GROUP 2- Healthcare

“Hospital Management System”

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INTRODUCTION

In the continuously changing environment of healthcare, the use of modern technologies has become critical to improving efficiency, streamlining processes, and, ultimately, patient care. The Hospital Management System (HMS) is one such game-changing innovation that has transformed the healthcare industry. This comprehensive software system is intended to manage the complexities of hospital operations, such as patient registration and appointment scheduling, as well as billing and inventory administration. HMS represents a paradigm shift in how healthcare facilities approach administration, providing a holistic approach to optimizing workflows, reducing errors, and providing a smoother and patient-centric healthcare experience.

The origins of Hospital Management Systems can be traced back to the increasing complexity of healthcare organizations. As hospitals extend their services and deal with a rising volume of patient data, the requirement for a reliable and integrated system becomes critical. HMS serves as a digital nerve center, integrating diverse departments such as finance and human resources as well as clinical operations and patient care. As a result, these solutions alleviate the issues associated with traditional paper-based procedures, resulting in a more agile and responsive healthcare infrastructure.

One of the most important aspects of Hospital Management Systems is their capacity to improve operational efficiency. Healthcare practitioners can devote more time to patient care by automating common administrative duties such as appointment scheduling, billing, and inventory management. This not only optimizes resource utilization but also reduces the possibility of errors, resulting in a safer and more dependable healthcare environment. Furthermore, real-time access to patient records provides medical practitioners with immediate insights, allowing for faster and more informed decision-making at the point of care.

In addition to operational efficiency, HMS plays a critical role in improving patient care quality. The use of Electronic Health Records (EHR) means that patient data is not only digitized but also freely accessible, allowing for a comprehensive perspective of the patient's medical history. This allows for more precise diagnoses, personalized treatment strategies, and better care coordination among healthcare specialists. Furthermore, implementing decision support tools within HMS helps physicians stay up to date on the most recent medical research and recommendations, supporting evidence-based practice.

As we begin our investigation of Hospital Management Systems, it is critical to consider the broader ramifications of these technology breakthroughs in the healthcare sector. The parts that follow will delve into the essential characteristics, difficulties, and future prospects of HMS, providing a thorough knowledge of how these systems are transforming the face of healthcare delivery. In essence, the adoption and integration of powerful Hospital Management Systems is the first step towards a more efficient, networked, and patient-centric healthcare ecosystem.

PURPOSE

A Hospital Management System (HMS) improves the efficiency and efficacy of healthcare organizations by streamlining different administrative and clinical operations. An HMS's major goal is to integrate and automate the many processes within a hospital or healthcare facility, fostering smooth communication and collaboration among various departments. This system has many features, such as patient registration, appointment scheduling, billing and invoicing, inventory management, and electronic health records (EHR) maintenance. An HMS avoids manual errors, reduces paperwork, and speeds up overall operational workflows by automating these tasks.

Furthermore, an HMS greatly contributes to the enhancement of patient care and safety. Healthcare practitioners can access accurate and up-to-date information about a patient's medical history, medications, and treatment plans because of the centralized administration of patient records. This accessibility allows healthcare practitioners to make well-informed decisions, resulting in better patient outcomes. Furthermore, an HMS supports the deployment of clinical decision support systems, allowing healthcare providers to follow best practices and evidence-based guidelines, ultimately improving the quality of care provided to patients.

From a strategic standpoint, an HMS provides significant insights to hospital executives via data analytics and reporting capabilities. Administrators can make educated judgments about resource allocation, budgeting, and overall organizational strategy by analyzing key performance metrics and trends. This data-driven strategy assists hospitals in streamlining operations, improving financial management, and adapting to changing healthcare trends. In essence, the goal of a Hospital Management System is to develop a more patient-centric, efficient, and sustainable healthcare environment in addition to streamlining day-to-day operations.

AUDIENCE

The Hospital Management System's intended recipients include a wide range of healthcare professionals and administrators involved in patient care and hospital resource management. This includes the following:

Doctors: are in charge of obtaining and updating patient medical records, prescribing drugs, and using the system to make informed decisions.

