

Capstone Case Study

New Century Wellness Group



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Executive Summary

Opportunities and Issues

New Century Wellness Group is functioning fine with their outdated system, but the current system is not sustainable for where the company envisions itself. Security and efficiency are issues that come with using paper-based systems and outdated computer systems. Dr. Jones has highlighted a specific need for additional support within the HR Department. A complete overhaul of the current systems is needed, making time and money some of the greatest considerations. There is a fantastic opportunity to enhance both customer and employee satisfaction, as well as support growth within the practice. It is likely that competitors either utilize more technical systems or are beginning to implement them, so it is critical that New Century is modernized.

Solution

The solution, while preliminary and subject to change, is to implement a hybrid system that includes a mix of a transaction processing system and a business support system, which has aspects of a user productivity system. Each of these systems enhances efficiency and productivity while reducing costs pertaining to errors. New Century Wellness Group must be brought out of the past to remain relevant in the growing healthcare industry, and improving efficiency and eliminating detrimental errors in all aspects of the practice is a crucial first step. Integration of the proposed systems as well as initial cost are issues that must be addressed, but our findings in the feasibility study prove that these risks are worth taking. Additionally, time is needed to implement a new system and train the staff, but there are detailed plans for mitigating these risks. Numerous solutions have been considered and discussed with New Century Wellness Group, ensuring the recommendations that have been suggested are tailored to the specific needs of the practice through JAD teams.

Efforts have been put into completing an analysis of the viability of the new system proposed for New Century Wellness Group. The assessment outlined the expenses linked to the operations and the new system such as employee salaries, training costs, hardware enhancements and time taken for error corrections. An initial prototype has been made for the user interface for the system by crafting storyboards and wireframes for important screens to ensure smooth navigation for users. The prototypes also include data defining methods for patients through input documents and data screens while incorporating validation and control features to improve data accuracy and user interaction. Within design and modeling, all existing data flow diagrams and object models were used to pinpoint entities and their characteristics. With the assistance of data modeling tools, an entity relationship diagram was developed. This detailed data model acts as a foundation for the systems database layout, guaranteeing storage and access to data.

Included within this deliverable is a diagram of New Century's logical network, designed to ensure that every device can be connected to the network. This diagram also outlines the cost and time needed to implement the network and feedback on whether New Century Wellness Group should switch to a wireless network sometime in the future to help cut down costs. Application development methods have also been explored, with each of their processes and advantages being documented. Also, a basic testing strategy has been devised to give the teams guidelines on who

will have certain roles and to ensure any changes will not hurt the up time of the implemented system. All groups who require training have been documented to ensure all members are fluent and comfortable working with the system. Finally, memos have been attached to address potential issues within the system as well as system maintenance, including how to address slow response times, types of maintenance that may be performed, a maintenance release methodology, and security concerns and recommendations. These combined efforts ensure that the upcoming system will not just address New Centuries' requirements but also have room for growth to support the company's long-term objectives. This project does not come without risk, but the awareness of these risks will ensure the long-term success of the project.

Conclusion

New Century Wellness Group is a budding practice that needs help upgrading its outdated systems to suit their current and future needs. New Century provides a unique level of care and services that is not found elsewhere in Brea, California. With New Century being ahead of the competition already, it is imperative that they continue to grow upon their success. A hybrid solution has been proposed that includes an EMR system, CPOE system, and CDSS system, allowing more efficient work to be completed. Being in the healthcare business, confidentiality and security of records is of the utmost importance, and these proposed solutions will increase security and put patients at ease. Employees will produce better work and show increased engagement with a more efficient system. Cost and time will be the significant issues when approaching this project. A new system will be very costly and could take a year to implement, which are factors we have heavily considered when approaching this project. In the following studies we have detailed our findings and determined that this project is feasible in every aspect, and that New Century Wellness Group will earn far more than what is initially expended with proper implementation.

Section 1

New Century Wellness Group Business Profile

Introduction

New Century Wellness Group was founded in 2014 in Brea, California, and has risen to remarkable success over the past decade. Taking a holistic approach to modern medicine as well as focusing on preventative care has set New Century Wellness Group apart from their competitors.

Mission

- Diagnosis, prevention, and treatment of adult diseases
- Concentration on preventative medicine and fitness
- Holistic approaches to patient care

Function

New Century strategically offers services covered by about 35 insurance providers, Medicare, and Medicaid. The offerings of New Century surpass its competitors and are remarkably diverse. An outside certified public accountant works with the in-house accounting department to ensure accurate reporting. The Patient Relations Department ensures patient confidentiality and security needs are met. Departmental support is given by the HR Department.

Products

New Century Wellness Group works to provide accurate diagnoses and utilizes medications, treatments, and secondary care. Medications are prescribed and scripts are written for imaging, testing, or additional specialty care and consultations.

Services

New Century Wellness Group provides typical in-house tests such as wellness checks, annual physical exams, bloodwork, and vaccinations. Standard vision and hearing exams and some imaging tests can be conducted. Nutrition and plans regarding digestion, eating habits, and disorders can be made through the in-house Nutritionist. Physical rehabilitation services are available on an outpatient basis.

Customers

New Century Wellness Group currently services approximately 8,000 patients, coming from 325 different employers. These customers have a variety of insurance providers ranging from Medicare and Medicaid as well as 35 private companies. New Century is focused on adult care.

Suppliers

New Century must work with suppliers of medical equipment such as needles and syringes, wound care items, and all other objects used in the services provided. Carla Herrera, the head of the Facilities Department, is responsible for working with vendors and suppliers to obtain these instruments.

Competitors

New Century Wellness Group is in direct competition with other healthcare providers in the Brea, California, area where they are located. Healthcare practices in the surrounding area outside of Brea will become immediate competitors once New Century expands.

Constraints

Constraints include time needed to implement new systems and expand the practice, working within budget to achieve a more technical system and expansion, and materials needed to continue providing exceptional services.

Future Direction

New Century Wellness group hopes to expand on the services and insurance carriers that they currently accept. In the next year New Century will open a second location near another medical center in California and will open an additional 2-3 locations in the next three years.

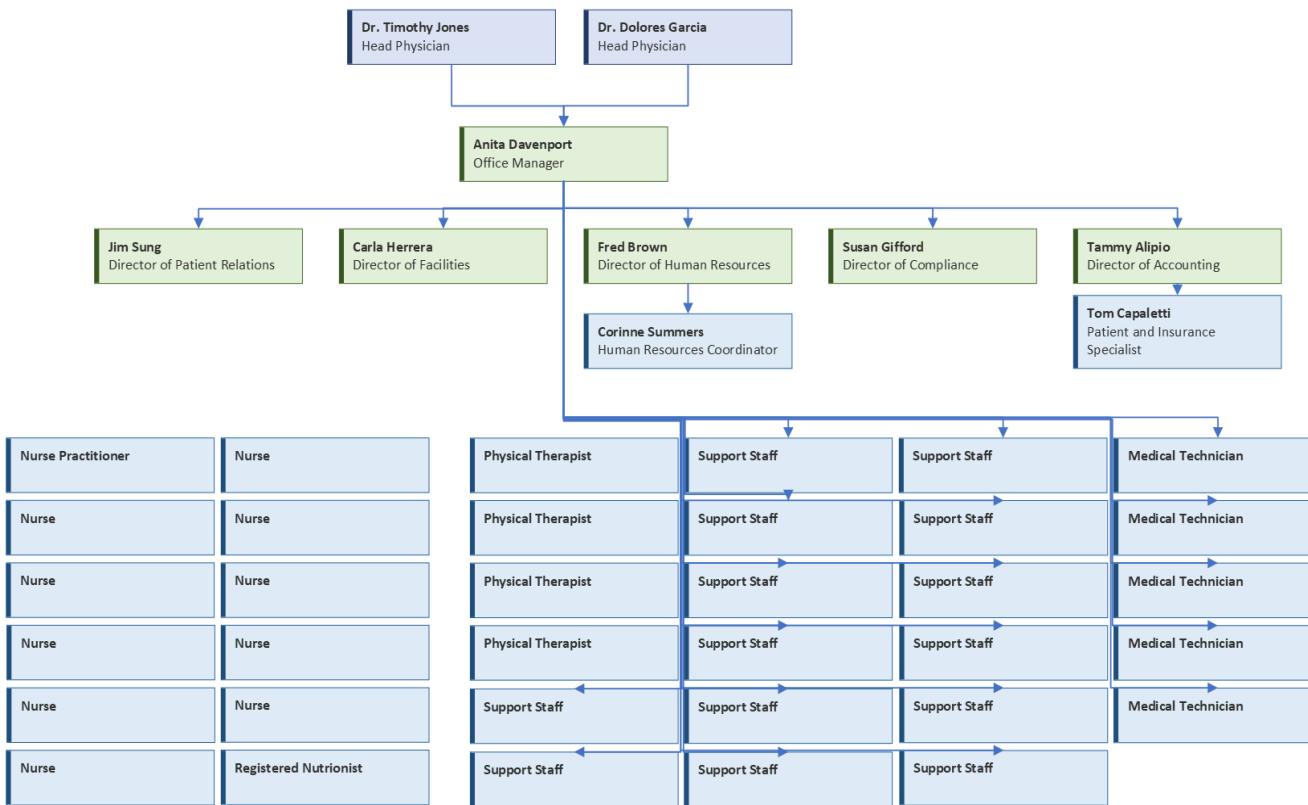
Staff Organization Chart



New Wellness Century Group

A Holistic Driven Clinic

Organizational Chart



Departments

Human Resources Department

Fred Brown is the head of the HR Department, which is responsible for hiring and onboarding as well as employee training. The HR Department is also responsible for employee benefits, health benefits, and payroll duties.

This department will need data pertaining to:

- Personal information (employee names, addresses, contact information)
- Employee records (start dates for current employees and end dates for former employees, job titles and descriptions, and any paperwork relevant to the hiring or firing process and training process)
- Compliance information (detailed list of employee violations or write-ups, absences, and vacation and sick time used/accrued, legal requirements surrounding each title)
- Performance reviews

The reports generated by this department will include:

- Detailed employment information (turnover, number of current employees, diversity, employee complaints and satisfaction)
- Benefit allocation (How many employees are utilizing their full benefits package, which benefits are being used.)
- Attendance reports
- Leave reports. (How many employees are out on workers' compensation, birth-related leave, other leaves of absence as well as the money allocated toward these leaves.)

Payroll Subdepartment

Corinne Summers reports to Fred Brown in the HR Department and is the head of the payroll subdepartment. She is responsible for tracking and cutting the payroll, the pay-roll tax reporting, and interfacing with the accounting department when necessary. Reports produced and data needed align with those of the HR Department and additional financial documents.

This department will need data pertaining to:

- Financial information (insurance plan and tax information, W2 and W4 forms)
- Employee salary information (bonuses, stock options, pay according to job title, overtime pay)
- Hours worked including overtime
- Time off information (PTO, unpaid leave, workers compensation, etc.)

The reports generated by this department will include:

- Insurance reports detailing the plans each employee has.
- Payroll report including all details listed above per pay period
- Individual employee report detailing all listed information for each employee separately
- Employer contributions (IRA or stock options)
- Tax forms to ensure proper reporting

Compliance Department

Susan Gifford is the head of the Compliance Department, which is responsible for maintaining and securing all patient medical records. Her department also works to ensure all operations comply with the government's regulatory rules and agencies regarding medical data, its use, and/or how it is handled.

This department will need data pertaining to:

- Compliance (number of privacy incidents reported including breaches or breaking confidentiality, and employee compliance paperwork or confirmation)
- Retention (Length of time records will be kept, details on how they will be secured, and what will happen to them if the practice is closed.)
- HIPPA information and other government regulations (legal paperwork signed by employees)

The reports generated by this department will include:

- Incident reports
- If any information is specifically requested by an outside company or agency, this department will generate it.

Accounting Department

Tammy Alipio runs the Accounting Department, which handles the daily bookkeeping functions of the organization including billing, account payables, and accounts receivables. The Accounting Department also works with the company's CPA, or certified public accountant, outside to create all financial reports, tax filings and payments, and all other related activities. Additionally, Tammy is responsible for determining quarterly profit distributions among employees.

This department will need data pertaining to:

- Payment information (tracking payments from patients, insurance companies, etc. both incoming and outgoing)
- Employee salary and information relevant to determining the quarterly profit distribution per employee
- Medical records (to determine the amount of money to charge each patient based on their services and insurance)

The reports generated by this department will include:

- Balance sheet
- Income statement
- Statement of cash flow

Patient Relations Department

Jim Sung is the head of Patient Relations, responsible for all patient scheduling and intake. His department must make sure all patients schedule the patient intake process correctly. The intake form contains particularly important fields that must be completed by the patient, such as HIPPA signoffs, patient demographics, insurance and billing information, basic medical and allergy information, and more. This department will also generate the daily appointment list for each medical professional when it is appropriate. Additionally, the employees in the department must make daily appointment reminder calls to patients with upcoming appointments.

