

# Development of the Philippine National Police Region XI Hospital Information Management System (PNP-HIMS)

**\*Meljohn V. Aborde, Somerset Elcid R. Siang, and Ryann F. Pilapil**

College of Computing Education, University of Mindanao

*\*Corresponding author*

mjaborde@umindanao.edu.ph

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## ABSTRACT

This paper discussed the development of the PNP-HIMS, or the Philippine National Police Region XI Hospital Information Management System. To create the information management system, the researchers followed the software development life cycle, specifically the agile methodology, which comprises phases essential to produce a high-quality information management system. In addition, the development of this study followed the rules of the iterative software process using scrum methodology. As a result, the researchers were able to provide an automated process for patients from personal data encoding to releasing their electronic diagnosis report; provide a secured centralized database in storing records of patients; create a user-friendly interface with easy navigation and usage, and provide a mechanism for fast and accurate generation of pertinent and purposive reports, and statistics that their headquarters will require. In conclusion, the PNP personnel commended the information management system since it helped them provide quality-based service by improving their current system. Likewise, the users commended the user-friendliness environment and report generation mechanism of the information management system.

**Keywords:** *PNP-HIMS; Information Management System; Hospital System,*

## INTRODUCTION

Computer-based support for health-related procedures is a process where the manual transaction is integrated into machines which speed up the organizing and processing of data. The PNP-Hospital Information Management System is one of the technological advancements that improve the processes of the health care department of the PNP-Camp Catitipan PNP officers and applicants. It helped the PNP-Camp Catitipan unify their data to keep the personnel's information, generate timely reports, and provide a centralized solution to employee-related queries by authorized personnel to secure and preserve police and their applicants' information confidentiality.

The University of Mindanao has partnered with the Philippine National Police Regional Health Service Region XI to develop a system that will enable the latter to upgrade from a manual system to a computerized program to satisfy the needs of their clientele.

In general, PNP-HIMS provides a computer-based hospital information management system for the systematic record-keeping of all aspiring PNP applicants and even the current PNP officers. PNP-HIMS aims to assist doctors, nurses, and other medical staff manages a diagnosis report. The system aims to help PNP-RHS overhaul their current manual system into a completely automated process from filling personal data to releasing their diagnosis. Data analysis and report generation are also featured in this program so that the office can provide timely information about the status of the regional office.

The Philippine National Police Regional Health Service Region XI (PNP-RHS R11) Hospital Information Management System provides five modules. These modules are Module 1: Personnel Profile Management System (PPMS), Module 2: Neuro-Psychiatric Evaluation Records, Module 3: Medical Records, Module 4: Dental Records, and Module 5: Utility Program.

The PNP-RHS R11 hospital staff from PPMS, Neuro-Psychiatric Evaluation, Recording Dental Evaluation, and even from reports and dispensary has a manual practice of keeping their officers and applicant's data. The organization must keep its records in the respective cabinets in different forms and containing the additional information of the various PNP officers and applicants. The essence of the technological advancements has led to the establishment of said system, PNP-HIMS, to organize their police information to hasten their internal operation through efficient record-keeping and generate timely reports.

Developing a Medical Health Management System is anchored in the concepts that are discussed in various literature worldwide. Some of this literature is centered on the premise that operational automation is significant for improving business processes. Information Technology creates and operates the technological infrastructure to process, store, retrieve, and distribute an organization's information assets. It optimizes the utilization of technical resources for cost-effective management of information assets that provide backup protection and disaster recovery cab. Information technology has had a substantial significant positive impact on the healthcare sector 1 (Ismail et al., 2010)

Some institutions are seeking to improve effectiveness and efficiency by utilizing information systems. The hospital is a highly complex institution with various departments and units coordinating for patients (Management Information Systems for Electronic Warfare Command and Decision Support, 2018). It provides the required information to each department at the right time, in the proper form, and in order to make decisions effectively and efficiently. Hospital Information Systems (HIS) are designed as massive, integrated systems designed to store, manipulate, retrieve information (Amin et al., 2011) that are easy to use, flexible, and functional to serve the purpose of the system. It provides routine information from an organized collection of people, procedures, software, databases, and devices (Management Information Systems for Electronic Warfare Command and Decision Support, 2018).