Nurses: Use the system to schedule appointments, coordinate patient care, and manage essential information at the point of care.

Administrators: Oversee the hospital's general operation, utilizing the system for resource allocation, inventory management, and strategic planning based on generated reports.

Patients: Patients may be able to examine their medical information and plan appointments, increasing their engagement and empowerment.

SCOPE

The Hospital Management System encompasses the complete range of hospital administration, going beyond the urgent necessities of patient care. This includes the following:

- **Accessibility for Multiple Users:** The system supports several user roles and access levels, ensuring that each healthcare professional and administrator has access to important information based on their duties.

- **Scalability:** Designed to support a healthcare institution's growing and changing needs, the system should be scalable to incorporate new features and adapt to increasing technology standards.
- **Security and privacy:** Because healthcare data is so sensitive, the HMS prioritizes comprehensive security measures to secure patient information while also adhering to privacy requirements.
- **Interoperability:** The system should be built to interact smoothly with other healthcare systems and technology, supporting interoperability to improve data interchange and collaboration across the healthcare ecosystem.

Project Overview

PROJECT OBJECTIVES

The project aims to develop a comprehensive healthcare management system through a website, fostering communication and facilitating appointment bookings with healthcare providers. The system will feature a user registration and authentication process, ensuring secure account creation and data protection. Users will be able to manage their profiles, including personal information, medical history, and insurance details. Additionally, the platform will host detailed profiles for healthcare professionals, showcasing their specializations, credentials, and availability.

A key functionality of the system is the appointment scheduling module, providing users with a user-friendly interface to book appointments with their chosen doctors. A calendar system will display doctor availability, allowing users to select convenient time slots. Real-time communication tools, such as secure messaging and file sharing, will be integrated to facilitate seamless interaction between patients and doctors.

To enhance user experience, the platform will include features like appointment booking, search and filtering options for finding specific doctors, and a feedback system for patients to rate and review healthcare providers. Integration with Electronic Health Records (EHR) will be implemented to ensure easy access to patients' medical history.

Security measures will adhere to industry standards, with a focus on compliance with healthcare regulations and data protection laws. The website will be designed to be mobile-responsive, ensuring accessibility from various devices. Scalability will be a key consideration, accommodating potential growth in both users and data.

The platform will provide educational resources on medical conditions, treatments, and preventive measures. Accessibility will be prioritized, ensuring the website is usable by individuals with disabilities. A customer support system will be in place to address user queries and issues promptly. Continuous improvement will be emphasized, with mechanisms for collecting user feedback and regular updates to meet evolving user needs and technological advancements. In summary, the project aspires to deliver a user-centric, secure, and efficient healthcare management system that enhances the overall patient-doctor experience.

KEY FEATURES

The Hospital Management System (HMS) strives, at its core, to turn the fragmented environment of hospital operations into a unified, digital ecosystem. This digital hub promotes easy communication and coordination among healthcare providers while revolutionizing patient information management. The HMS aspires to achieve the following features by leveraging the power of automation and digitization:

- **Patient Information Management**: The system enables doctors, nurses, and administrators to manage and retrieve patient data such as medical history, prescriptions, and appointments more efficiently. This centralized repository provides easy access to vital information, allowing for more informed decision-making.
- **Appointment Scheduling:** The HMS simplifies the process of scheduling and managing appointments, lowering patient wait times and optimizing healthcare professional productivity. This feature is critical for improving patient happiness and maximizing hospital resource utilization.
- **Prescription Management:** The system supports healthcare practitioners in electronically producing, modifying, and maintaining prescriptions. This function helps reduce errors, ensure prescription correctness, and improve the efficiency of the pharmacy and drug dispensing process.
- **Inventory Tracking:** In addition to patient-centric capabilities, the HMS incorporates inventory tracking functionality. Administrators and procurement staff can use this to monitor stock levels, streamline supply chain management, and reduce the danger of shortages or excess situations.
- **Reporting:** The system creates detailed reports on numerous elements of hospital operations, providing insights that may be used to influence strategic decisions. Patient demographics and operational efficiency measures are included.
- **Medical Records**: Within the HMS, a complete electronic medical record (EMR) system assures the safe preservation and retrieval of patient medical records. This not only enhances care quality by providing a comprehensive picture of a patient's health, but it also aids in fast and correct diagnosis.
- **Medical Billing:** Allows hospitals to improve financial performance, improve patient experience, and manage the complexity of healthcare reimbursement more efficiently and accurately.