This department will need data pertaining to:

- Patient personal information (name, address, birth date, contact information).
- Patient demographics (age and gender)
- Patient health and medical history (documents from both current and previous visits, surgeries, etc.)
- Patient complaints and satisfaction (concerns or complaints about the practice itself, general staff, etc.)

The reports generated by this department will include:

- Patient satisfaction
- Patient complaints
- Incident reports

Facilities Department and Cleaning Services Subdepartment

Carla Herrera runs the Facilities Department, which is responsible for ordering and organizing all office and medical supplies. She is also in charge of the cleaning service subdepartment, which is responsible for the cleaning of the facility and proper disposal of all normal and medical waste daily.

This department will need data pertaining to:

- Lighting, heating, and cooling systems as well as energy usage.
- Equipment status.

The reports generated by this department include:

- Risk analysis reports (code violations, safety risks, environmental risks).
- Financial reports (How many resources are being used, in what amount of time and what their costs are.).
- Building safety reports (Are the systems such as heating and cooling up to date, functioning, and safe?)

Solution Recommendation

From the solutions we have considered, our preliminary recommendation is a hybrid solution that is a mix of a transaction processing system and a business support system which has aspects of a user productivity system. Our recommendations are subject to change as we continue our analysis. This section will describe our findings of each system and how they can integrate in the system.

- A Transaction Processing System can track and help with financial business operations of a company, such as payments. This system can be used to assist with payment between the customer and the company. The customer can pay either out-of-pocket, through their insurance, or both. The clinic will verify the insurance and update any relevant areas as needed based on the transaction, such as settling an outstanding balance or purchasing medication from the clinic, if applicable.
- A Business Support System can help provide job-related information to everyone in an organization. This system is used by everyone in an organization so that they would have the required information needed to do their job. This system can be used to give everyone data on what they need to do. People in Patient Relations can easily track, gather, and output information on today's appointments, and then see tomorrow's or future appointments to give those people a reminder. Accounting can keep track of billings and transactions with the assistance of a TP system, and more.
- User Productivity Systems are applications and sometimes physical hardware that can help everyone do their job and keep on top of things. These applications include but are not limited to e-mail, video conferencing, word processors, automated calendars, database management software, spreadsheets, presentation software, and mobile computing systems like a phone/laptop/tablet. These applications are universally useful, allowing key components for people of most departments to do their job more efficiently compared to how they are now with the mix of paper and legacy systems.
- An Enterprise Resource Planning System (ERP) is a system that can provide cost-effective support for both users and managers within the company. A system like this can help predict

whether certain services provided within the clinic will be in demand at a specific location or time of year. To successfully implement ERP systems, the company will need enterprise computing, which are information systems that support company-wide operations and data management requirements. The main goal of enterprise computing is to integrate the company's primary functions and improve efficiency, reduce costs, and help the people in charge make key decisions. There is a risk of bringing ERP systems into companies, as the system may not be compatible with the operating style of the company. However, with the benefits enterprise computing and ERP systems can bring in, it would be worth the risk to try to implement ERP systems into the company. It can improve areas where the company might need improving, reduce the cost of operations within the company, and can lead to an increase in the company's longevity therefore beating out competition.

Section 2

Defining Recommended Systems

Electronic Medical Record System (EMR)

Electronic medical records are a collection of a patient's medical history stored on a computer. Medical history can include diagnoses, what medicine they are/were taking, any tests that have been conducted on the patient (Ex. Blood tests), and what kind of allergies they have. It can also include any immunizations they have developed due to getting a vaccine. It does not make them immune to a disease, but it makes them better protected against it. These records can be seen by all health care providers (doctors, physicians, nurses, etc.) that are taking care of that patient, and can be used to make recommended choices about a patient's health and care. For example, if a patient is overweight, a doctor might suggest they go on a diet and/or exercise. Staff will be better equipped to make the best possible suggestions if they have access to the entirety of a patient's medical history at the click of a mouse. If a new patient has become a customer of your practice, obtaining their medical history will be simple, as it will be stored in this system that is easily transferrable and accessible.

Computerized Provider Order Entry System (CPOE)

The Computerized Provider Order Entry allows providers to enter notes and treatment instructions digitally. Orders for tests (blood panels, x-rays, etc.) can be sent directly to the lab or imaging center as the entire process is online. This eliminates the issues that come with paper documentation and orders, such as inability to connect through phone calls, or the time it takes to fax documents and orders. Utilizing a CPOE reduces the errors an organization or provider may make and improve the safety of the patients. In addition, this system improves efficiency, which allows providers to save time without expending more energy. CPOE systems also improve reimbursements. Occasionally, orders will require pre-approval from the patient's insurance provider. A CPOE system can flag the orders that require pre-approval, which can help reduce denied insurance claims. The insurance claim is a formal request by a policy holder to the insurance company they are with for

compensation for a loss or policy event that is covered under the insurance. This system can be integrated with a CDSS system to provide real-time support and cross-reference patient allergies with prescribed medications.

Clinical Decision Support System (CDSS)

A clinical decision support system is intended to improve the delivery of healthcare services (physical therapy, primary care, urgent care, etc.) by enhancing medical decisions with targeted clinical knowledge, patient information, and other health information. It is typically made of software designed to aid clinical decision making. Clinical decision making refers to the physician determining which tests to order and what information to gather to conclude what is best for the patient. Characteristics of an individual are matched to a clinical knowledge base within the computer, and patient-specific assessments and/or recommendations are presented to the clinician for a decision. An advantage of using a clinical decision support system is the improvement of patient safety. Preventing an accidental mix of drugs is just one example of a critical situation being avoided through using a CDSS system. It can also be implemented to help with clinical management, which can help the practice stay within clinical guidelines, improve cost-effectiveness, streamline administrative functions, and improve diagnostic support.

Preliminary Investigation

Before beginning, we would like to explain the procedure of our preliminary investigation. The first step was to understand the problem or opportunity. The scope and constraints of the project are then identified. Fact-finding techniques are then used through analysis of the organizational structure of New Century, operations of the clinic, provided documentation. An organizational chart is created, and a user survey is conducted. Additionally, usability, costs, benefits, and schedule data are studied and analyzed. Finally, operational, technical, economic and schedule feasibility are evaluated. Recommendations at this point are preliminary and are subject to change, as more information is needed before the final system is designed. As more data and information is recorded and evaluated, changes will be made to the recommendations, and a more comprehensive analysis will be provided.

Designing a new system for the requests made by New Century does not come without risk. New Century is trying to expand and will need to move away from its current mix of a paper-based system and legacy computer system, which is several years old. The clinic is also planning to grow and expand its locations, and the system it currently runs will not be able to handle the growth. Converting New Century's system from paper-based to a modern information technology system can take several weeks to several months. Furthermore, converting a legacy system to an IT system can take upwards of several months to years depending on how extensive the legacy system is, the migration approach chosen, and resources allocated to the task. Though potential issues and risks must be addressed and outlined, there are many benefits to the proposed system.

Upgrading a legacy system to a modern IT system can increase security, which is especially important pertaining to medical documentation. Migrating from a smaller legacy system now can prove to save the clinic money overall before it gets bigger, which will end up costing more if conversion is delayed. The clinic will also experience lower maintenance costs, as the new system should not need updates or changes soon. Having the opportunity to convert to a legacy system can also give the clinic an upper hand in the competition, depending on the system they use. Upgrading would make New Century more scalable, productive, and user friendly. Also, transitioning from a part paper-based system to a new modern system will lower ink and paper costs and any additional costs associated with printing and scanning equipment.

To summarize, continuing business on a part paper-based system and legacy system several years old could cost New Century more money, make the business less scalable, and decrease productivity. Transitioning from a paper-based system and old legacy system can be extensive on company resources. It may take months to years to transition fully and can be costly due to utilizing third-party vendors to help with the transition. Modernizing the clinic's technological infrastructure can be beneficial to operations. Scalability, production, user experience, net income, and having an upper hand in competition all can improve drastically from having a modernized IT system.

To transition to an up-to-date computerized system smoothly and cost effectively we will proceed with a process that involves migrating data step by step. Initially, the focus will be moving records, billing details, and medical documentation from the existing paper-based and older systems to a centralized Electronic Medical Records (EMR) platform. This approach will cut down on the time needed for recordkeeping and guarantee fast and precise access to patient information—resulting in increased productivity and fewer administrative mistakes. Following that step will be the integration of a Computerized Provider Order Entry (CPOE) along with a Clinical Decision Support System (CDSS) to simplify patient care processes by enabling healthcare professionals to enter treatment orders and get alerts and suggestions in time—leading to enhanced efficiency and a decrease in expensive medical errors. All employees must receive training to help them use the system smoothly and without any interruptions.

By shifting from procedures and obsolete software to practices at the clinic, costs will be cut in multiple aspects; getting rid of paper records will cut down costs on paper supplies and ink as well as storage space. Automating billing and insurance claims will help expenses by streamlining operations and reducing errors that can slow down payments or require rework. Savings on maintenance expenses are expected when we upgrade from the legacy system, which may be increasingly expensive in terms of upkeep. The new system will enable current employees to manage more patients, eliminating the need for hiring additional staff therefore decreasing spending and improving efficiency.

There are two systems to consider so far, Epic and Cerner. These systems are known for their presence in the healthcare sector due to their reliable and secure platforms that can effectively cater to the clinics' expanding needs. While Epic is known to be more flexible in systems

integration, Cerner has a customizable interface that can be tailored to meet the needs of the practice. The variety of features offered by both systems are worth considering, as either system will provide a great benefit to New Century Wellness Group. Other systems will continue to be analyzed as the process moves forward, as the goal of this analysis is to determine the best possible systems to integrate.

Benefits of an Updated System

- Electronic Medical Records (EMRs) are set to transform the way patient information is organized and accessed by digitizing all records for retrieval of history as well, as demographic and insurance information, across departments while ensuring data accuracy and secure sharing capabilities.
- The CPOE module enables doctors and healthcare professionals to input orders electronically (such as prescriptions and lab tests), decreasing the chances of errors from orders and expediting processing.
- Managing Patient Appointments and Scheduling Efficiently; having a system designed for scheduling patients can help the clinic handle appointments smoothly and make the patient intake process more efficient. Using automated reminders can help minimize missed appointments and enhance the effectiveness of scheduling.
- Automating billing and insurance management processes will streamline payment processing and minimize errors for patients bills and insurance claims while also cutting down the time spent handling billing tasks and follow up.

By transitioning to a platform such as Epic or Cerner software solutions, New Century Wellness Group can enhance patient care quality. Administrative tasks will be more streamlined, and security of confidential medical information will be boosted. Additionally, operational costs will be reduced with the introduction of automation and decreased manual workload. The scalability of these systems allows for growth alongside the clinics' expansion to ensure enduring viability. A series of steps should be taken to ensure a smooth transition and reduce user error and frustration. All files and billing details will be checked and operational records moved to the new system.

Collaborating with the software provider to create a data migration strategy outlining the methods and timeline for transitioning data to the system will be a useful step. The software system will be set up by our team and be tailored to fit the clinic's requirements and needs by establishing user access rights and checking its compatibility with other systems such as third-party payroll services. A pilot test will be conducted before fully running the new system. Doing this will make sure that the transition process is smooth.

There are many reasons why this business scope is critical. When a project experiences scope creep it expands beyond the initial deadline due to inefficiency or additional tasks being required. Having an outlined scope helps avoid additions that could throw the project off track and result in delays and increased costs. Establishing boundaries for what is included and excluded from the project scope upfront ensures efficient allocation of resources such as budget and time while avoiding unnecessary strain to achieve project success. A defined scope enables estimates of time and budgets, assisting in creating a feasible timeline and preventing the project from going over the clients' financial and deadline boundaries.

Moving to a healthcare management system brings about various advantages; however, there are also potential drawbacks or obstacles linked to this transition that need to be acknowledged and addressed for proper planning and management purposes. In the period of the changeover to the system, employees will need time to adapt to the new system and become fluent with it. This could lead to temporary decreases in efficiency as they familiarize themselves with the updated procedures. Integrating a system such as Epic or Cerner may necessitate an initial investment in software licenses and upgrades to hardware and infrastructure. Training the staff extensively will be necessary, which might lead to expenses in terms of both time and money. As always, this is all preliminary. Input and parameters can always change which can lead to different output.

Feasibility Study

Operational Feasibility

The management staff at New Century is extremely supportive of new systems being implemented. The old systems are out of date and no longer support the needs of the business. The old systems include a paper-based system and a legacy computer system that is several years old. No direct knowledge is known about how the employees of the practice outside of management feel about implementing new systems, but it is implied that the old systems are no longer favored by anyone within the company, signaling a need for change.

None of the systems proposed would directly result in a workforce reduction. Each proposed system is for data organization and efficiency and still requires ample staff to operate. All staff members affected by the new systems will experience a more efficient system that will also keep them employed. These new systems will require training for most if not all users, as New Century has never had such technical systems before. No direct information has been provided on the ability of New Century to train their employees on these new systems.

