found the app acceptable and useful (improving information access and reporting), while noting practical barriers (e.g. connectivity, cost, staffing). Relevance: Highlights user acceptance and implementation challenges of a Philippine community health app (for TB), providing insights into adoption issues (training, infrastructure) that Health Connect’ s must consider for scaling m Health solutions at the local level.

“Padayon”: a New Digital Health Model for Diabetes and Hypertension in Rural Philippines

Paluyo et al., (2022). This report describes an offline-first mobile health platform used by community health workers (CHWs) in rural PH to manage NCDs. CHWs used the app to record patients’ blood pressure and glucose data; over time the program achieved notable health gains (community blood pressure fell by 29% and blood sugar by 8% compared to baseline). Relevance: Provides a successful example of an mHealth intervention designed for low-connectivity Philippine communities. The positive health outcomes and offline design are directly relevant to Health Connect goal of extending chronic disease care via technology in rural barangays.

The use and potential impact of digital health tools at the community level: results from a multi-country survey of community health workers

Blondino et al., (2024). In a global survey of 1,141 CHWs (308 from the Philippines), the authors found that CHWs overwhelmingly believe digital tools enhance their impact. Formal training strongly increased CHWs' use of digital devices, whereas cost barriers (mobile/data expenses) significantly reduced usage. Relevance: Suggests that Philippine barangay health workers are open to using mobile health tools if given proper training, but cost/access is a major constraint. This informs Health Connect's that investing in CHW training and minimizing tech costs will be key to successful implementation.

Feasibility and acceptability of asynchronous video-observed therapy (VOT) among patients with drug-resistant tuberculosis in the Philippines

Casalme et al., (2022). This pilot study equipped MDR-TB patients with a smartphone app to video-record medication intake, allowing remote monitoring. Of 308 patients approached, 36% chose VOT; among them 67% achieved >90% adherence and the treatment success rate were 88%. Nearly all health workers (90%) viewed VOT positively, citing convenience, privacy, and comfort as benefits. Relevance: Demonstrates that community-based mobile telehealth (for TB treatment) can be accepted by both patients and providers in PH. It provides a model for how Health Connect' s could use video or mobile technologies to monitor treatment or health behaviors in rural barangay

Conceptual Framework

INPUT → **PROCESS** → **OUTPUT**

INPUT

- Resident/Patient Information Details
- Barangay Health Worker Account Details
- Medical Records
- Appointment Schedule
- Medicine Inventory Data
- Immunization Records

PROCESS

Determine

- Manual record-keeping and communication were the default process.
- Inventory tracking was done using hand written logs approval.
- Appointments were handled via face-to-face or informal messages.
- Feedback collection and patient monitoring lacked a structured system.

Assess

- Time-consuming and error-prone manual system.
- Difficult to trace medicine stock and immunization schedules.
- No real-time access to patient information for staff.

Identify

- High dependency on paper-based
- Accidental loss of distribution records occurred due to paper-

OUTPUT

"(HEALTH CONNECT: WEB-BASED HEALTH MONITORING SERVICE FOR BARANGAY HEALTH CENTER OF BARANGAY POBLACION, PRES. QUIRINO, S.K)"

FEEDBACK

Figure 1. Conceptual Framework of the Study

Figure 1 shows the conceptual framework of the study through input, process, and output presentation.

INPUT

The INPUT stage comprises the collection of critical information necessary for barangay health operations. This includes resident or patient personal data, barangay health worker account credentials, medical histories, consultation records, appointment schedules, and immunization records.

PROCESS

The PROCESS the researchers assessed the limitations of the current manual system, identifying inefficiencies such as delays in patient service, disorganized record-keeping, and the lack of real-time access to vital data. Through this analysis, the study determined that the manual handling of health records were time-consuming and error-prone. The system development process addressed these problems by designing an automated and centralized platform that offers digital appointment scheduling, SMS reminders, immunization scheduling, and health data dashboards for analytics.

OUTPUT

The OUTPUT is the development of Health Connect: Web-based Health Monitoring Service for Barangay Health Center of Barangay Poblacion, Pres. Quirino, S.K. This system improves healthcare service delivery by streamlining health data management, enhancing communication between patients and health workers, and automating routine tasks. The platform enables the barangay health center to provide more accurate, timely, and accessible health services, while also generating automated reports for better planning and decision-making. Ultimately, the system empowers both healthcare providers and patients, contributing to a more efficient and responsive community health system.

FEEDBACK

This FEEDBACK will be used to assess the effectiveness of the system, identify areas for improvement, and implement updates or feature enhancements. The continuous feedback loop ensures that the system evolves based on user needs and remains relevant, responsive, and user-centered in addressing the community's healthcare demands.

Chapter II
METHODOLOGY

This chapter presents the research design, research locale, research participants, research instrument sampling technique, data gathering procedure, data analysis methods, and ethical consideration.

Project Development Description

Materials

The following materials were identified and acquired by the researchers to ensure that the development process would not be delayed.

Hardware Requirements

QTY.	COMPONENTS	SPECIFICATION
1	PC	(8Gb RAM, Intel Core i7, 1 TB (HDD))
1	PRINTER	Brother
	Other Peripherals	Keyboard, mouse, mouse pad, flash drive
1	WI-FI	PLDT

Table 1 shows the tabular representation in the hardware requirements that was used in developing the system, the researchers provided 1 laptop with the brand and specifications such as *PC* (8Gb RAM, Intel Core i7, 1 TB (HDD))*,* 1 printer, *(Brother)* and 1 Wireless Fidelity, (PLDT Wi-Fi).

Table 2. Software Requirements

Database Application	Xampp (phpMyAdmin, MySQL)
Web Scripting Languages	PHP, HTML, CSS, JavaScript
Front-end Framework/Web Framework	Bootstrap
Web Designing Tools	HTML, CSS, Ajax
Operating System	Windows 10 and 11
Office Application	WPS (Word, and Powerpoint)

Table 2 shows the tabular representation of the software requirements used in the system. The researchers used the following software applications and tools in the development of the system: Web Scripting Languages (PHP, HTML, CSS, JavaScript), Front-end Framework/Web Framework (BOOTSTRAP), Web Designing Tools (HTML, CSS, Ajax), Operating System (Windows 10 and 11), and Office Application WPS (Word and PowerPoint).

Table 3. Budgetary Requirements

Quantity	**Description**	**Unit Price**	**Amount**
Software			
	SMS API	300.00	3300.00
	Website Hosting	3,000.00	
Hardware			
	QR Code Scanner	5,000.00	5,000.00
Materials			
1 Ream	Bond Paper	190.00	1,190.00
	Prints	1,000.00	
Miscellaneous			

	Outline Defense English Critic Statistician Final Defense	400.00 1,000.00 700.00 5,000.00	7,100.00
Sub Total			44,290.00
	Contingency (10%)		4,429.00
Overall Total			48,719.00

Table 3 shows the bills of supplies and materials used in the system as well as the miscellaneous bill for incidental expenses and supplies

Activities	**Duration (AY 2023-2025)**									
	Aug	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**
Conceptualization For Title Proposal	⇨									
Title Defense		⇨								
Gathering Tools and Equipment		⇨	⇨							
Outline Defense				⇨						
Construction Of Project					⇨	⇨				
Testing							⇨			
Finalization Of Design Project								⇨		
Gathering Data and Information								⇨	⇨	
Final Defense									⇨	
Finalization Of Manuscript										⇨

Project Duration

Table 4 show the timeline, task, duration, of the project, and expected completion date. It also displays the horizontal bar chart that shows the expected project's planned schedule and task over the assigned timeframe. The horizontal axis represents the time or the months and the vertical axis shows the task involves the development system.