TECHNOLOGIES USED

The healthcare management system will be developed using a robust set of technologies to ensure its functionality, security, and scalability. Visual Studio Code (VSCode) will serve as the integrated development environment (IDE) for efficient coding and collaboration. The front end of the website will be built using HTML for structure, CSS for styling, and JavaScript for interactive features, ensuring a responsive and user-friendly interface.

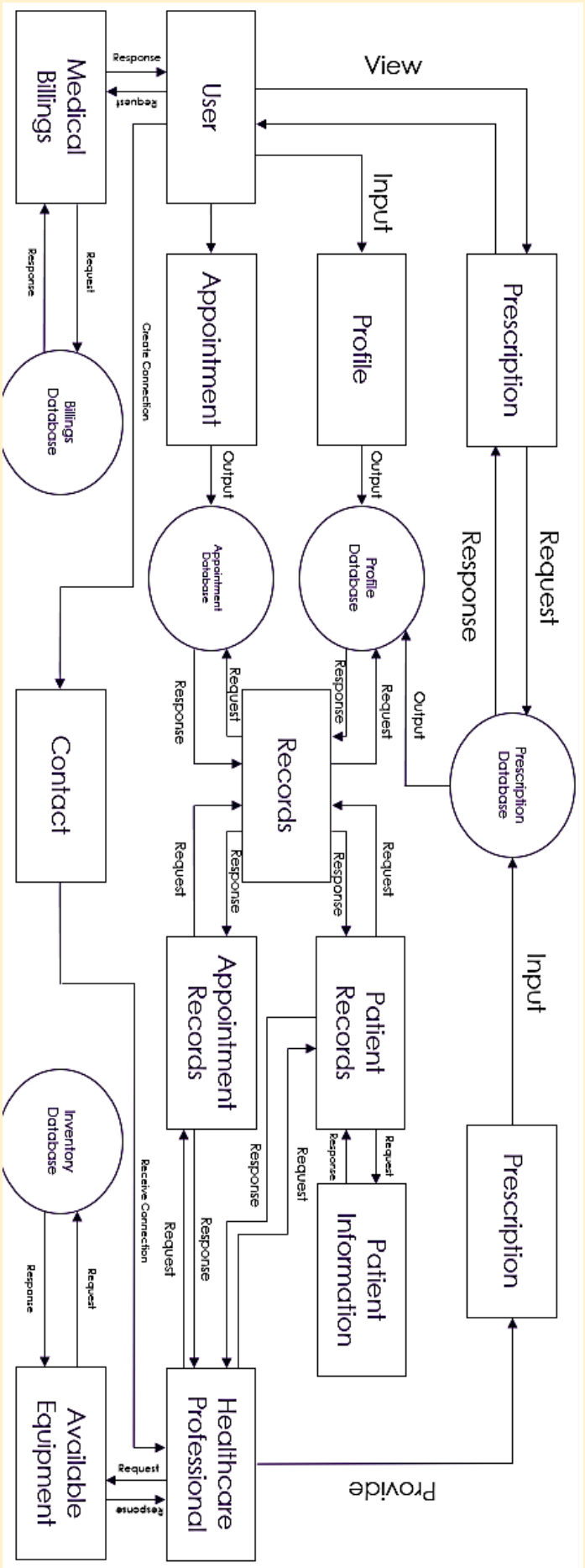
The back end of the system will be powered by PHP, a server-side scripting language well-suited for web development. PHP will handle dynamic content generation, user authentication, and data processing. MySQL will be employed as the relational database management system (RDBMS) to store and manage user profiles, appointment details, and other relevant data securely.