Dr. Jones requested more support within the system for the HR Department, specifically the payroll duties housed in this department. Dr. Jones has communicated in a way that leads us to believe he is prepared to provide the necessary resources for training his employees. Some users are involved in the initial planning of the new system. Though Dr. Jones is in direct communication about the new systems, it is known that both Dr. Jones and Dr. Garcia are actively involved in the planning of the new systems. There can be issues with implementing entirely new systems in an environment which have been functioning with outdated and inefficient systems.

Users must be open and willing to learn the inner workings of these systems, have a positive attitude, and be communicative about their needs. The addition of EMR, CPOE and CDSS systems will make all records and information more accessible and organized. Reports should be easier to produce and include fewer errors, so the frequency of reports generated can be expected to increase. Employees will experience fewer frustrations once the new systems are in place, making employee satisfaction higher and improving performance. The overall gain to the organization will outweigh the losses if New Century is prepared to adequately train their staff and said staff is receptive to these changes.

Customer satisfaction will also improve, as tasks that may otherwise be frustrating will be streamlined and easy. Customers will have an easier time scheduling appointments, requesting prescriptions, and viewing transcriptions and results of tests and appointments. None of the proposed systems come with any risk toward New Century's image or goodwill. Legal or ethical issues need to be considered when utilizing an EMR system as any privacy leaks or system malfunctions would be detrimental. Training on any system that involves confidential patient information must be detailed and the risks of using this system must be known.

New Century's current priority is the development of their new systems. All other known goals of the practice can only be achieved once their operation is more efficient, streamlined, and up to date. Day-to-day operations must still be able to take place during this transitional period, but no other priorities will be interrupted.

Economic Feasibility

New Century Wellness Group currently holds the monopoly on traditional and preventative medical care in the Brea, California, area, as no surrounding providers offer such an extensive range of services. New Century Wellness Group is projected to increase in size, revenue, and services provided, making the implementation of updated systems a beneficial investment. The cost of replacing outdated systems is insignificant in comparison to the benefits it will bring to employees and customers of New Century alike.

The tangible costs of implementing new systems at New Century Wellness Group are not yet known in detail, but due to the success New Century has had while utilizing outdated systems, it is understood that implementing a new system is priceless. With the addition of an electronic medical record system, accuracy of documentation will be increased, cutting down on costs associated with the rewriting of documents and time spent fixing errors. Paper copies of documents will no longer be the standard, cutting costs on supplies and time spent producing those various documents.

Implementation of a computerized provider order entry system will reduce employee workload by instantly transmitting documents to testing and imaging facilities. Any reduction in the workload will decrease overtime hours, saving New Century time and money. All implemented systems will improve the efficiency and accuracy of the staff at New Century, providing invaluable intangible

benefits to the company and staff. Immediately upon staff being trained, the proposed systems will improve employee morale and reduce frustrations regarding inaccuracies and tedious tasks.

Operational costs will increase depending on the level of training required for the staff to become fluent in the proposed systems and the additional time spent by the IT Department maintaining them. New Century Wellness Group has expressed its need to gut their old systems and entirely upgrade and replace them, which comes at a cost. New Century is hoping to expand their practice and accept additional insurance providers, which can only be done if they are willing to change and modernize.

The cost to the future of New Century, if these risks are not taken, is far greater than the tangible costs outlined. The proposed systems will reduce costs associated with errors and paper-based systems almost immediately upon being adopted into the company environment. Increased efficiency will not be seen directly when the system becomes operational, as the staff needs to become comfortable and well-versed in the system. More time must be allocated toward daily operations initially to ensure all records and data are transferred over properly. Once the system is familiar to the staff and customers, New Century can expect to begin their path to success and expansion.

Technical Feasibility

New Century Wellness Group currently uses a paper-based system and a computer legacy system. Due to this, it is not likely that New Century currently has the necessary hardware, software, or network resources to implement the proposed systems. To implement an EMR system, New Century will need to acquire new hardware with faster processing abilities and more storage. This will also be necessary to acquire for the CPOE and CDSS systems. The operating system must be compatible with these systems.

It can be assumed that New Century currently has some hardware that is needed to work with the new EMR system, such as card readers, scanners, and printers since New Century previously had a paper-based system and was accepting all forms of payment. The computers at New Century must be replaced and upgraded to handle these systems effectively but will be used for all three systems and can be acquired with ease.

EMR software must be acquired as well as medical billing software for processing insurance information quickly. CDSS software must be acquired which will work with medical knowledge database software and specific algorithms. CPOE software is needed as well, and this software will all be integrated and work together. These resources can all be acquired without much difficulty. The company does not appear to have the technical expertise needed to implement these tools, as the staff have not been highlighted as being technically skilled beyond what is necessary to complete their individual jobs. Technical staff can be hired, and an outside team can be brought in to assist New Century in getting their system up and running.

The proposed platform has sufficient capacity for future needs and goals but can be upgraded if New Century outgrows it. This will be the first time New Century has implemented such a technical system, so there will be a learning curve as the company decides what works best for them and their expansion goals. A prototype may be helpful for communication and collaboration purposes, but Dr. Jones and Dr. Garcia are certain they would like to implement the proposed systems and are committed to the idea. For this reason, a prototype is not required. A prototype will be recommended if the budget allows, or uncertainty is communicated.

Current systems can be integrated with the proposed systems. The paper-based system includes printers and scanners that can still be utilized assuming network compatibility can be achieved. If an upgrade is needed in the future, the EMR system may be difficult to do this with, but it is not likely that New Century will require a new system to reach their one, five, and even ten-year goals. The combination of hardware and software will supply adequate performance. These systems may be new to New Century, but they have been utilized specifically within healthcare and medical spaces for many years. The proposed systems are not experimental and work well together in similar environments.

Dr. Jones and Dr. Garcia have given specific instructions to ensure the complete system will include additional support for the HR and Payroll departments, which can be implemented and work well with the three systems they have proposed. The system must make the job of each employee more streamlined and pleasant to use. EMR systems can grow with the company and handle future transaction volume, as well as CPOE and CDSS systems.

Schedule Feasibility

The time needed to implement the proposed system depends on a variety of factors, with one being the complexity of the system. Dr. Jones and Dr. Garcia have options when it comes to acquiring each system. Software can be acquired in diverse ways, each of which has pros and cons as well as differences in price. The more complex the system chosen is, the more time it will take to implement. We are looking to change multiple systems, so the critical path must be determined, and task dependencies must be known. If the systems can be integrated on the same timeline, that will decrease the time and cost needed. If the systems must be implemented one-by-one, the timeline for the project drastically increases.

New Century controls this project's timeline in that they are involved in the decision-making process for how complex the system is. It is up to the IT team to determine if it is possible to implement these systems simultaneously or if an individual approach is more feasible.

Management has not established a firm timetable for the project yet. Budget and resource constraints have not yet been communicated. Legal conditions surrounding the EMR system must be met, and New Century must be compliant with EMR use regulations. Security surrounding the EMR system must be of utmost importance when designing the system or choosing which company to acquire the software from. The CDSS system must also meet these security requirements and conditions.

An accelerated schedule may pose many risks. Budget constraints that fit within a more generous time limit may not be met if the schedule is accelerated. It can be complex to integrate numerous systems, especially simultaneously, and any rapid acceleration of the project may result in missed details that are detrimental. It is essential for the team to meet all the project requirements and ensure that systems are secure and properly integrated or there is a risk of failure, costing time and money. These risks are not acceptable and could damage the success of New Century or at least set the practice back greatly. If the budget allows, the project could potentially be accelerated in a manner that does not put the legal and technical aspects at risk, but this would require additional support, testing, and planning. The accessibility of rapid acceleration of the project can better be assessed once the scope is more accurately determined and tasks with detailed timelines are outlined.

Project management techniques will be available to coordinate and control the project. The management staff has already shown initiative and interest in the planning and management of the

system. Dr. Jones and Dr. Garcia are keen on helping their staff complete tasks more efficiently, leading us to believe they are willing and able to support their staff throughout the implementation process. A specific project manager has not yet been appointed, but Dr. Jones and Dr. Garcia are at the head of the project team at this point. The management team has displayed care and consideration for their staff and has clearly communicated with said staff about their needs and desires for a more effective system. If these factors remain consistent and the budget allows, it is expected that there will be very few risks regarding project completion in a timely manner.

Section 3

Joint Application Development (JAD) teams are made of important stakeholders and decision makers, making parts of the organization come together. This varied group will work together to make sure that the requirements of the system are well defined and that all departments' requirements are considered.

Business Support System Team 1

In the phase of the project, attention is directed towards patient files organization and management tasks are executed smoothly. This is to ensure integration across various departments, such as scheduling services and financial operations along with human resources and facilities management.

1. Office Manager

Anita Davenport

Anita manages the day-to-day activities of the business. She organizes the appointments for staff, playing a vital role in ensuring that the system is coordinated with office procedures.

2. Head of Human Resources

Fred Brown

Fred oversees tasks related to payroll processing and benefits administration in his department while also playing a role in ensuring the integration of HR operations affecting employee management.

3. Head of Accounting Department

Tammy Alipio

Tammy takes care of managing the clinic's finances. She requires a software solution that can assist with invoicing clients and managing both outgoing payments while also providing detailed financial reports.

4. Facilities Management

Carla Herrera

Carla oversees the management of supplies and maintenance of facilities, providing input for tracking inventory and overseeing facility operations in the system.

5. Insurance and Patient Billing Specialist

Tom Capaletti

Tom handles billing tasks with patients and insurance companies offering perspectives on the importance of streamlining billing processes and incorporating automation systems.

6. Co-Founder and Physician

Dr. Timothy Jones

Dr. Jones plays a role in making decisions at the clinic, ensuring that the system is in line with the clinic's overarching vision.

7. Clinic Staff

Nurses, doctors, and support staff

Various members of the clinic's staff will work with patient files, and proper management tasks will directly impact all clinic employees. Nurses, doctors, and support staff will access and update patient files daily, making their input crucial to ensure compatibility.

Business Support System Team 2

In this phase, the emphasis will be on uses of Electronic Health Records (EHR) Computerized Physician Order Entry (COPE) and Clinical Decision Support Systems (CDSS). All members of team 1 will be involved in the team 2 processes, including some additional members listed below.

1. Head of Compliance Department

Susan Gifford

Susan makes sure that the medical records meet all the regulations and standards in place. Her knowledge and skills play a role in establishing a compliant system for managing patient data.

2. Co-Founder and Physician

Dr. Dolores Garcia

Dr Garcia plays a role at the clinic as one of the founders and a working physician to offer insights and ensure that the system aligns with clinical/medical processes.

3. Physical Therapist Representative

To be Determined by Anita

The clinic provides physical therapy services; thus, it is crucial to grasp the needs for documenting progress and arranging therapy sessions effectively.

4. Nurse Practitioner Representative

To be Determined by Anita

Given that nurse practitioners tend to care for a volume of patients, it is crucial that the system's specifications accurately reflect their workflow requirements.

5. Nutritionist Representative

To be Determined by Anita

The nutritionist will make sure that guidance and meal plans are included in the records when necessary.

6. Clinic Staff

Nurses, doctors, and support staff

All support staff as well as clinical staff must be part of this process, as they will utilize the systems mentioned above daily. The systems must suit the needs of the practice and its users to be most effective.

There will be many ways in which we will create a sense of team ownership from the start. We plan to involve all users at each step of the process from gathering requirements to testing. This will ensure all members feel engaged in and responsible for the project's success. Moreover, we will set up meetings for feedback collection, to confirm that the system aligns with their requirements. This approach also promotes transparency in decision making. We will utilize project management software that enables team members to monitor progress and share feedback effortlessly. To maintain consistency between the systems during the phases of the project planning process (for example with individuals, like Dr. Jones and Anita Davenport) it may be necessary for some team members to participate in both groups.

New Century Patient Questionnaire

Hello! You have been randomly selected to fill out this survey, using our systematic sample system. Please take a couple of minutes to fill it out with honest feedback. This helps our crew gain insights into patients' perspectives on appointment scheduling and billing procedures. We want to have a better understanding of your experiences. Thank you!

About Your Visit

1. How simple was it to book your appointment?

- Very Easy
- Somewhat Easy
- Neutral
- Somewhat difficult
- Difficult

2. Did you encounter any difficulties while trying to schedule?

- Yes (Provide explanation.)
-
-

- No

3. How would you like to set up appointments in the future?

- By phone
- By Mail
- Online Portal
- Mobile App

4. How much time had passed before you were called in for your appointment, once arriving?

- Less than 5 minutes
- 5-10 minutes
- 15-30 minutes
- Over 30 minutes

5. Were the Medical Forms simple to fill out?

- Yes

- No (Provide explanation.)
-
-

6. What information were you asked to provide before your appointment?
(Check all that apply:)

- Insurance forms
- Medical Records
- Allergens
- Current health concerns
- Family Medical History
- Vaccination History

Billing Process

1. How well did you understand the billing procedure?

- Very well
- Neutral
- Not clear

2. Did you encounter any challenges with your insurance coverage or billing?

- Yes
- No

3. What is your preferred method of receiving billing information?

- Text message
- Paper bill
- Online portal
- Mail

How would you rate your experience with New Century Wellness?