Methods Used in Developing the System

Agile Software Development Methodology was developed to ensure satisfaction of the requirements among existing computerized system. It is a methodology construction to make sure that the requirements planning, development and implementation, testing of the system follows logical approach and technical ways.

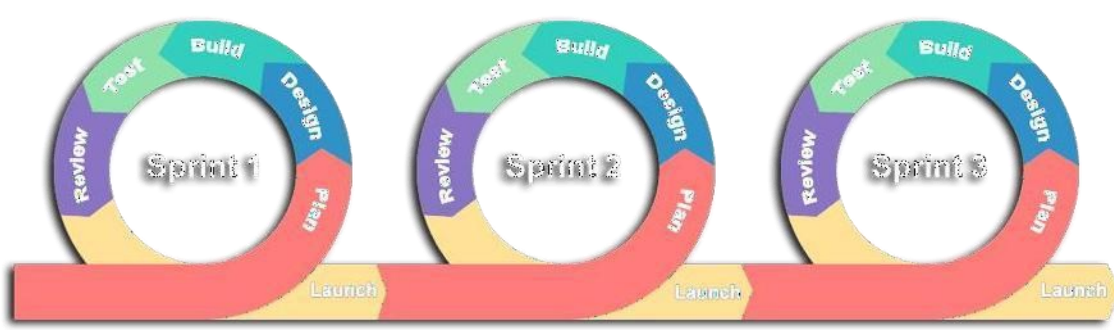

Figure 2. Agile Methodology Model

Sets of related activities are organized inside of Agile Model

1. Plan
2. Design
3. Build
4. Test
5. Review
6. Launch

Sprint 1

In this sprint, the team gathers detailed requirements by engaging barangay health workers and a small group of representative patients, clarifying workflows for account management, patient records, appointment flows, immunization tracking, and report formats. Simultaneously, the technical environment is provisioned: selecting frameworks (e.g., cross-platform mobile tech or responsive web), backend stack, database schema baseline, version control, CI/CD pipelines, and basic security policies (authentication approach, encryption standards). A lightweight prototype or wireframes for key screens (login, patient list, appointment booking) are sketched and reviewed with stakeholders. The sprint ends with a refined product backlog, user stories prioritized, and a minimal working development environment ready ensuring the team can start building features with confidence about scope boundaries, accessibility considerations (low-end devices, minimal data use), and performance constraints. The researchers planned out the user registration form, application modules, and submission process through a responsive web-based system. During this phase, diagrams such as context diagrams, data flow diagrams (DFD), and entity relationship diagrams (ERD) were created to outline the process flow and data handling procedures. Development tools used included PHP for server-side scripting, Bootstrap for front-end design, HTML/CSS for structure and styling, and MySQL for database management. The feature was tested for functionality and data accuracy before being launched

Sprint 2

This sprint will focus on implementing user registration, login, profile management, and access control for health workers. The team builds secure authentication (e.g., email/password with hashing, optional two-factor if feasible) and role-based access scaffolding (even if roles are simple now, such as “Nurse and Midwife” vs. “admin”). Validation and basic UI/UX considerations (clear forms, error messages) are prioritized to ensure usability for non-tech-savvy staff. Offline handling is considered (e.g., caching credentials securely for intermittent connectivity). By sprint’s end, health workers should be able to create accounts, log in, update profiles, and log out reliably, forming the foundation for all subsequent modules. Basic automated tests for authentication flows and security checks (e.g., password strength enforcement) are added. The researchers planned out the user registration form, application modules, and submission process through a responsive web-based system. During this phase, diagrams such as context diagrams, data flow diagrams (DFD), and entity relationship diagrams (ERD) were created to outline the process flow and data handling procedures. Development tools used included PHP for server-side scripting, Bootstrap for front-end design, HTML/CSS for structure and styling, and MySQL for database management. The feature was tested for functionality and data accuracy before being launched

Sprint 3

This sprint develops CRUD for patient profiles: capturing personal details, medical history entries, treatment notes, and immunization records placeholders. Emphasis is on intuitive forms (grouping fields logically), search/filter basics, and data validation (e.g., date formats). The UI should work smoothly on low-end devices, with sensible defaults and offline draft saving if connectivity drops. The backend schema is extended for patient tables, ensuring data privacy (access control so only authorized users see records). Prototypes are tested with a small group of health workers to refine field labels and workflows. By the end, health workers can create, view, edit, and delete patient records; basic list views and search allow quickly finding a patient. This sprint also establishes audit logging (who accessed/edited records) to support security evaluation later. The researchers planned out the user registration form, application modules, and submission process through a responsive web-based system. During this phase, diagrams such as context diagrams, data flow diagrams (DFD), and entity relationship diagrams (ERD) were created to outline the process flow and data handling procedures. Development tools used included PHP for server-side scripting, Bootstrap for front-end design, HTML/CSS for structure and styling, and MySQL for database management. The feature was tested for functionality and data accuracy before being launched

Sprint 4

Building upon patient records, this sprint adds an immunization schedule module: defining vaccine schedules (e.g., recommended ages/dates for childhood vaccines, adult boosters) and linking them to patient profiles. The system calculates upcoming due dates and triggers reminder emails. Health workers can mark vaccinations as administered, updating records and inventory logs if vaccines are in scope. The UI shows upcoming immunizations per patient, and a list of patients due for vaccines in a given period. Offline considerations apply: allow recording administered vaccines offline with sync later. Usability testing ensures the flow matches existing immunization workflows. By sprint's end, health workers can manage immunization schedules: schedule, remind, and log vaccine events for children and adults. The researchers planned out the user registration form, application modules, and submission process through a responsive web-based system. During this phase, diagrams such as context diagrams, data flow diagrams (DFD), and entity relationship diagrams (ERD) were created to outline the process flow and data handling procedures. Development tools used included PHP for server-side scripting, Bootstrap for front-end design, HTML/CSS for structure and styling, and MySQL for database management. The feature was tested for functionality and data accuracy before being launched.

Sprint 5

This sprint introduces a text-based messaging channel between patients and health workers. Given constraints, it may be implemented as near-real-time (e.g., long polling or lightweight WebSocket if connectivity allows) or asynchronous messaging stored in the system. UI should notify health workers of unread messages; patients can send questions or feedback via the mobile/web interface. Security/privacy is crucial: messages are linked to patient records, encrypted in transit, and accessible only by authorized health workers. The flow includes notification handling (e.g., push notification or an in-app alert) if feasible. During the sprint, test with a small group to fine-tune UX: ensure conversations are threaded or organized per patient, with clear timestamps. By sprint's end, messaging is functional: patients can send queries and health workers can respond, with messages logged in the system for audit and follow-up. The researchers planned out the user registration form, application modules, and submission process through a responsive web-based system. During this phase, diagrams such as context diagrams, data flow diagrams (DFD), and entity relationship diagrams (ERD) were created to outline the process flow and data handling procedures. Development tools used included PHP for server-side scripting, Bootstrap for front-end design, HTML/CSS for structure and styling, and MySQL for database management. The feature was tested for functionality and data accuracy before being launched.