The researchers focused on the three best practices of the organization. Among these practices are policies, procedures, and processes. The guidelines consist of guidance on information confidentially, privacy, and security. It is also related to protecting covered information that holds legal, confidential, and accepting and releasing customer information. The PNP-HIMS considers the information security policy of each department that includes the network by excerpting data requirements for password control and authentication, securing confidential matters, and, lastly, securing personal documents. The processes and systems of the PNP-HIMS also depend on several vital functions, methods, and associated tools. It includes

classifying information from one office to another, preserves information for future reference such as claim, record declaration process and securing data from access by unauthorized individuals, and keeping related documents.

The PNP-HIMS provides a mechanism for the fast and accurate generation of pertinent and purposive reports. The importance of these reports can be the basis of decision-making for the future.

Generally, the researchers aimed to help the PNP Regional Health Service in Camp Catitipan automate its processes and manage its records by developing a PNP Hospital Information Management System named PNP-HIMS. In doing so, these specific system objectives are established: To provide an automated process for patients from personal data encoding to releasing their electronic diagnosis report; To provide a secured centralized database in storing records of patients; To create a user-friendly interface with easy navigation and usage; To provide a mechanism for fast and accurate generation of pertinent and purposive reports; and statistics required by their headquarters, Camp Crame.

## METHOD

The study follows a set of activities prescribed for software engineering. The four software processes as essential steps to take to produce high-quality software. These processes include software specification, software design and implementation, software validation, and software evolution.

The researchers followed all four processes to accomplish their goal to develop a PNP-Hospital Information Management System. Also, Agile Methodology was used by the researchers to describe the production method in deeper detail. Scrum follows an iterative process model that allows for faster software development compared to a more traditional approach.

### *Software specification*

The researchers came up with the following essential user requirements:

- The system shall provide a secure database for storing records of patients, which is driven by a user account mechanism to avoid intrusions and unauthorized access.
- The system shall provide an automated process for patients from personal data encoding to releasing their electronic diagnosis report. It must also feature a fast search engine mechanism.
- The system shall provide a user-friendly interface for easy navigation and usage.
- The system shall provide a mechanism for the fast and accurate generation of reports and statistics required by their headquarters.
- The system shall be connected to a network.

### *User requirements specification*

The PNP-HIMS has multiple types of users who can access the different modules of the system. The admin has access to all the modules in the system. The cashier can manipulate the cashiering part of the system. The biller who can create billing statements. The nurses for admissions and outpatient department. The pharmacist can access the pharmacy end of the system, and the stock clerk has access to monitoring the stocks. Each user was provided with different accounts and different modules to access and manipulate.

### Development tools

Visual Studio .NET is Microsoft's visual programming environment utilized for designing and building the user interface capable of accepting police records and integrating the different modules of the application.

XAMPP Control Panel is a lightweight Apache software utilized by the researchers for the quick time constraints and ease in the configuration and building of the application developed in the Visual Studio .NET

MySQL is a storage software utilized by researchers to manage the demographic profile of the police and their mobility vehicle.

Crystal Report is the software utilized by the researchers to generate reports from various modules sources.

### Software design

The research team developed the design using the outputs of the software specification phase. The design is in the form of entity-relationship diagrams, use cases, and input/output forms that show the user interface of the software solution. When the intended users approved the prototype, the team started the software development phase, also known as the coding or implementation phase. At this time, modules were created based on the specifications established during the first phase. The team works on a specific module, submits it for validation, and depending on the outcome, the process repeats to address the errors or bugs.

To show the logical and physical design of the PNP-HIMS application, the researchers created a data model through the contextual framework, context data flow diagram, and process flow diagram.