5 is the highest, 1 is the lowest.

- 5
- 4
- 3
- 2
- 1

Are there any ways we can improve your experience with us?

- No
- Yes (Provide details below.)

The survey will be emailed to patients serviced by the clinic within the last 6 months and available in the office for patients at checkout. Patients can fill out the survey through a patient portal or by completing physical forms at the clinic. If this survey is reached by our patients through email, it will be using a systematic system, meaning every 10 patients will get this email and fill it out. If it is left at the front desk, it will be a random system where people are free to take one and complete it. Leaving the form at the desk reduces the feeling of forced participation, as there is no obligation for the patient to fill out the survey. All questions asked on the survey are specifically targeted with the goal of understanding the ease with which a patient can interact with the system. All questions are asked in a specific manner that will significantly reduce user error such as not understanding the question or giving responses in a format that is incorrect. All surveys will be analyzed and can be put into graphs and charts including percentages. For yes or no answers, percentages will be used and any additional information provided in the open-ended sections will be analyzed quantitatively. For questions with multiple choices a pie chart can be created to display the various percentages of each answer. Beyond analyzing simply what is given, it is critical that any correlations between certain answers are understood. These surveys can also be used to understand New Century's patient demographic and determine if there are any correlations between age, race, gender, etc. And the results of the surveys.

Section 4

Context Diagram

The proceeding diagram is a context diagram for New Century's information system. This diagram outlines the system's boundaries and scope.

1. *New Century to Support Staff:* Support staff can generate invoices and provide patient data while New Century can provide patient services via the system.
2. *New Century to Medical Provider:* Medical providers can supply services and a sorted appointment list while New Century can provide the patient visit information via the system.
3. *New Century to Patient:* New Century can provide finalized bills to patients while patients will provide payments via the system.
4. *New Century to Medical Code Providers:* The American Medical Association and Centers for Medicare and Medicaid can provide CPT codes and ICD-10 codes via the system.
5. *New Century to Insurance Provider:* New Century can provide medical bills to insurance companies while they can electronically provide coverage on medical bills.
6. *New Century to Billing Department:* New Century can provide Billing Dept. with relevant CPT codes while they can return total service cost.

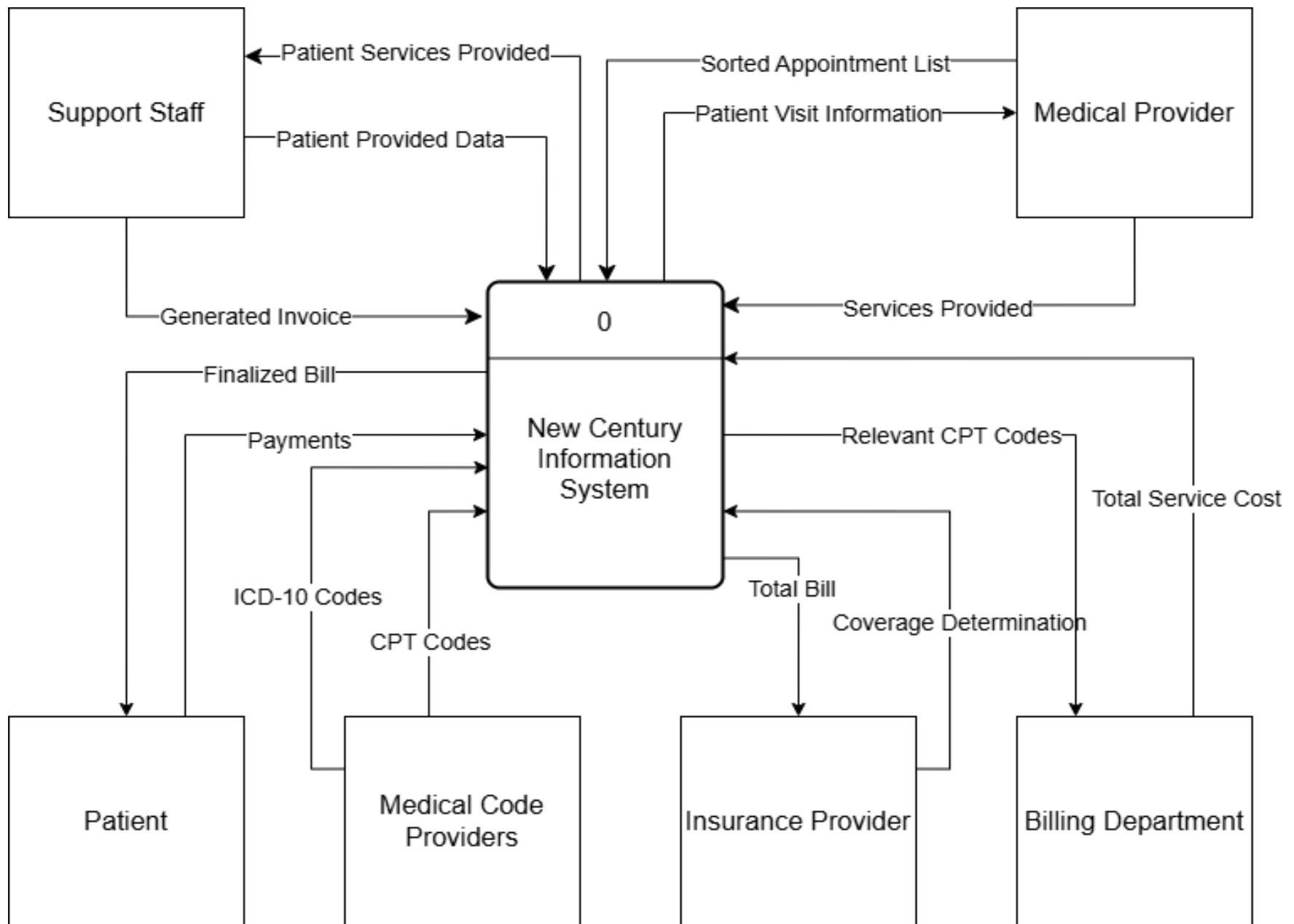
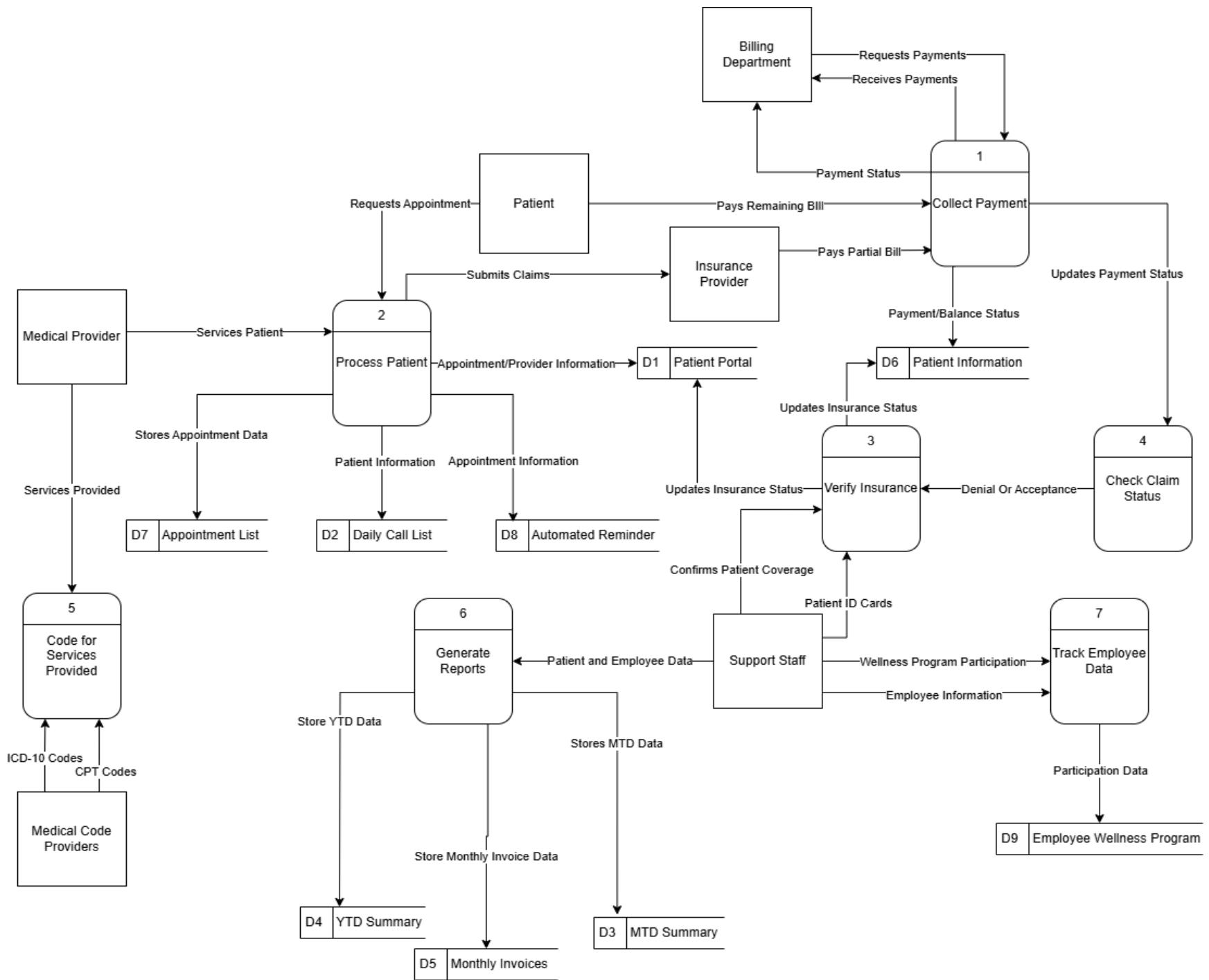


Diagram 0

The proceeding diagram represents a diagram 0 of New Century's Information System. This diagram will show the inner workings of the information system and provide context to all the components interacting to form the system.

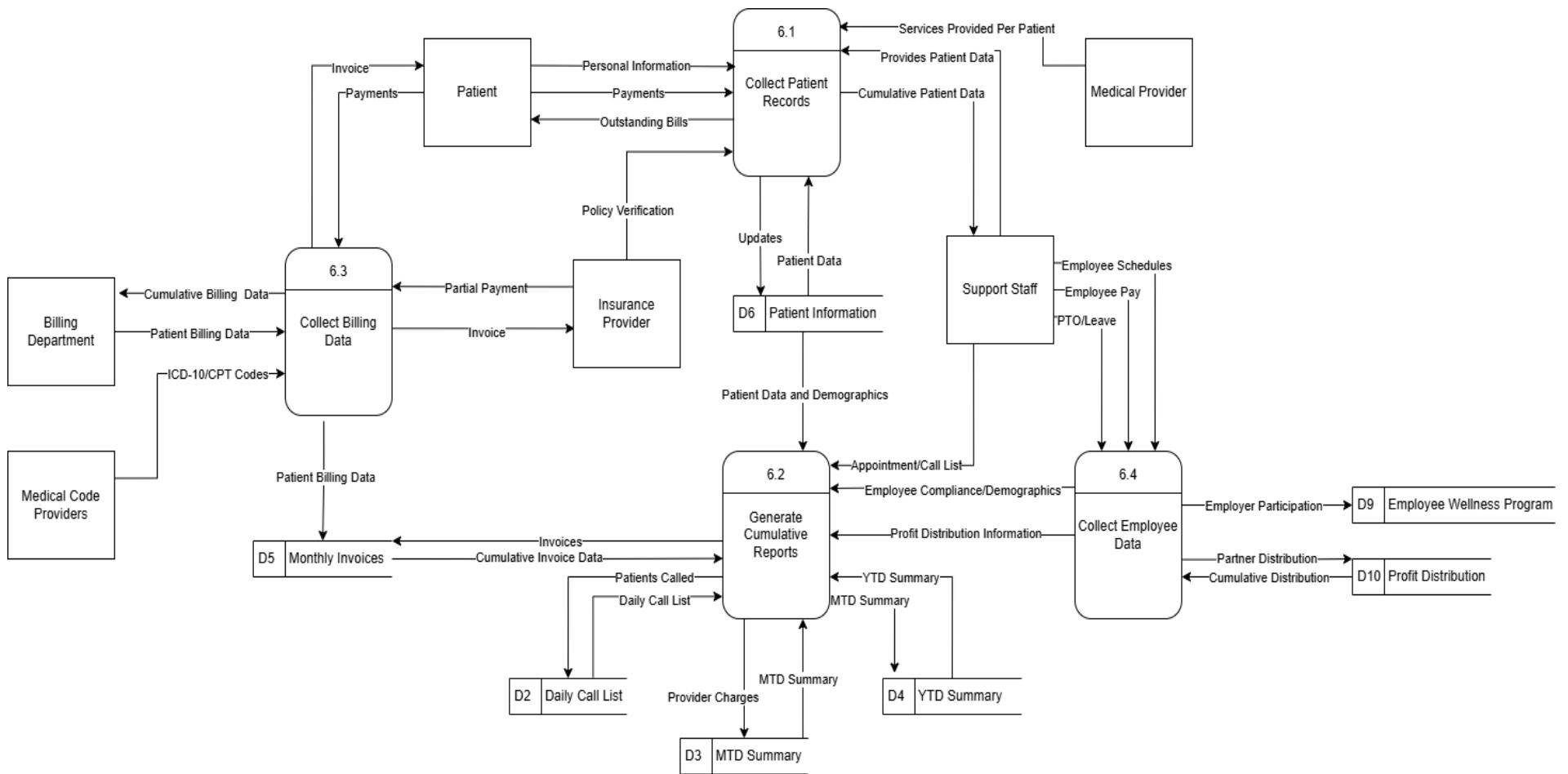
1. *Code for Services, Inputs:* Services performed are provided by the medical provider, ICD-10 codes are provided by Centers for Medicare and Medicaid, and CPT codes are provided by the AMA. *Code for Services, Outputs:* Services will provide updates to the patient portal which then provides patient information to verify insurance and provider availability to process the patient.
2. *Process Patients, Inputs:* Provider information is provided by the Patient Portal, Medical Provider provides service, patients request an appointment, and Inputs Patient Name and Information into the Daily Call List. *Process Patients, Outputs:* Stores appointment data into Appointment list, provides appointment/patient information into Automated Reminder, and Submits claim to insurance provider.
3. *Verify Insurance, Inputs:* Insurance Provider sends Patient Coverage Details, Patient Portal provides patients information, Support Staff confirms the patient's coverage and ID cards, Check Claim Status provides a denial or acceptance of the claim. *Verify Insurance, Outputs:* Updates the patient information with gathered information.
4. *Generate Reports, Inputs:* Support Staff provides Patient and Employee Data. *Generate Reports, Outputs:* Stores YTD Data into YTD Summary, Stores Monthly Invoice Data into Monthly Invoices, and Stores MTD Data into MTD Summary.
5. *Collect Payment, Inputs:* Insurance Provides pays partial amount and Patient pays remaining balance. *Collect Payment, Outputs:* Updates the Check Claim Status and the Payment/Balance Status for Patient Information.
6. *Track Employee Data, Inputs:* HR Department provides Wellness Program Participation information and other Employee Data. *Track Employee Data, Outputs:* Provides Participation Data into the Employee Wellness Program.
7. *Check Claim Status, Inputs:* Insurance Provider provides updates and Collect Payment provides updates. *Check Claim Status, Outputs:* Provides Denial or Acceptance of Claim to Verify Insurance.