Sprint 6

The team builds a dashboard showing key metrics: appointment counts over time (e.g., weekly/monthly trends), total active patient counts, upcoming appointments. Reports for lists of appointments, patient registries are implemented with export options (PDF or CSV). Attention is paid to performance: queries are optimized to avoid slow loading on limited bandwidth. Accessibility checks ensure readability of charts (e.g., clear labels). Prototype dashboards are reviewed with health workers to ensure insights align with decision needs. By sprint close, the dashboard and reporting features are live, offering actionable visuals and exports. The researchers planned out the user registration form, application modules, and submission process through a responsive web-based system. During this phase, diagrams such as context diagrams, data flow diagrams (DFD), and entity relationship diagrams (ERD) were created to outline the process flow and data handling procedures. Development tools used included PHP for server-side scripting, Bootstrap for front-end design, HTML/CSS for structure and styling, and MySQL for database management. The feature was tested for functionality and data accuracy before being launched.

Sprint 7

This sprint will be dedicated to comprehensive testing and evaluation. Functionality testing involves end-to-end scenarios for all modules, capturing bugs and usability issues. Accessibility evaluation includes basic usability tests with users of varying digital literacy, checking interface clarity, data usage, and offline behaviors; adjustments (e.g., simpler navigation, help prompts) are made. Security assessment covers reviewing authentication flows, encryption in transit/storage, and basic vulnerability scans or checklist reviews; fixes are applied (e.g., secure headers, input sanitization). Efficiency/performance tests measure load times under simulated low-connectivity conditions; optimize caching strategies or reduce payload sizes if needed. The team documents known limitations (e.g., features requiring intermittent connectivity) and proposes workarounds. By sprint end, a clean evaluation report is produced, with prioritized action items for fixes or future phases. The researchers planned out the user registration form, application modules, and submission process through a responsive web-based system. During this phase, diagrams such as context diagrams, data flow diagrams (DFD), and entity relationship diagrams (ERD) were created to outline the process flow and data handling procedures. Development tools used included PHP for server-side scripting, Bootstrap for front-end design, HTML/CSS for structure and styling, and MySQL for database management. The feature was tested for functionality and data accuracy before being launched.

Context Diagram (Existing System)

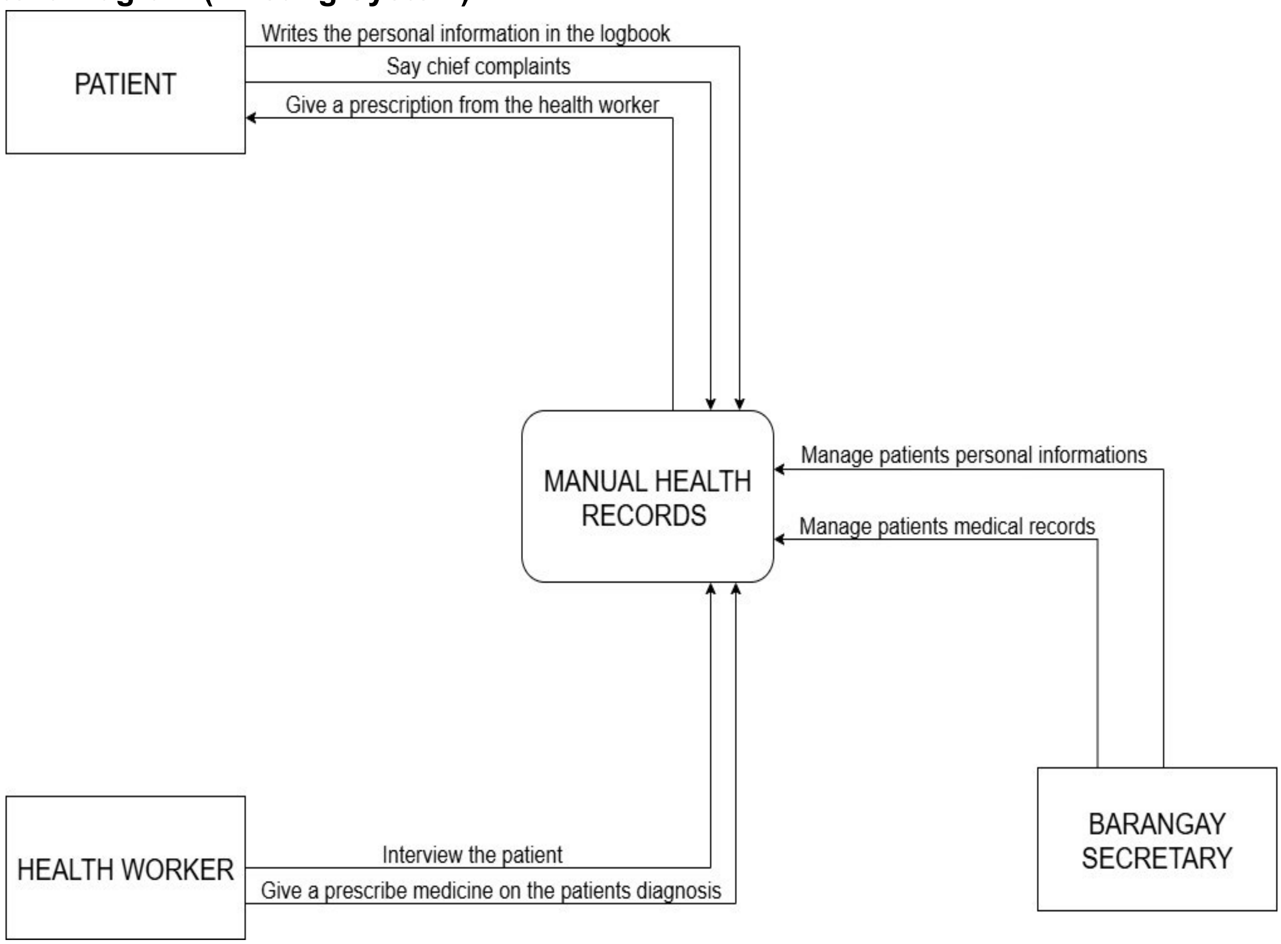

Figure 3. The Context Diagram of the Existing System

Figure 3. The Context Diagram of the Existing System Figure 3 showed the diagram of the existing system illustrates the high-level interactions between external entities and the central "Manual Health Records" process. This diagram depicts three primary external entities: "Patients", "Health Workers" and “Barangay Secretary”. Patients interact with the system by providing their "chief complaints" and receiving a "prescription from the health worker" and “Barangay Secretary” manages the patient personal information and medical records. They also have their "personal

information written in the logbook," which is then integrated into the "Manual Health Records." On the other hand, Health Workers "interview the patient" and "give a prescribed medicine on the patients diagnosis," with these activities directly influencing and being influenced by the "Manual Health Records." The diagram highlights the manual nature of the current system, where all information flows through and is managed within the "Manual Health Records" entity.