APIs (Application Programming Interfaces) will play a crucial role in connecting different components of the system, facilitating seamless communication between the front-end and back-end, as well as integration with external services or data sources. XAMPP, a free and open-source cross-platform web server solution, will be used for local development and testing purposes, providing an environment that includes Apache, MySQL, PHP, and other components.

The chosen technology stack leverages well-established tools and languages to create a robust, secure, and scalable healthcare management system. This combination of VSCode, HTML, CSS, JS, PHP, MySQL, APIs, and XAMPP provides a solid foundation for developing a feature-rich platform that meets the diverse needs of both patients and healthcare providers.

System Architecture

ARCHITECTURE OVERVIEW



COMPONENTS AND MODULES

- **User Account Creation:** New users can create an account and choose between two account types (Healthcare Professional and Patient). The website has different functionality between these two account types.

- **Records viewer:** Healthcare professionals can choose between two records which is the patient record and the appointments record. Patient record shows the basic information of the patient such as Name, Age, Address, and Contact Number. Choosing a specific patient brings them to the patient information page where further information is shown which are the demographic profile of the patient, medical records, medications, doctor's recommendation, and recent appointments. The appointment record shows the patient's name, date, contact number, and concern.

- **Generation of Report:** This functionality allows healthcare professionals to have a soft copy or print out a hard copy of the complete patient information to achieve their work objectives.

- **Inventory System:** Healthcare professionals can quickly check all the available equipment in the hospital. This provides convenience of saving time than checking all equipment physically.

- **Prescriptions:** Patients can easily view the prescriptions provided by their doctor. The prescription provided shows the patient's name, date, medicine name, amount, and frequency.

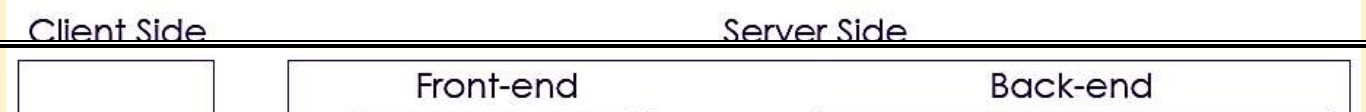
- **Appointments:** This enables patients to quickly create appointments with their own chosen doctor, date and time, and concern. The website will check if the chosen doctor is free during the chosen period.

- **Medical Billings:** The website will calculate the medical expenses of the patient. The patient can view the amount needed to be compensated and possibly pay physically or virtually.

- **Contact and Communication:** Patients can use the website to get in touch with the healthcare professionals from the hospital. The website provides contact information such as contact numbers, email addresses, etc. which can be used by patients to contact healthcare professionals.

- **Profile Information:** Each user has a profile information page that can be edited. Patients profile information can be viewed by healthcare professionals on their patient record page. Patients can only edit their demographic profile so medical records, medications, doctor's recommendations, and recent appointments are excluded.

DATA FLOW DIAGRAM

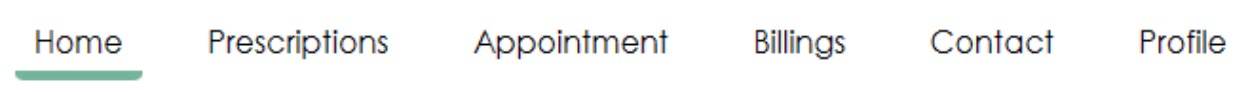


Site Structure

NAVIGATION MENU

For Doctors/Nurses:

- Home (contains name of website, shortcut for navigations).
- Prescriptions (provides prescriptions to each patient).
- Records (choose between patient record and appointments record).
- Inventory (view all available equipment on the hospital).
- Profile (view and edit profile information).



For Patients:

- Home (contains name of website, shortcut for navigations).
- Prescriptions (view prescriptions provided by doctors).
- Appointments (make appointments with chosen doctor, date, and time).
- Billings (patient's medical billings).
- Contact (provide all contact information for the hospital).
- Profile (view and edit profile information)

SITEMAP

Design and Layout

Our website used a monochromatic color scheme. We focused on blue-green and their different tones from the color wheel. A hospital typically correlates to the blue or green color which is the reason why we chose this color scheme. By using a monochromatic color scheme, the website gives a feeling of simplicity and avoids the clashing of different color values which affects the readability of the contents of the website.