Lower-Level DFDs: Part 1

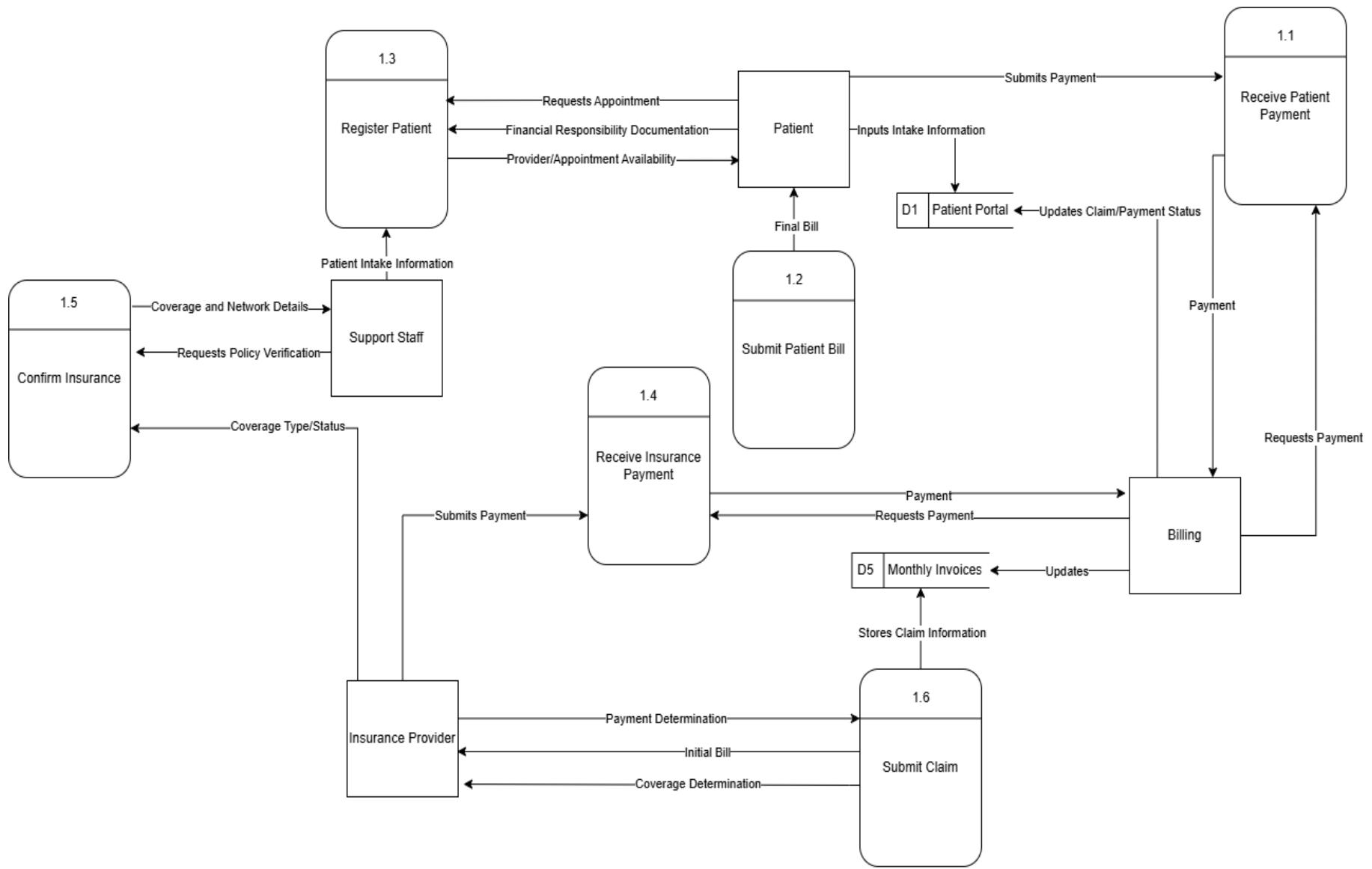
The proceeding Lower-Level DFDs provide further context and information on the processes in the Information System for the New Century Wellness group.

1. *Collect Patient Records, Inputs:* Patient provides payments, personal information, and Insurance Card. Insurance Provider verifies insurance policy, Patient Information provides any stored Patient Information, Medical Provider provides information on services provided, and Support Staff provides Patient's appointment data. *Collect Patient Records, Outputs:* Notifies patient of any Outstanding Bills and Updates Patient Information.
2. *Collect Employee Data, Inputs:* Schedules, Pay Rate, and PTO provided by Support Staff. Cumulative Distribution from Profit Distribution. *Collect Employee Data, Outputs:* Updates the Generate Cumulative Reports, provides Partner Distribution into Profit Distribution, and Employee Participation into Employee Wellness Program.
3. *Collect Billing Data, Inputs:* Patient provides payments and Insurance Provider provides Partial Payment. *Collect Billing Data, Outputs:* Sends invoice to Insurance Provider and Patient, patient billing data to Monthly Invoices, and provides updates to Generate Cumulative Reports.
4. *Generate Cumulative Reports, Inputs:* Updates from Collect Billing Data, Monthly Invoices from Monthly Invoices, YTD Summary from YTD Summary, MTD Summary from MTD Summary, Updates from Collect Employee Data, Patients Called from the Daily Call List, Appointments and Call List from Support Staff, Charges Generated from Medical Provider, and Data from Patient Information. *Generate Cumulative Reports, Outputs:* Provides Daily Call List to Daily Call List, updates Provider Chargers to MTD Summary and YTD Summary, and sends invoices to Monthly Invoices.



Lower-Level DFDs: Part 2

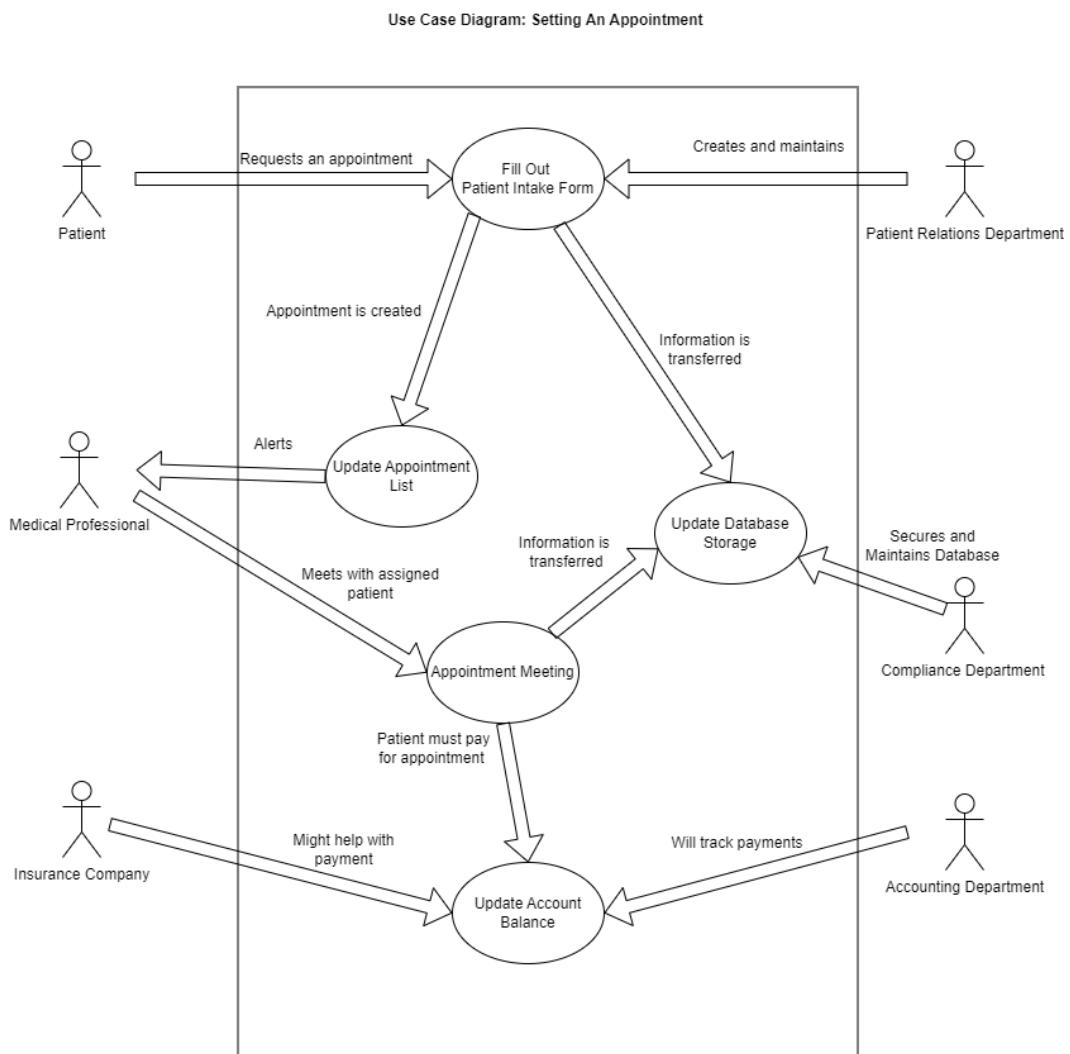
1. *Register Patient, Inputs:* Patient Requests Appointment, Patient provides a Financial Responsibility Agreement, and Support Staff provides Patient Intake Forms. *Register Patient, Outputs:* Stores updates and insurance into Patient Portal, provides Patient Availability to Support Staff, and Provider availability to the Patient.
2. *Confirm Insurance, Inputs:* Support Staff Requests Verification and Checks Coverage and Network Details, and Insurance Provider provides Status. *Confirm Insurance, Outputs:* Confirms Status to Support Staff and provides Coverage Details to Submit Claim.
3. *Submit Claim, Inputs:* Confirm Insurance provides Coverage Details, Support Staff proposes the Initial Bill, and Insurance Provider provides Payment Determination. *Submit Claim, Outputs:* Provides updates to Monthly Invoices and Initial Bill to Insurance Provider.
4. *Receive Insurance Payment, Inputs:* Billing provides Updated Bill and a Payment Request. *Receive Insurance Payment, Outputs:* Updates Patient Portal and provides Payment to Billing.
5. *Submit Patient Bill, Inputs:* Billing provides Patients Responsibility and Support Staff forwards Patient's Bill. *Submit Patient Bill, Outputs:* Provides Updates to the Patient Portal and Requests Payment from the Patient.
6. *Receive Patient Payment, Inputs:* Patient provides the payment. *Receive Patient Payment, Outputs:* Submits Bill to the Patient and Updates the Patient Portal.