Data Flow Diagram (Existing System)

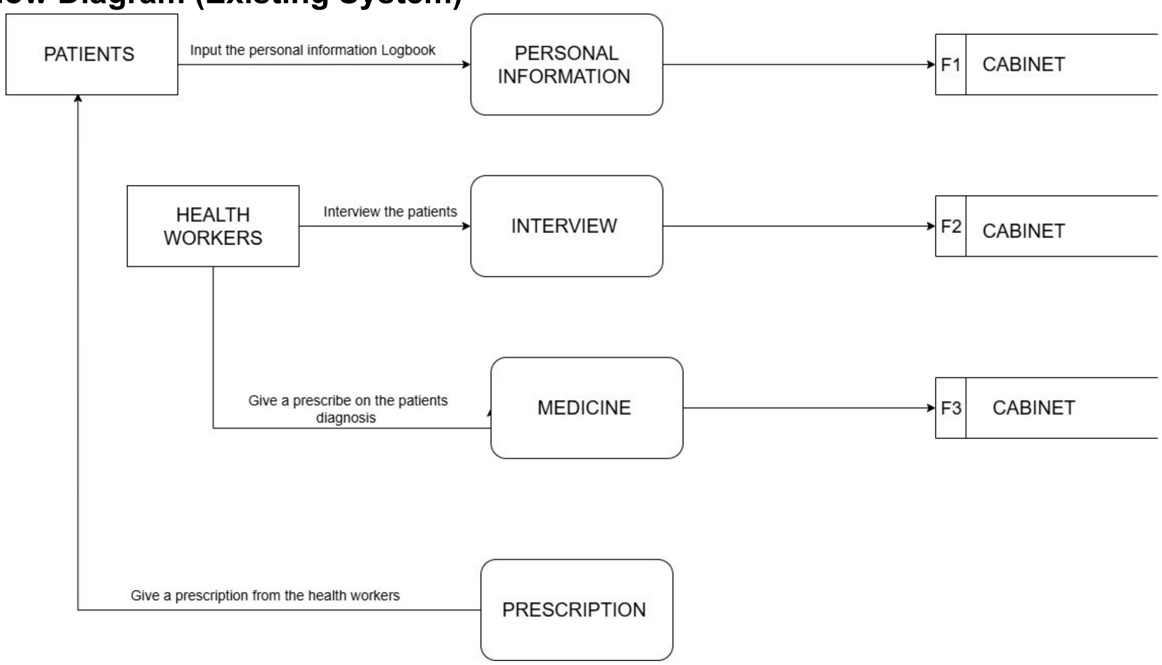

Figure 4. Data Flow Diagram (Existing System)

Figure 4 shows the manual operations and information flow of the existing system. The existing system for managing patient information is a largely manual and physical process, involving interactions between Pssatients and Health Worker. Patients initiate the process by providing their personal details, which are then recorded and stored in a physical "F1 Cabinet." Concurrently, Health Workers conduct interviews with patients, and the resulting interview information is documented and stored in a "F2 Cabinet." Following the interview, Health Workers prescribe medicine based on diagnoses, with the details of the prescribed medication being recorded and filed in a "F3 Cabinet." Finally, Health Workers issue prescriptions to patients, marking the culmination of the patient's interaction with the system. This setup indicates a traditional, paper-based approach to record-keeping, relying on physical storage for all critical patient data.

Context Diagram (Proposed System)

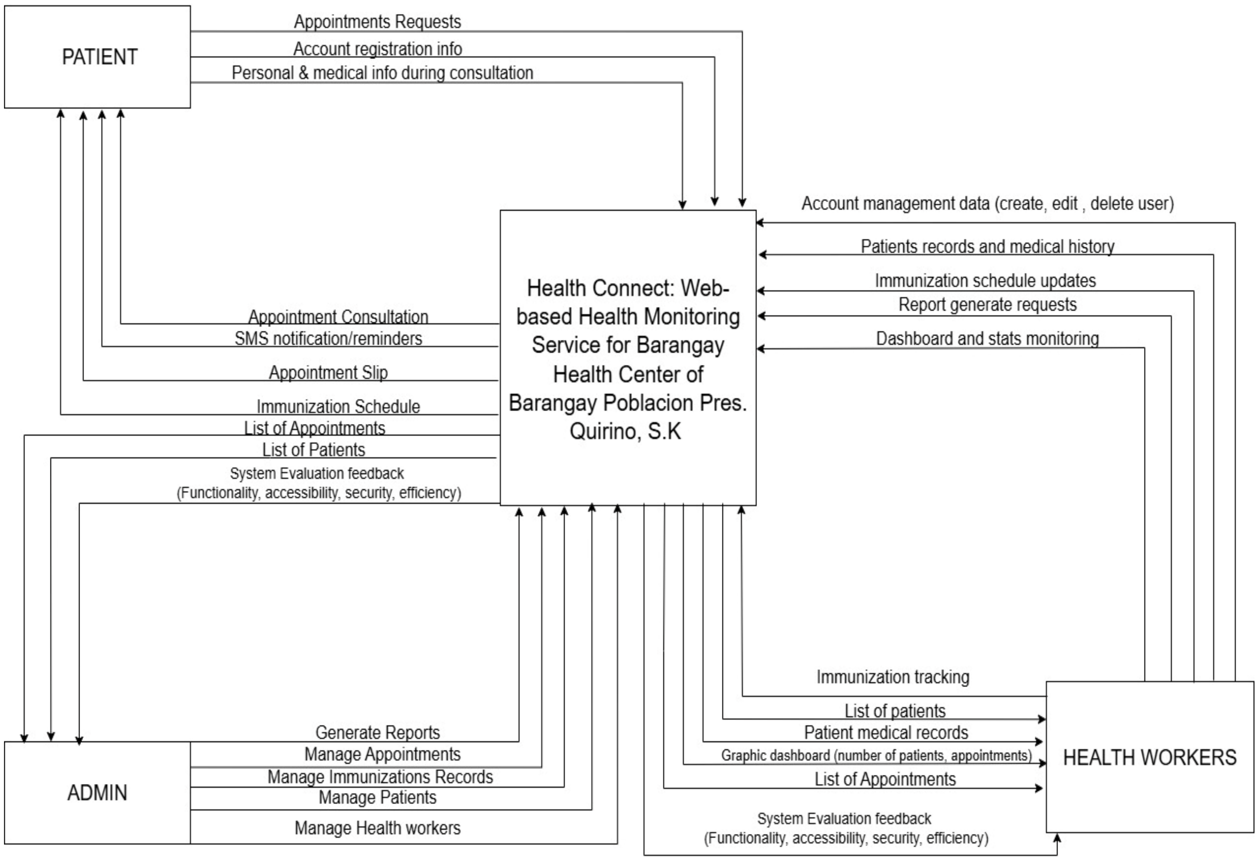

Figure 5. The Context Diagram of the Study

Figure 5 illustrates the core functions and interactions between the main users' admin, patients' health workers and the system. It emphasizes how the mobile application serves as a centralized platform for managing health worker accounts, handling patient records, and monitoring immunization schedules. Patients can register accounts, submit appointment requests, and receive SMS notifications and appointment slips. Health workers, on the other hand, can manage patient medical records, update immunization schedules, and monitor system statistics through a dashboard that visualizes patient and appointment data. Admin on the other hand manage health workers, patients accounts, monitor system statistics through a dashboard that visualizes patient and health worker data. The system also supports automated report generation, allowing health workers to generate lists of patients, and appointments. Additionally, the system is designed to be evaluated based on functionality, security, accessibility, and efficiency. This context diagram highlights the automated and integrated nature of the system, reducing manual processes and improving communication between patients and health professionals.