The website follows a minimalistic design which prevents objects from being clustered resulting in the avoidance of confusion for the users and follows the simplicity of color scheme design. The design enables the website to display the essential information only to the user. Titles use a larger font size and uses a strong font style to attract attention from the user. Easy-to-read fonts were used and the font color used contradicts the background to provide readability for users.

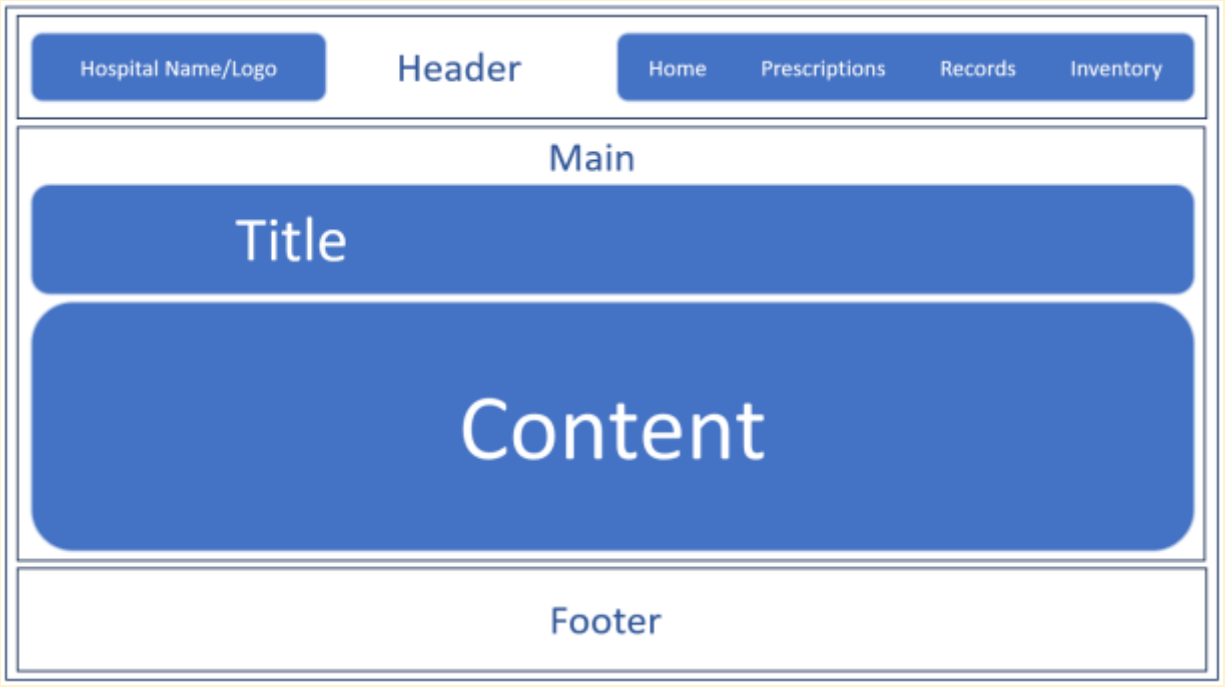
The header of the website contains the hospital name, and navigation menu which changes depending on the type of account logged in from the website. The patient account type navigation menu contains the prescriptions, appointments, billings, contacts, and profile while the Doctor and Nurse account

type navigation menu contains prescriptions, records, and inventory. There are similar objects in the navigation menu between the two account types such as prescriptions but they have different functions.

The website prevents users with different account types from accessing the sections for specific account types. This prevents patients from gaining access to the section specifically for doctors and nurses such as their records for patients and appointments. Doctors and nurses also cannot access the sections provided for patients such as viewing billings and making appointments etc.

The website provides convenience to doctors and nurses since they can access all of the patient's information and appointments through the records section, easily provide prescriptions to each patient, and quickly check the available equipment in the hospital. Also, the patient to quickly check the provided prescriptions, create appointments without falling in line in the hospital, be able to contact the hospital quickly, and be able to pay billings online or face-to-face.