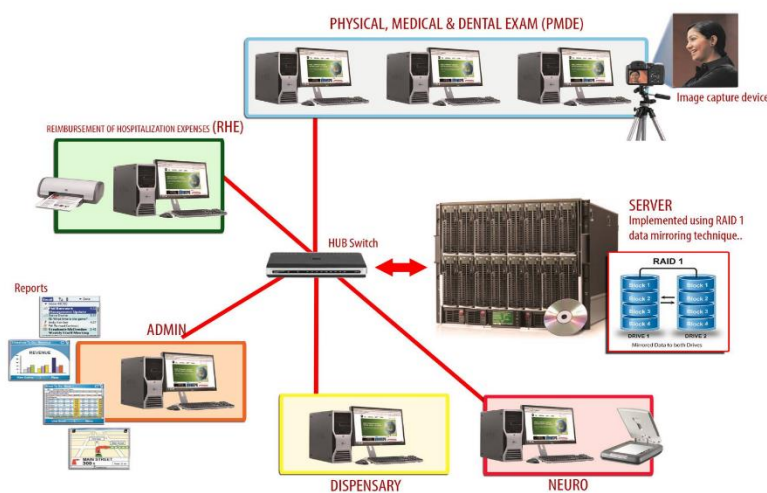


Figure 1. Contextual framework

The PNP-HIMS handles the management of the patients. The PNP-HIMS covers the PNP Applicants, current PNP Officials, PNP Officials' family members, and even civilians. Figure 1 shows that it will start from the filing of personal information with image capture. As they progress to their Physical, Mental, and Dental Examinations, all details will be recorded via the network-connected system. The Neurological Department opted that all their records will



only be stored as an image file not to be tampered with due to the level of confidentiality they are oriented.

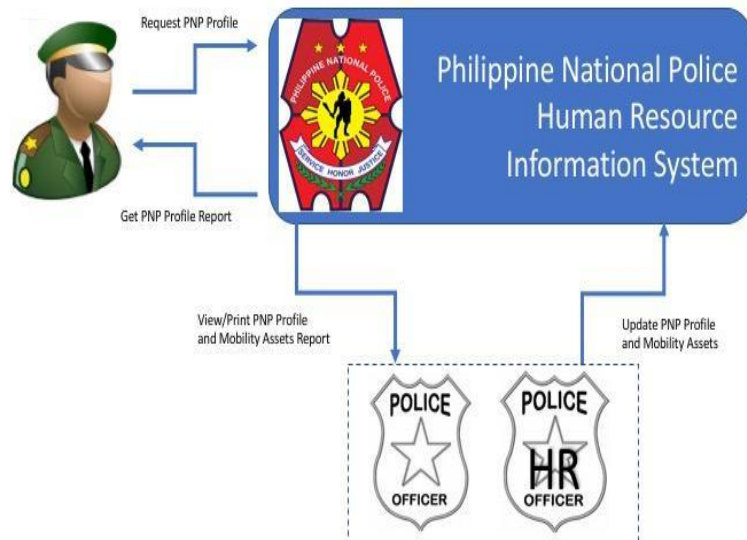


Figure 2. Context flow diagram

Figure 2 shows the context data flow diagram of the system. Figure 2 also shows the connection from different users to the Information Management System.

*Process flow diagram*

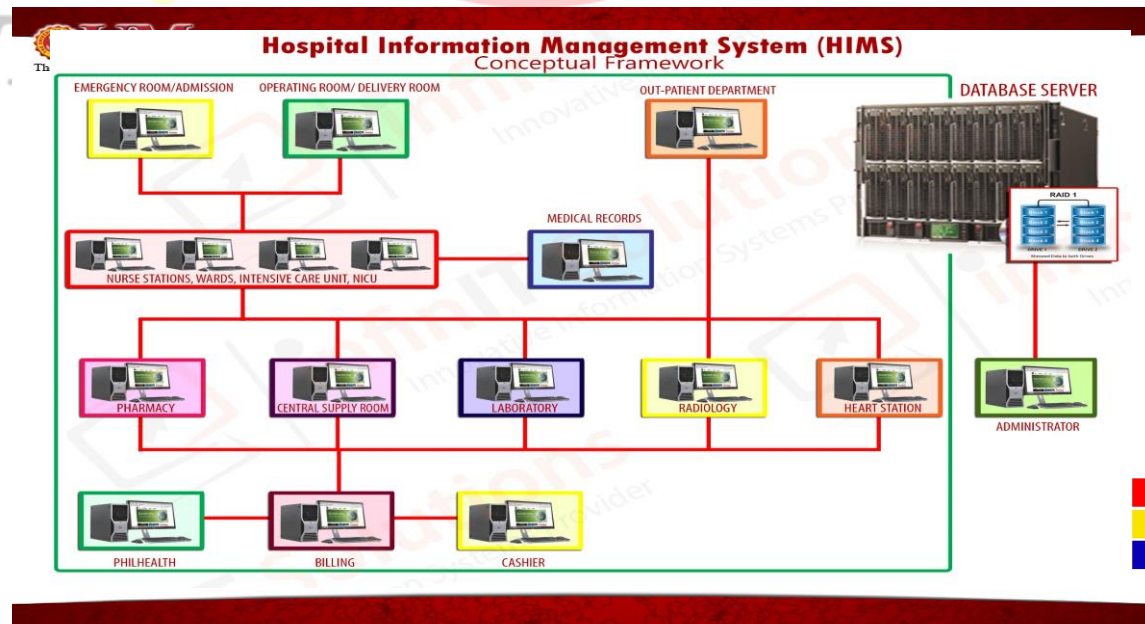


Figure 3. Process flow diagram

Figure 3 shows the process flow diagram of the whole system. All computers with an installed application are connected to the central server. The central server contains all the data entered

from the different methods, monitored and maintained by an administrator. Users are also provided with specific accounts to access the other parts of the system.