DATA FLOW DIAGRAM (Logical)

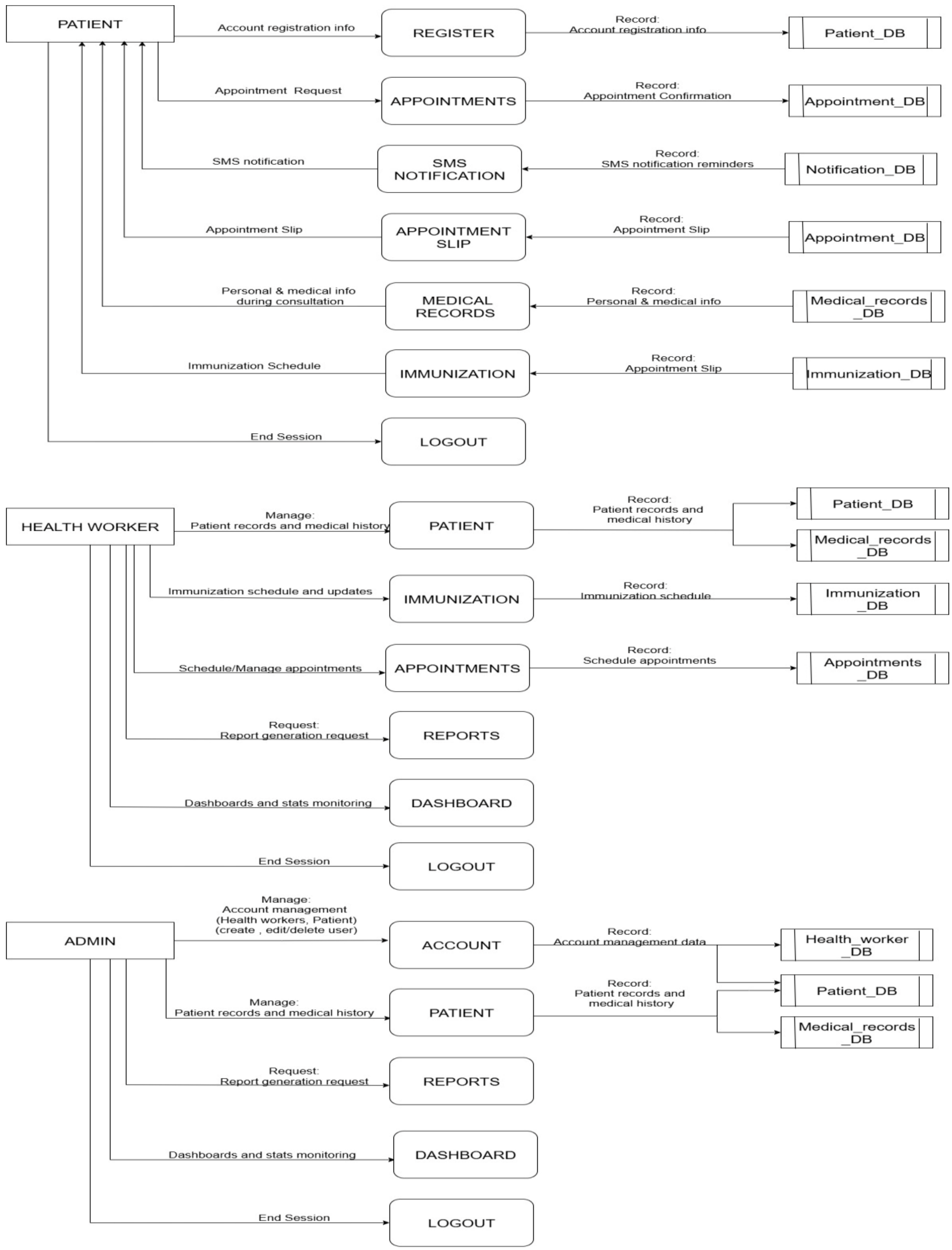

Figure 6. The Logical Data Flow Diagram of the System

Figure 6 shows the healthcare management system designed around two primary user roles: Patients, Health Workers and Admin. Patients initiate interactions by registering accounts storing theirinformation in the Patient_DB and requesting appointments, which are logged in the Appointment_DB. During consultations, they provide personal and medical details that are recorded in the Medical_record_DB. Patients can also submit feedback and chat messages, and receive SMS notifications such as appointment confirmations managed through the Notification_DB. Additionally, they access immunization schedules from the Immunization_DB, view their medical records, and generate appointment slips for upcoming visits. Health Workers, on the other hand, manage a broader range of system workflows. They oversee appointments, review and update patient profiles in the Patient_DB, and maintain detailed medical histories in the Medical_record_DB. Admin , on the other hand, manage health workers account and patients account , personal information and medical records in the Health_worker_DB, Patient_DB and Medical_records_DB, request a report generation and monitor dashboard and statistics (health worker , patients data) . The system emphasizes smooth data synchronization across eight core databases: Patient_DB (registration), Medical_record_DB (health history), Appointment_DB (bookings), Immunization_DB (vaccine scheduling), Notification_DB (SMS alerts), and Health_worker_DB (staff credentials). Key processes include appointment coordination (linking patient requests to health worker schedules), medical data consolidation (updating records during consultations), and automated notifications (sending SMS confirmations). As a logical DFD, this model abstracts away technical implementation details such as infrastructure or security and focuses instead on the flow of data, user interactions, and storage mechanisms to represent a streamlined, patient-centric healthcare workflow.

DATA FLOW DIAGRAM (Physical)