Layout for Homepage



Content

Text Content

Welcome to the Healthcare Management System for PUP Biñan Doctors, a dedicated platform designed to streamline interactions between doctors and patients, ensuring efficient prescription management and appointment scheduling. Our homepage invites hospital staff to explore further, highlighting the system's objectives focused on enhancing the doctor-patient experience. Regular updates on the latest healthcare practices, in-depth evaluations of prescription management technologies, and expert insights from medical professionals can be found on our Medical Insights Blog. Guides and tutorials cater to both doctors and patients, offering step-by-step instructions for seamless interaction within the system. This all-inclusive platform provides dynamic material for investigating different aspects of doctor-patient interactions.

Images and Media

The Prescription Showcase section captivates doctors, showcasing the latest in prescription management technologies and tools. It goes beyond the surface, providing insights into the functionality of cutting-edge prescription systems and highlighting their significance in modern healthcare.

In the realm of Video Content, our platform offers engaging materials, including instructional videos on efficient prescription management, insightful interviews with medical professionals, and the latest updates on medical advancements presented in video format. This multimedia approach ensures a dynamic and informative experience for doctors seeking diverse perspectives on the ever-evolving healthcare landscape.

Content Management System (CMS)

At the core of the Healthcare Management System for PUP Biñan Doctors is a user-friendly Content Management System (CMS) designed to prioritize seamless functionality. The intuitive dashboard simplifies prescription management and appointment scheduling, providing a cohesive experience for doctors. Our CMS relies on multimedia integration to enhance the prescription management experience. Doctors can easily prescribe medicines, and the system allows for the integration of other media, resulting in visually appealing and diversified material.

The CMS features powerful organizing elements such as Categorization and Tagging, with well-organized categories for various prescription types and a tagging system that improves information retrieval efficiency. Collaboration is eased using doctor accounts that provide various access levels and collaboration features, allowing multiple doctors to contribute seamlessly to patient care. In conclusion, the CMS acts as a solid foundation, enabling effective prescription management and collaborative activities within the Healthcare Management System for PUP Biñan Doctors.

Functional Components

This is a comprehensive healthcare management system designed to streamline patient-doctor interactions and optimize healthcare processes. Serving as a centralized hub, this healthcare management system encompasses various functional components aimed at enhancing the overall healthcare experience for both patients and healthcare providers.

The Patient’s Module includes features to facilitate seamless communication and appointment management. The Appointment Scheduling component allows patients to schedule appointments with healthcare professionals conveniently through a user-friendly interface. Patient Profiles store and organize individual health information, medical history, and insurance details securely. Real-time Communication tools enable secure messaging and file sharing between patients and doctors, fostering effective virtual consultations. A Search and Filters function assists users in finding specific doctors based on specialization, location, and availability. Appointment Reminders and Feedback and Ratings mechanisms enhance user engagement, reducing no-shows and providing valuable insights for continuous improvement.

The Healthcare Provider’s Module focuses on empowering doctors and healthcare administrators with efficient tools. Doctor Profiles provide detailed information on healthcare professionals, including specializations, credentials, and availability. The Appointment Management component allows doctors to view and manage their schedules, facilitating a well-organized workflow. Integration with Electronic Health Records (EHR) ensures seamless access to patients' medical history, improving diagnostic accuracy. Security and Compliance features adhere to industry standards, safeguarding patient information and

ensuring regulatory compliance. Analytics and Reporting tools offer insights into appointment trends, user interactions, and system performance.

The Administrative Module serves as the central hub for overseeing and managing the healthcare system. User Management allows administrators to handle user accounts, ensuring security and privacy. The System Configuration component enables adjustments to system settings and routine maintenance tasks for optimal performance. The Database Management feature oversees the secure handling of patient data, including additions, edits, and removals. Continuous Improvement mechanisms involve collecting user feedback, implementing updates, and staying abreast of technological advancements. Overall, these functional components collectively create a robust healthcare management system that prioritizes patient well-being and enhances the efficiency of healthcare delivery.