#### *Software implementation*

The researchers utilized the Agile-Scrum incremental and iterative method in developing the application. The process is composed of the development team to accomplish the development stages through sprints. Part of the development team is the Scrum Master, who oversees the entire achievement of every Sprint.

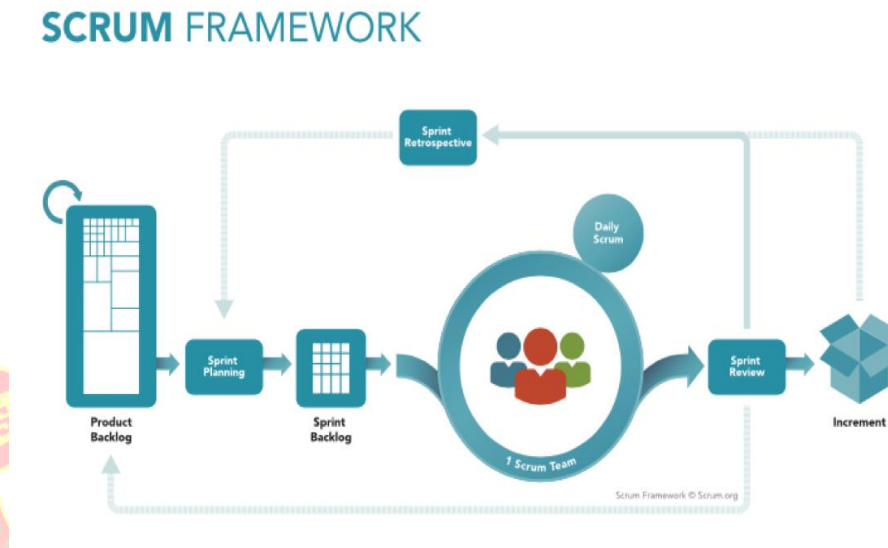


Figure 4. Sprint Cycle

Figure 4 is the cycle followed by the researchers in achieving the seven sprints. Sprints 1 through 7 are based on the incremental method, while the testing phase in sprint 8 follows the iterative process, where it checks the successful connections of the different forms.

#### *Software validation*

There were three levels of this software process: unit testing, system testing, and acceptance testing. Unit testing focused on validating the individual component or module of the program. System testing is focused on ensuring that the entire system is functional through the workings of its parts and as real-world data is applied. Acceptance testing is a validation activity conducted by the intended users to ensure that the software meets their user requirements specifications.

#### *Software evolution*

After a series of testing, the research team have set a schedule for the PNP-RHS Region XI at Camp Quintin for users training, deployment, and implementation of the PNP-HIMS. The essential software to run the application was installed in five (5) computers, where the authorized users were given a chance to use the system.

## RESULTS

The Information System was able to automate the existing manual system of the PNP RHS Region XI. The system enabled the users to encode data of the police and police aspirants and produced pertinent records such as personal profiles, physical exam reports, dental health records, neuro-psychiatric clearance reports, and medical records. The system also provided an automated medical history where users can view the health records of every police and police aspirant/ applicant.

The Information System had a central database where all the records were stored. Figure 4 of page 13 shows the position of the database server of the system. A standard security mechanism of the MySQL Database Management System was used to secure the system's records. There is also an admin level authorization who can manipulate all the features of the system.

The Information System was also user-friendly. Labels were in place in order to identify the different icons. Sections were also put into frames in order to divide different sections and for more straightforward navigation.

## CONCLUSION

In conclusion, after it was presented and deployed in The Philippine National Police Regional Health Service Region XI, the personnel commended the system since it helped them provide quality-based service by improving their current system. The system was also praised because of its user-friendly environment, and it helped them generate essential and needed reports to be submitted in their headquarters.

## RECOMMENDATION

Since the system is networked, it can only be accessed within the network. The researchers recommended that it be online to be accessed outside the network or the vicinity of the camp.

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