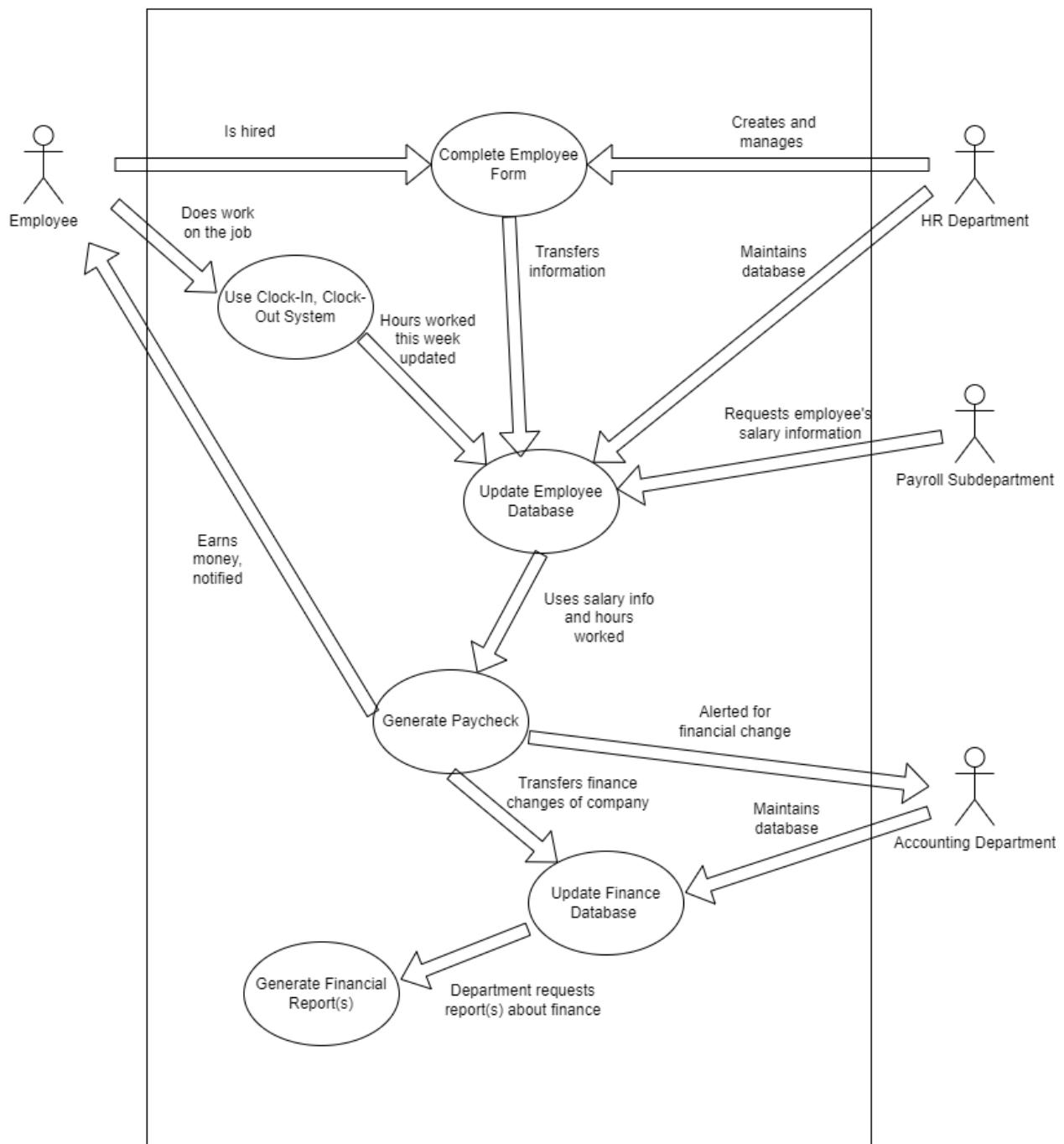
Section 5

System Planning with Use Case Diagrams

When implementing a system, it is important to know what the moving parts of the system are. These moving parts are detailed in the following use case diagrams. A use case, first, will represent the steps taken in a certain function or process of a business. Registering a patient into the new system is part of a use case, for example. The use case diagram is the visual summary of multiple related use cases within a system. The following diagrams provided are examples of use case diagrams that can be implemented later in the project: Setting an appointment and the payroll system. These can be subject to change later, but this is the groundwork for which the system can be built upon in a logical sense.



Use Case Diagram: Payroll System



Explanation of The UML Class Diagram

To expand on one of the use case system's concepts, there is a UML class diagram. A class diagram is used to show the relationships and interactions between certain object classes within a use case. This is a lower-level, or more detailed, diagram that shows what each class an object's attributes, or characteristics, and methods, or tasks and/or functions, that the class can do. It also shows if that class has, at least for this diagram, one-to-many entities (1..*) or just one (1) entity.

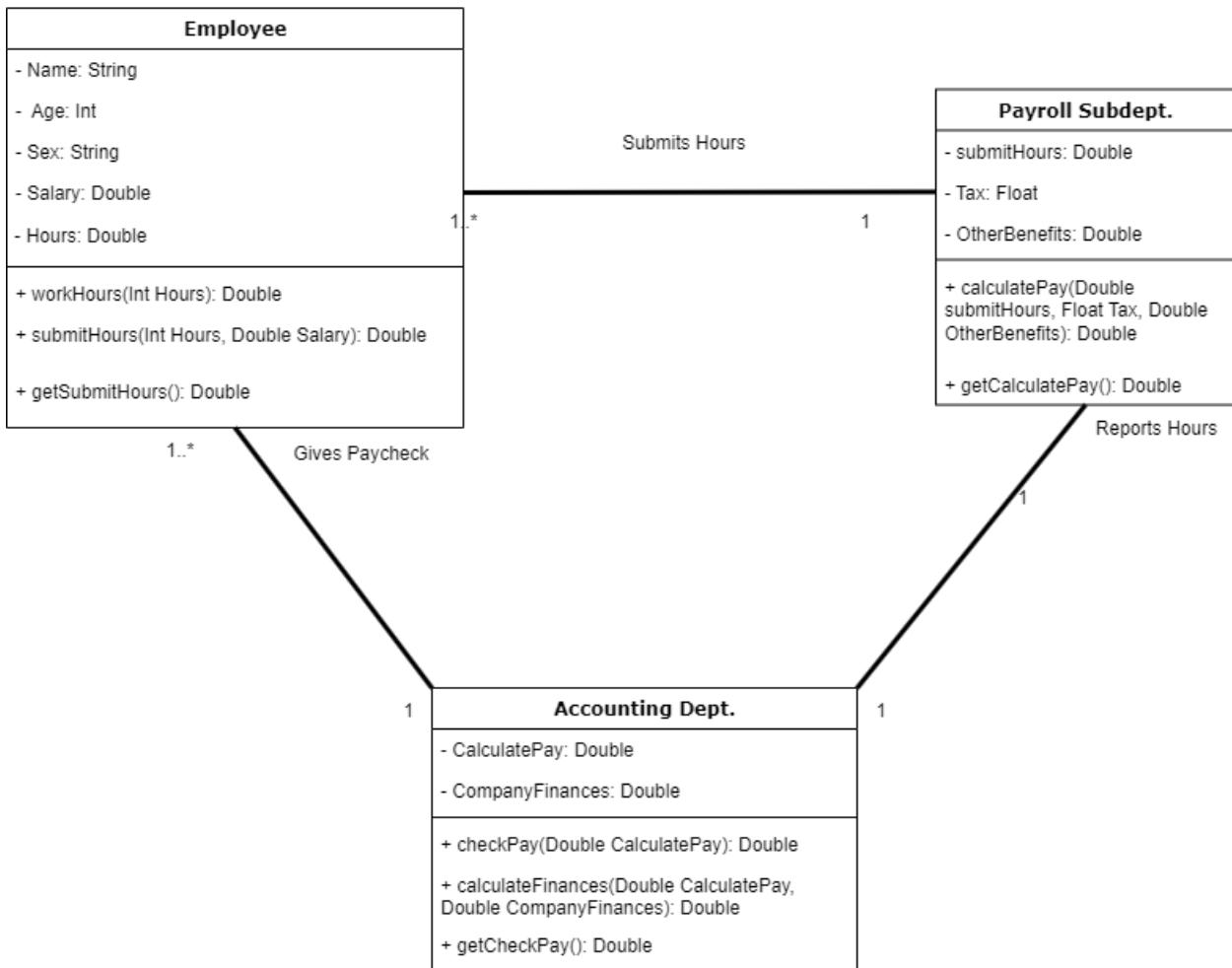
The first class illustrated is the employee class, with the attributes of name, age, sex, salary, and hours. String, for more detail, is a variable type within an object-oriented language, as well as int, double, and float. String is also a variable that just stores a word or words, same with sex. Age, hours, and salary are int and double respectively. The int variable type stores the number, while the double variable type also stores a number, but double can display more digits if necessary and can store decimals and fractions. Also note the plus signs that are behind each attribute, which signifies that they are public and available for others to see. The workHours method uses the hours variable, and it can be used to insert and display how many hours the employee has worked today. Plus, it also uses the double variable type. submitHours use both hours and salary variables, as methods can be used more than one variable in a program. The method itself uses it both to calculate their overall gross pay or pay without taxes. Finally, the getSubmitHours method is used to return the calculated value of the method that was executed. The employees can then submit their hours to the Payroll Subdepartment, either manually or automatically through a few processes.

The payroll class object uses that method and a few other variables, named Tax and OtherBenefits, to calculate the net pay, or the pay that they will take home. All variables within this function have dashes behind them, indicating that it is private. The tax variable type is a float, which just holds a basic decimal number. The class has only three jobs: Get the hours submitted by the employee, calculate the net pay with the calculatePay method that uses the variables submitHours, Tax, and OtherBenefits, and with the getCalculatePay method, report the information to the accounting department.

The accounting department class object only has the calculatePay variable, which is from the payroll class's method, and the Finances variable, which keeps track of the company's available finances. The checkPay method is there to make sure that the calculation is correct, and calculateFinances is used to reduce the money the Company currently has by the money that will

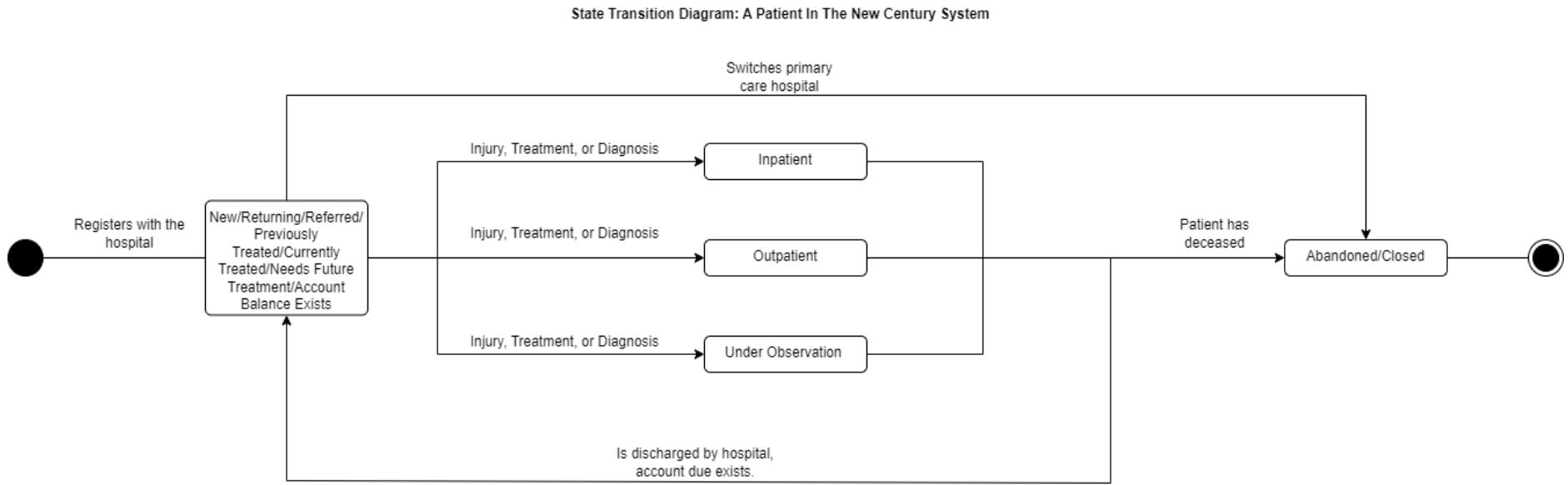
be sent to the employee. Finally, the check is sent to the employee through the accounting department with `getCheckPay`.