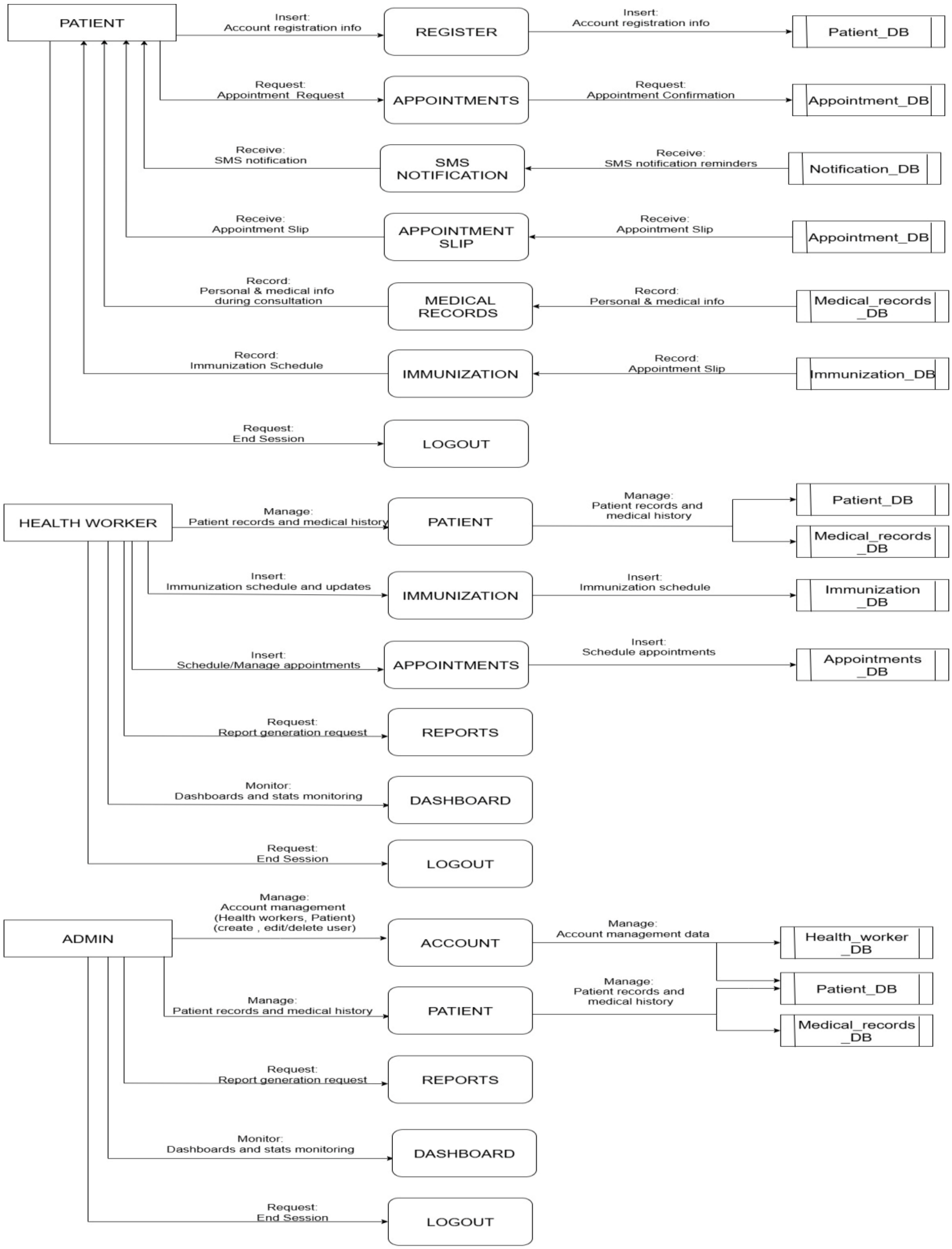

Figure 7. The Physical Data Flow Diagram of the System

Figure 7 presents an implementation-specific view of a healthcare management system, building upon the logical model by incorporating concrete components, technologies, and workflows. It restrains the triple-user structure of Patients, Health Workers and Admin, but adds physical elements such as SMS notifications, graphical dashboards, and explicit interactions with system databases. For Patients, the workflow begins with appointment booking and registration through the Appointment module. During registration, personal details are stored in the Patient_DB, while confirmed bookings result in the creation of an Appointment Slip stored in the Appointment_DB and trigger automated SMS alerts via the Notification_DB. Patients can access their historical health data from the Medical_record_DB and review vaccination schedules stored in the Immunization_DB. Patient sessions conclude with a logout process.

Admin, on the other hand, manage health workers account and patients account, personal information and medical records in the Health_worker_DB, Patient_DB and Medical_records_DB, request a report generation and monitor dashboard and statistics (health worker, patients' data).

Health Workers manage a range of operational tasks. They handle appointments via the Appointment_DB, access demographic data from the Patient_DB, and consult or update medical histories in the Medical_record_DB during consultations. Vaccine administration and monitoring are handled through the Immunization_DB. Analytical functions are supported through Graphical

Dashboards.A System Evaluation module helps monitor system performance. Reports are generated as needed, and sessions end with logout. Several key physical components enhance system functionality. The SMS Notification System, integrated with the Notification_DB, automates appointment alerts. All core data is stored in centralized databases, including Patient_DB (registration), Appointment_DB (bookings), Medical_record_DB (health records), Immunization_DB (vaccines), and Health_worker_DB (staff credentials). The Implementation Specific Workflow for patients typically follows the sequence: Registration → Appointment → SMS Alert → Consultation → Medical Record Access → Logout. For admin, on the other hand: Manage Accounts (health workers, patients) → Patient Profile Check → Medical Record Update→ Dashboard Analytics→ Logout. For health workers, it proceeds as: Appointment Review → Patient Profile Check → Medical Record Update→ Dashboard Analytics → Logout. This physical DFD distinguishes itself from the logical model by introducing physical artifacts like the SMS gateway (Notification_DB), appointment slip generation, and interactive dashboards. Ultimately, the purpose of this physical DFD is to illustrate how the system operates in practical environment. Patients benefit from digital appointment slips and SMS alerts. The databases represent physical data structures such as tables or collections and support consistent, secure, and user-friendly workflows. As a comprehensive technical blueprint, this DFD guides developers in deploying a fully functional, patient-centric healthcare system.

Entity-Relationship Diagram (ERD)

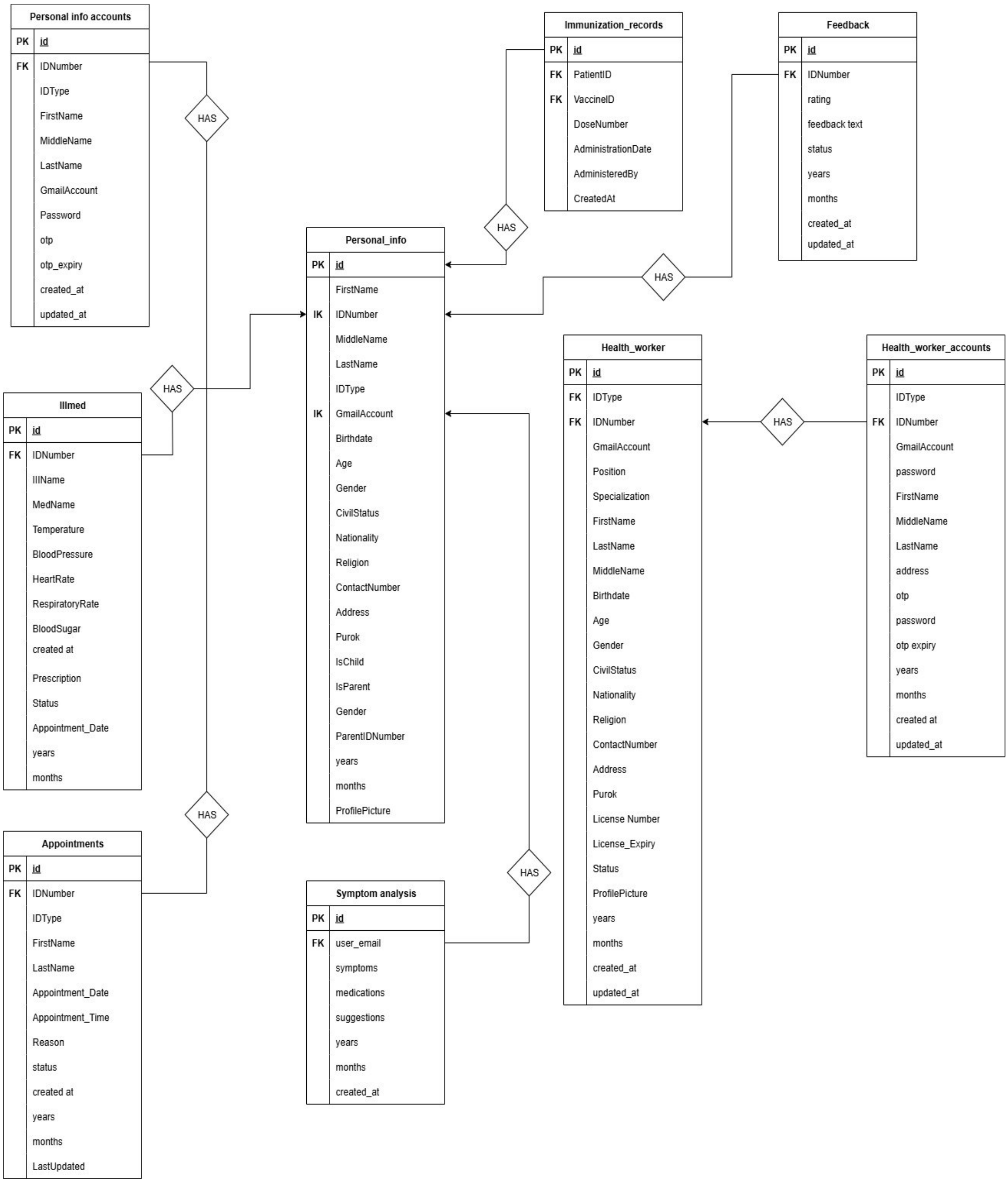

Figure 8. Entity-Relationship Diagram of the Study

Figure 8 shows the data structure and relationship between entities in the System. It will demonstrated the data about personal accounts, personal information, medical records (illness, immunization, symptom analysis), health workers, and vaccine dispensing are organized and connected within the system. The ERD emphasized primary keys (PK) and foreign keys (FK) to establish relationships, ensuring data consistency and integrity throughout the system. The relationships included:

- One Personal_info_accounts HAS one Personal_info.
- One Personal_info HAS many Illmed entries.
- One Personal_info HAS many Immunization_records.
- One Personal_info HAS many Feedback entries.
- One Personal_info HAS many Symptom_analysis entries.
- One Personal_info HAS many Appointments.
- One Personal_info HAS many Health_worker entries.
- One Vaccines HAS many Immunization_records.
- One Vaccines HAS many Vaccine_dispensing entries.
- One Health_worker_accounts HAS one Health_worker.

Database Structure

Database name: center

Table 4. appointments

tbl_ appointments				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
IDNumber	varchar(50)	No		
IDType	varchar(50)	No		
FirstName	varchar(100)	No		
LastName	varchar(100)	No		
Appointment_Date	date	No		
Appointment_Time	time	No		
Reason	text	Yes	NULL	
status	varchar(20)	Yes	Pending	
created_at	timestamp	No	current_timestamp()	

Table 5. feedback

tbl_ feedback				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
IDNumber	varchar(50)	No		
rating	int(11)	No		
feedback_text	text	No		
status	enum('submitted', 'reviewed', 'addressed')	Yes	submitted	
years	year(4)	Yes	year(curdate())	

months	varchar(15)	Yes	NULL	
created_at	timestamp	No	current_timestamp()	
updated_at	timestamp	No	current_timestamp()	

Table 6. health_worker

tbl_health_worker				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
IDType	varchar(50)	No		
IDNumber	varchar(50)	No		
GmailAccount	varchar(255)	No		
Position	varchar(100)	No	*NULL*	
Specialization	varchar(100)	Yes	NULL	
FirstName	varchar(100)	No		
LastName	varchar(100)	No		
MiddleName	varchar(100)	Yes	NULL	
Birthdate	date	No		
Age	int(11)	Yes	NULL	
Gender	varchar(20)	No		
CivilStatus	varchar(50)	No		
Nationality	varchar(100)	No		
Religion	varchar(100)	Yes	NULL	
ContactNumber	varchar(20)	No		
Address	varchar(255)	No		
Purok	varchar(50)	No		
License_Number	varchar(50)	Yes	NULL	
License_Expiry	date	Yes	NULL	

Status	enum('Active', 'Inactive', 'On Leave')	No	Active	
ProfilePicture	varchar(255)	Yes	NULL	
years	year(4)	Yes	year(curdate())	
months	varchar(15)	Yes	NULL	
created_at	timestamp	No	current_timestamp()	
updated_at	timestamp	No	current_timestamp()	

Table 7. health_worker_accounts

tbl_ health_worker_accounts				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
IDType	varchar(50)	No		
IDNumber	varchar(50)	No		
GmailAccount	varchar(255)	No		
password	varchar(255)	No		
FirstName	varchar(100)	No		
MiddleName	varchar(100)	Yes	NULL	
LastName	varchar(100)	No		
otp	varchar(6)	Yes	NULL	
otp_expiry	datetime	Yes	NULL	
years	year(4)	Yes	year(curdate())	
months	varchar(15)	Yes	NULL	
created_at	timestamp	No	current_timestamp()	
updated_at	timestamp	No	current_timestamp()	

Table 8. illmed

tbl_ illmed				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
IllName	varchar(255)	No		
MedName	varchar(255)	Yes	NULL	
Temperature	decimal(4,1)	Yes	NULL	
BloodPressure	varchar(20)	Yes	NULL	
HeartRate	int(11)	Yes	NULL	
RespiratoryRate	int(11)	Yes	NULL	
BloodSugar	varchar(20)	Yes	NULL	
Prescription	text	Yes	NULL	
IDNumber	varchar(50)	No		
Status	varchar(20)	Yes	Critical	
Appointment_Date	datetime	Yes	NULL	
years	year(4)	Yes	year(curdate())	
months	varchar(15)	Yes	NULL	

Table 9. immunization_records

tbl_ immunization_records				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
PatientID	int(11)	No		
VaccineID	int(11)	No		
DoseNumber	int(11)	No	1	
AdministrationDate	date	No		
AdministeredBy	varchar(100)	No		

Notes	text	Yes	NULL	
CreatedAt	timestamp	No	current_timestamp()	

Table 10. intv

tbl_ intv				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
IDNumber	varchar(50)	No		
what_you_do	text	Yes	NULL	
what_is_your_existing_desease	text	Yes	NULL	
have_you_a_family_history_desease	text	Yes	NULL	
have_you_a_allergy	text	Yes	NULL	
years	year(4)	Yes	year(curdate())	
months	varchar(15)	Yes	NULL	

Table 11. medical_history

Tbl_ medical_history				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
patient_id	int(11)	No		personal_info -> id
BloodType	varchar(5)	Yes	NULL	
Allergies	text	Yes	NULL	
ChronicIllnesses	text	Yes	NULL	

PastSurgeries	text	Yes	NULL	
CurrentMedications	text	Yes	NULL	
FamilyHistory	text	Yes	NULL	
FullyVaccinated	tinyint(1)	Yes	0	
AdditionalNotes	text	Yes	NULL	
CreatedAt	timestamp	No	current_timestamp()	
UpdatedAt	timestamp	No	current_timestamp()	