UML Class Diagram: Payroll System



Explanation of the State Transition Diagram.

Within the New Century Wellness Group, patients will enter the system, and unfortunately, patients may leave the system. This can be for many factors, but the system must adjust for whatever situation the patient is currently facing. With that, there is a starting point that the company can refer to and can expand upon later. The state transition diagram can show how an object can change from one state to another depending on the events or circumstances that happen as a result of influencing the current object within the state. For example, when the patient registers with the hospital, they are considered new, and their new state will be in whatever the “New” state of the patient is in. In this case, it goes into the extensive state in the diagram “New/Returning/Referred/Previously Treated/Currently Treated/Needs Future Treatment/Account Balance Exists” State. Within this state, if a patient has an unfortunate circumstance that requires them to be within the hospital, their current state can go into one of three states depending on their condition: “Inpatient,” “Outpatient,” and “Under Observation.” Once they are discharged from the hospital, they flow back into the first state, only this time they have an account balance. This means that they must eventually pay off whatever dues they have from the hospital because of being there. This does not mean that they cannot accept any services while that account balance exists, it is just something that they must pay off sooner rather than later. While this is a more basic diagram, it can be expanded on and changed in the future, as not everything is set in stone.



Section 6

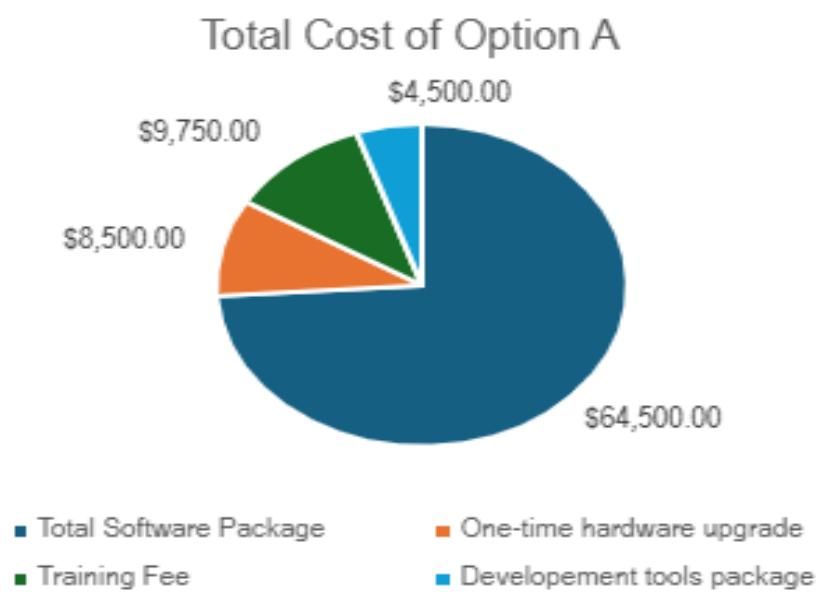
Financial Overview

In our previous studies we have determined that New Century Wellness Group must implement a new system to grow and maximize their profits and future business opportunities. There are a few approaches that can be taken to acquire and install this system, and all tangible costs must be considered. We have outlined the costs for purchasing a software package and in-house development in the following charts generated from a spreadsheet. Set costs that will not change regardless of the development style chosen include a ten-week training period provided by our team to familiarize the staff with the system and a one-time hardware upgrade cost. Though the cost of paying employees may seem like a fixed cost, there is a significant opportunity to save on labor relating to both hourly wage as well as overtime pay. Implementing the new system will save New Century 100 minutes (about 3 hours) per day on errors and eliminate overtime hours and the need for an additional staff member. Beyond these initial costs, New Century should consider either in-house development or the purchase of a semi-customizable software package from an outside company. In-house development is beneficial for satisfying the unique business requirements of New Century, though the cost may be more daunting up front. In-house development would take the most time at approximately 20 weeks (about 4 and a half months), making the cost of labor the bulk of the budgetary impact. This option would allow New Century to have a system that is fully customized and suited to every need, but the total cost of ownership must be considered heavily.

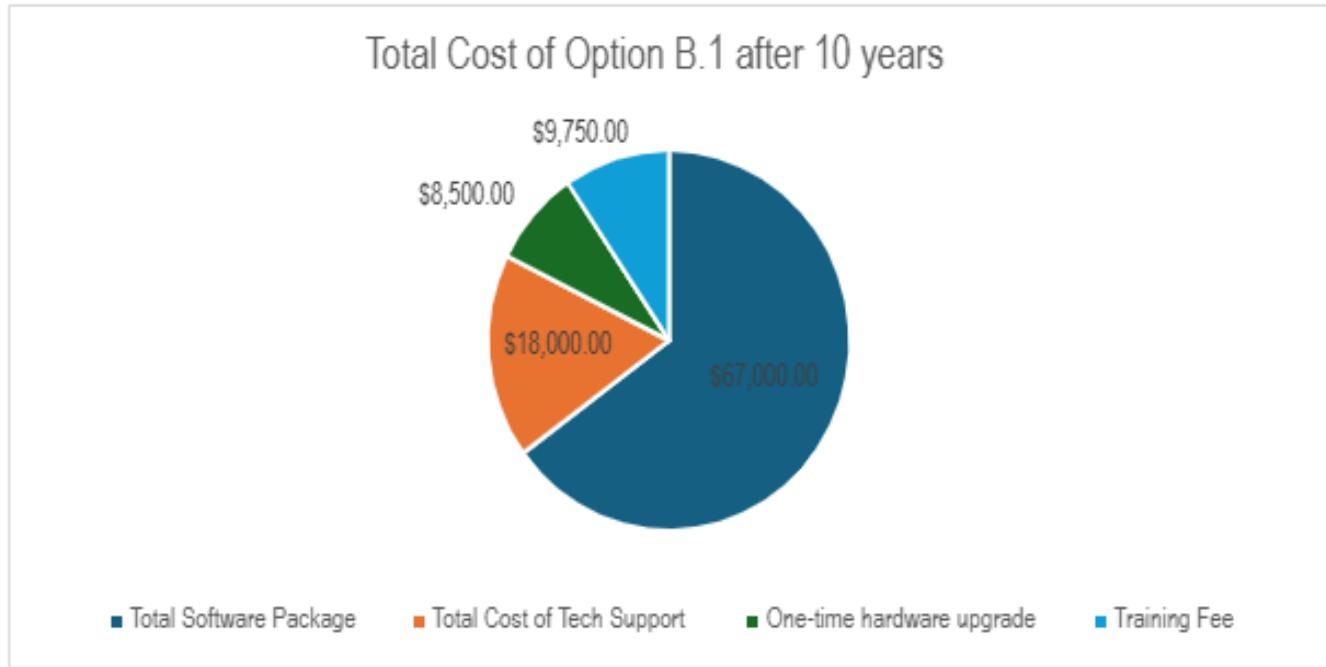
We have estimated that the new system, regardless of development style, will have a useful life of ten years including the year that the system is implemented. With in-house development, the system's maintenance will be done by staff with first-hand knowledge of the system and its functions at the rate that the company is paying that staff. Purchasing a software package would come with ongoing maintenance fees for the entire system's life at a rate chosen by the provider. The system will be fully functional and implemented in a much shorter time (two weeks) with the purchase of a vertical package, but the maintenance fees and annual technical support agreement costs (\$2,000) add up to be more expensive than the in-house development strategy. Though our spreadsheet outlines the tangible benefits of each proposed solution, it does not consider the

intangible benefits relating to the implementation of these proposed systems. When deciding which development route to take, tangible and intangible benefits should be considered to determine what method aligns best with the needs of the company.

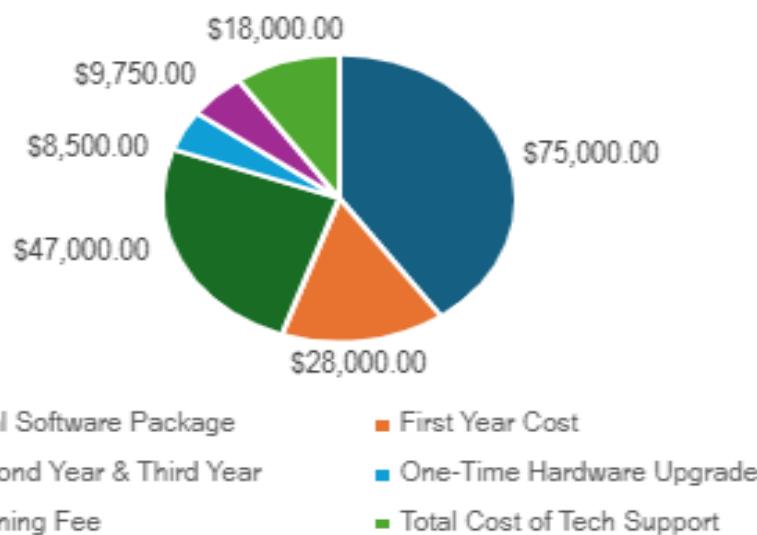
In-house development for option A outlines the estimated costs associated with purchasing a complete software package, which will require training, a development tools package, and a one-time hardware upgrade. The installation team will provide development services at the agreed upon rate of \$75.00/hour and work a standard 40 hours/week. Development will take approximately 20 weeks (about 4 and a half months) for full installation. Once the system is running, New Century will be able to handle routine maintenance and discontinue outside assistance efforts.



Development option B.1 displays the semi-customizable vertical support system package. The package's cost has additional fees including an annual cost of \$2,000, not required for the first year of the system. It would take two weeks to install, configure, and test the software. The total cost of this option after ten years is approximately \$103,250.



Total Cost of Option B.2 After 10 years



Option B.2 displays the costs associated with utilizing the three-year-lease-to-purchase option. \$28,000 must be put down in the first year, followed by two annual installments of \$23,500 each year. The annual \$2,000 technical support agreement cost still stands. The total cost of this option after ten years is approximately \$111,250.

Economic Feasibility Analysis

The economic feasibility analysis of the proposed system for New Century Wellness group shows a promising gain over 10 years. The system requires an investment of \$82,750.00 and is estimated to generate around \$43,221.10 in savings per year leading to a payback period of approximately 1.91 years. The substantial amount saved is attributed to reduced staffing expenditure. It will no longer be necessary to hire an additional full-time employee and overtime will be eliminated. The ROI (Return on Investment) stands at 422%, which estimates a highly profitable outlook for the project. ROI was calculated by the following formula: ((Savings over 10 years - Total investments) / Total investment) * 100. Also worth noting is the NPV (Net Present Value) of \$188,370.85 at a discount rate of 10% which highlights the feasibility of the project. In summary, these findings indicate that adopting a new information system is not only financially viable but also strategically beneficial in improving operational efficiency and cost effectiveness at New Century Wellness Group. The total profit will be \$349,461.

The staff's weekly payroll is \$7,003.50. The updated system is expected to bring down this expense to \$6,400 every week by eliminating overtime and daily errors. The weekly savings of \$603.50 result in annual savings of \$31,382. Currently, New Century encounters five mistakes daily, each of which requires twenty minutes to be rectified. The time spent fixing these errors adds up to one hundred minutes (one hour and forty minutes) per day. The updated system will allow each employee to save 20 minutes daily on average, which amounts to saving 4 hours and 40 minutes per day for the 14 total staff members. If a 5-day workweek scenario is considered, approximately 23 hours and 20 minutes will be saved weekly, and approximately 1,214 hours and 12 minutes are saved yearly. The financial savings equate to \$13, 919.10 yearly. The staff reductions and error elimination combined will save New Century approximately \$43,221.10 per year. The total expenses created by the system amount to \$64,500, with \$8,500 needed for hardware enhancements and training costs of \$9,750 over a 10-week period—bringing the overall investment in development and training to \$82,750 in total. The payback period is determined by dividing the investment of \$82, 750 by the savings of \$43,221 which shows 1.91 years. The Return on Investment is determined by comparing the amount saved over 10 years with the investment made in the project capital upfront. Multiplying 43,221 by 10, shows the decade duration of \$432,211. When deducting the investment of \$82,750 from the accumulated savings, a total profit of \$349,461 is shown. The Net Present Value (NPV) is

determined by applying a 10 percent discount rate over a span of 10 years to calculate the value over this period. This amounts to \$188,370.85 over the course of 10 Years.

It is also important to present the costs and benefits in a more detailed manner so that the consumer can have a clear understanding of them. To this end, a spreadsheet has been developed that outlines both the costs that are involved as one-time costs and the costs that are likely to be repeated in the future, as well as the benefits that are likely to be realized from this venture. This way the client can see where the numbers come from and how they were computed. There are also other high intangible costs and benefits that are difficult to quantify. For example, the cost may be the time that the employees will take to familiarize themselves with the new system, which may cause a slowdown in the throughput and a little bit of inconvenience. A soft gain can be easier access to patient information as it will all be stored in one database.