Table 12. nurse_schedule

tbl_ nurse_schedule				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
unavailable_date	date	No		
unavailable_start_time	time	No		
unavailable_end_time	time	No		
reason	text	Yes	NULL	
years	year(4)	Yes	year(curdate())	
months	varchar(15)	Yes	NULL	
created_at	timestamp	No	current_timestamp()	

Table 13. personal_info

tbl_ personal_info				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
FirstName	varchar(100)	No		
LastName	varchar(100)	No		
MiddleName	varchar(100)	Yes	NULL	

IDType	varchar(50)	No		
IDNumber	varchar(50)	No		
GmailAccount	varchar(255)	No		
Birthdate	date	No		
Age	int(11)	No		
Gender	varchar(20)	No		
CivilStatus	varchar(50)	No		
Nationality	varchar(100)	No		
Religion	varchar(100)	Yes	NULL	
ContactNumber	varchar(20)	No		
Address	varchar(255)	No		
Purok	varchar(50)	No		
IsChild	tinyint(1)	Yes	0	
IsParent	tinyint(1)	Yes	0	
ParentIDNumber	varchar(50)	Yes	NULL	
years	year(4)	Yes	year(curdate())	
months	varchar(15)	Yes	NULL	
ProfilePicture	varchar(255)	Yes	NULL	

Table 14. personal_info_accounts

tbl_ personal_info_accounts				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
IDType	varchar(50)	No		
IDNumber	varchar(50)	No		

FirstName	varchar(100)	No		
MiddleName	varchar(100)	Yes	NULL	
LastName	varchar(100)	No		
GmailAccount	varchar(255)	No		
Password	varchar(255)	No		
otp	varchar(6)	Yes	NULL	
otp_expiry	datetime	Yes	NULL	
created_at	timestamp	No	current_timestamp()	
updated_at	timestamp	No	current_timestamp()	

Table 15. recipient_vaccines

tbl_ recipient_vaccines				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
DispensingID	int(11)	No		
PatientID	int(11)	No		

Table 16. symptom_analysis

tbl_ symptom_analysis				
Column	**Type**	**Null**	**Default**	**Links to**
d (Primary)	int(11)	No		
user_email	varchar(255)	No		
symptoms	text	No		
medications	text	Yes	NULL	
suggestions	text	Yes	NULL	
years	year(4)	Yes	year(curdate())	
months	varchar(15)	Yes	NULL	
created_at	timestamp	No	current_timestamp()	

Table 17. vaccines

tbl_ vaccines				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
VaccineName	varchar(100)	No		
VaccineType	varchar(50)	No		
TargetAgeGroup	varchar(50)	No		
DoseCount	int(11)	No	1	
StockQuantity	int(11)	No	0	
ExpiryDate	date	No		
Manufacturer	varchar(100)	No		
Notes	text	Yes	NULL	
CreatedAt	timestamp	No	current_timestamp()	
UpdatedAt	timestamp	No	current_timestamp()	

Table 18. vaccine_dispensing

tbl_ vaccine_dispensing				
Column	**Type**	**Null**	**Default**	**Links to**
id (Primary)	int(11)	No		
VaccineID	int(11)	No		
Quantity	int(11)	No	1	
RecipientName	varchar(100)	Yes	NULL	
Reason	varchar(100)	No		
DispensedBy	varchar(100)	No		
Notes	text	Yes	NULL	
DispensedDate	timestamp	No	current_timestamp()	

Evaluation Methodology

Evaluation of any system was a crucial part of its development. This determined if the system worked properly, met the objectives, and satisfied the users.

Research Design

This study adopts a Design and Development Research (DDR) approach, integrating descriptive, developmental, and evaluative research methods. The goal is to design, develop, and assess a web-based health monitoring service for Brgy. Health Center of Brgy. Poblacion, Pres. Quirino, S.K by addressing manual limitations in patient management, medicine tracking, and communication. The study is structured into three major phases: (1) Planning and Requirement Gathering, (2) System Design and Development, and (3) System Evaluation. Each phase is guided by both qualitative and quantitative data collection and analysis to ensure the system meets the needs of its user's barangay health workers, patients, and administrators.

Participants of the Study

The participants of this study are selected from key stakeholders directly involved in the use, management, and evaluation of the Heath Connect system. These include barangay health workers, health center administrators, patients or their guardians, IT support personnel, and the researchers themselves. The barangay health workers comprising midwives, nurses, and frontline health staff serve as the primary users of the system. They are responsible for managing patient records, scheduling appointments, and using the communication features. Their involvement is crucial to assess the system's usability, functionality, and integration into daily health center operations.

The health center administrators are also significant participants, tasked with overseeing system-generated reports, approving medicine logs, and using dashboards to monitor health service activities. Their feedback ensures that the system supports effective management and decision-making. Patients and guardians, on the other hand, participate in the study by interacting with the system through features like online appointment scheduling, email notifications, appointment slips, and feedback submission. Their experiences provide insights into the system's accessibility, convenience, and impact on healthcare engagement.

IT support personnel or local technical staff are included to assist with installation, deployment, and minor troubleshooting. Their role is essential in identifying technical issues and ensuring system sustainability. Lastly, the researchers themselves are participants in a dual capacity as system developers and evaluators responsible for collecting data, analyzing results, and refining the system based on user feedback. Overall, these participants are chosen based on their relevance to the system's core functionalities, and their diverse perspectives contribute significantly to the development, implementation, and assessment of Health Connect.

Data Gathering Procedures and Statistical Tools

In this study, data gathering will be conducted through a combination of quantitative and qualitative methods to ensure a well-rounded evaluation of the Health Connect system. Initially, the researchers performed informal observations and structured interviews with barangay health workers and health administrators to gather baseline information about their current processes, challenges, and expectations regarding digital health systems. These insights helped define the system's core requirements and design. Once a functional prototype was developed, surveys were distributed to users, including health workers and patients, to assess usability, efficiency, and satisfaction with the system. The System Usability Scale (SUS) was used to measure user-friendliness, while custom Likert-scale questionnaires evaluated aspects such as performance, accessibility, and ease of use.

During the post-deployment, feedback sessions and follow-up interviews were conducted to gather in-depth user impressions, particularly on system effectiveness and real-life applicability in a barangay setting.

For the statistical treatment of data, descriptive statistics such as frequency, percentage, mean, and standard deviation were employed to analyze survey results and usage data. These tools allowed the researchers to interpret user behavior, performance trends, and satisfaction levels in a simplified yet meaningful way. The findings were then triangulated with qualitative feedback to identify areas of strength and aspects needing improvement, ensuring that the final recommendations were based on a balanced understanding of both system performance and user experience.

Table 9. Rating Scale used in the Study

CODE	MEAN RANGE	DESCRIPTION	LEGEND
5	4.20-5.00	Strongly Agree	SA
4	3.40-4.19	Agree	A
3	2.60-3.39	Moderately Agree	MA
2	1.80-2.59	Disagree	D

Formula For Weighted Mean:

$$x = \frac{\Sigma x_i}{n}$$

Where:

x = mean score

n = number of respondents

$\sum x_i$ = frequency