A	B	C	D	E	F
1 Cost Type		One Time Cost		Recurring costs	
2					
3 Hardware Enhancmer		\$8,500		\$0	
4 Training		\$9,750		\$0	
5 System Development		\$64,500		\$0	
6 Total Cost		\$82,750.00		\$0	
7					
8					
9					
10					
11					
12					
13					
14					n



A	B	C	D	E	F
1	Benefit Type	One-time Benefit		Recurring Benefits	
2					
3	Staffing Savings		\$0	\$31,382	
4	Error reductions Savings		\$0	\$13,919	
5	Total Benefits		\$0	\$43,221	
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					

A	B	C	D	E	F	G
1	Description		Amount			
2						
3	Weekly Payroll Before System		\$7,003.50			
4	Weekly Payroll After System		\$6,400			
5	Weekly Savings		\$603.50			
6	Annual Savings (weekly * 52)		\$31,392.00			
7	Time Saved per Employee Daily		20			
8	Total Employees		14			
9	Total time saved Daily(minutes)		280			
10	Total Time Saved Daily (hours)		4 hours 40 Minutes			
11	Weekly Time Saved (hours)		23 Hours 20 Minutes			
12	Annual Time Saved (Hours)		1,214 hours 12 minutes			
13	Hourly Rate		\$11.46			
14	Annual Error Reduction Savings		\$13,919			
15	Total Annual Savings		\$43,221.10			
16						
17						

[New Wellness.xlsx](#)

Potential Alternative Solutions

If the development of this project continues, there are various alternatives and strategies that should be considered. In-house development allows for unique business or security requirements to be satisfied, can meet constraints of existing systems and technology, and allows the company to develop precious internal resources and capabilities. Though in-house development has many pros, there are some faults to this development strategy. This strategy works best when the staff is technically savvy, as finding skilled developers can be extremely time-consuming. The cost of in-house development is high initially due to training and management needs. Having more control of the development process comes with having more monetary responsibility. Additionally, in-house development takes longer to implement, as it must go through all the testing and development stages before being implemented. Beyond in-house development, New Century should consider purchasing a software package. Software packages cost less than in-house development initially, as software is either acquired through a one-time purchase or is made available through a subscription plan. Since development is completed externally, there can be extra costs associated with user training and disruption of current business operations. Software packages require less time to implement as testing, programming, and development have already been completed, but the integration time of the software will still be significant. Costs related to upgrades will be reduced or eliminated, as vendors provide regular upgrades and improvements to their software. Fewer programmers and IT staff will be needed by New Century if a software package is purchased, and existing employees will be able to shift their focus to needs that are not satisfied with the

purchased package. If neither in-house development nor a purchased software package seem right for New Century, a customized software package may be appropriate. A basic package can be purchased and tailored within a specific set of guidelines determined by both New Century and the provider. This option would give New Century the benefit of a customized system without adding the time needed to create a system from scratch. The cost of a customized package will be greater than a fully premade package, and additional changes made could cost more than in-house development. New Century has expressed interest in using a patient portal for ease of appointment handling and viewing of test/scan results, indicating there are web-based components that are needed to satisfy user requirements. Web-based development refers to systems designed to be accessible to all users as a platform. Web-based systems allow for easy access to patient data and are easily scalable but come with their own unique set of security risks and can be more complicated to integrate with existing software and legacy systems. If New Century lacks the technical skills needed for in-house development, another option is outsourcing a team to develop custom software. Outside firms can develop, maintain, and provide support for the system, reducing the need for IT staff. Outsourcing would allow a variety of talented developers to be available to New Century whereas finding and hiring individual developers would cost more time and money. The cost of hiring these developers could become even lower if New Century decides to offshore the development process, moving development out of the country. This type of development would cost less than the above in-house options, as overhead costs will be lower. The firm chosen is particularly important, as New Century would not control its operations. Though a cheaper option, having a good line of communication and control over the entire project will provide better results.

Section 7

Patient Portal Storyboard and User Interface

New Century's systems must be replaced so they can compete with competitors in the California area. Thus, here is part of a proposed system interface. It will include future integration with other potential vertical packages that might be needed to increase efficiency and productivity within the company in the future. This design is not final, as it may be changed within the development of the system, but it is a good framework and indication of what will be included in the system for the patient that is entering the system itself as a new patient for New Century and requesting appointments.

Within the storyboard and proposed user interfaces, there are some things to keep in mind:

- The log-in screen will require the patient to log in with their account made on a separate sign-up screen in New Century's website.
- 2FA, meaning 2-Factor Authentication, will be used to add an extra layer of security and to deter a would-be infiltrator from entering a user's account.
- The patient portal is the main patient screen of the system, accessed by the patient logging into their account. There are multiple buttons, each with their own use:
 - Scheduling an appointment will send the patient to a new interface that will allow them to schedule a new appointment to meet with a doctor.
 - Checking the inbox will send the patient to a new interface that will show them what electronic mail they have gotten from the hospital
 - The test results button will send the patient to a new interface where they will be able to see their past test results if they have taken any.
 - The registered medication button will open a new interface that allows the user to see what medicine they have been prescribed and to request a refill.
 - The billing button will send the user to a new interface to see if they have an outstanding balance from the hospital for any reason.
 - The providers and care team will be a button that opens a side bar to see the patient's assigned medical team or doctor.

New Century Patient Screen Storyboard

New Century Patient Log-in

New Century Wellness Group

Patient Username
Password

Log In
(2FA is required)

Forgot your Password?

What can you do in your patient profile?

Pay Bills Online Manage Appointments

Request Refills for Prescriptions View Test Results

New Century Patient Portal

New Century Wellness Group Patient Portal

Hello [Patient Name], welcome back.

Schedule an Appointment Check Inbox Test Results Registered Medication Billing

[Notification] [Option 1] [Option 2]

Providers and Care Team

New Century Appointment Scheduling

Set An Appointment Date

What is the name of the patient being sent for the appointment?

Patient Name

Phone Number

Address

What is the reason that they need an appointment?

Reason

(Optional) Describe the reason that they need an appointment.

What date will the appointment take place?

MM/DD/YYYY

Confirm

Cancel

New Century Wellness Patient Portal Sign-In

https://www.newcenturywellness.org/patient/login/

New Century Wellness Group

Enter your username.

 ?

Enter your password.

 ?

Log In

Don't have an account yet?

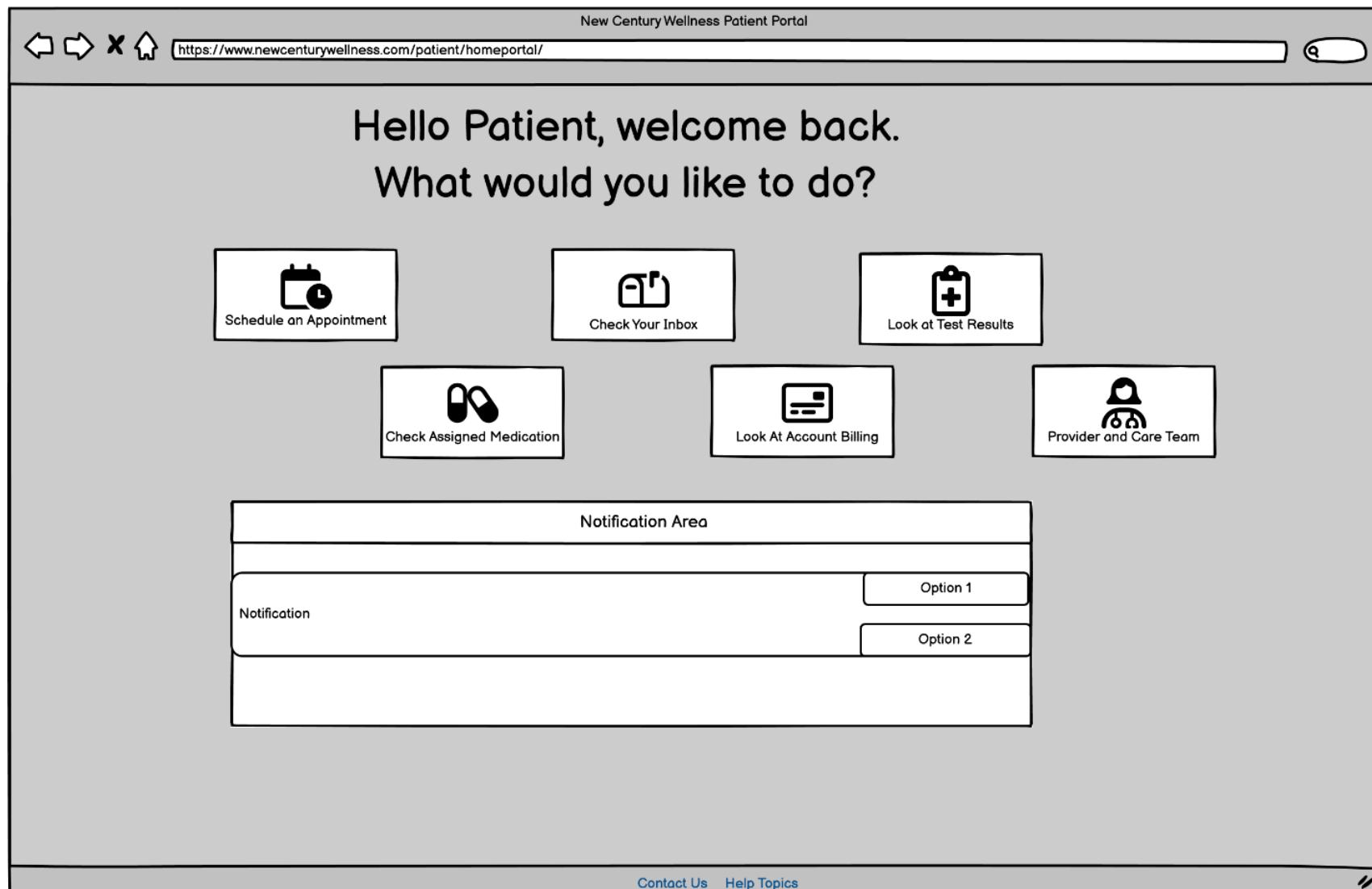
[Forgot your password?](#)

Sign Up

What can you do within New Century's Patient Portal?

-  Pay your hospital bills.
-  Manage and make appointments.
-  Request refills for prescriptions.
-  View your lab test results.

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New Century Wellness Patient Appointment Setting
<https://www.newcenturywellness.com/patient/homeportal/appointment/>

Set an Appointment with New Century Wellness Group.

What is the name of the patient that is being sent for the appointment?

Patient Name ((First Name, Last Name) Format) ?

What is the phone number of the patient?

((###-###-####) Format) ?

What is the address of the patient?

Address ((## Street Name, #####) Zip Number) Format ?

Select the type of appointment you would take.

Reason ▼

Cancer treatment
Check-up
CT Scan
Drawing Blood for Lab
Post-Surgery Appointment
Pre-Surgery Appointment
Other

(Optional) What is the reason that they need an appointment? Type it out in the field below.

Reason for the appointment.

What will the date of the appointment be? Be aware that an appointment must be made at least a week in advance.

/ /

Check on this box to confirm that this account will be billed for the visit regardless of if the patient being brought in can pay for it themselves.

Confirm Cancel

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Input Source Document and Data Entry

There is a plethora of data that will be required to be put into the system in the case of a new patient. This data will pertain to information about a patient's parent or guardian and any basic information that New Century may need to know about, if they have one, the patient itself with information such as their basic information (name, date of birth, relationship, etc.).

This will also include more sensitive information that can also identify an individual, such as social security numbers, physical address, insurance, race or ethnicity, health info, telephone number and if there are any other doctors or employers that are with the patient. New Century will need all this information for several reasons, including confirming that the patient has healthcare coverage, determining if they are qualified for certain programs within the hospital that can assist them, confirming information about the patient in general, keeping track of any outstanding balance, and more.

In accordance with this, a form will be made available for new patients to fill out and gather as much information as possible so that the company can integrate them into the system. There will also be an interface specific to the staff at New Century to input the data into a database for safekeeping.

Patient Intake Form

New Century Wellness Group

New Patient Form

Welcome to New Century Wellness Group. This form is made to integrate you into our system so you can have a wide range of services that will be accessible once finished. Please fill out as many areas of the form as possible. Certain parts of the form will be marked with an asterisk (*), indicating that it is mandatory for you to fill out that part of the form. Once completed, bring your form to the receptionist at the counter. Thank you.

SECTION A: PARENT/GUARDIAN INFO

If you are not a parent/guardian filling out this form for the patient, please skip this section and start filling out **SECTION B**.

Parent/Guardian's Legal First Name: _____

Parent/Guardian's Legal Middle Name: _____

Parent/Guardian's Legal Last Name: _____

Parent/Guardian's Relationship to Patient:

Parent/Guardian's Legal Birth Date: _____

Parent/Guardian's Street Address and Zip Code:

Parent/Guardian's Primary Phone Number: _____

Parent/Guardian's E-mail: _____

What would be your preferred contact method?

- Phone Number
 - E-mail
 - Paper mail
 - Other _____
-

Use your contact information for Patient's Emergency Contact?

- Yes
- No

SECTION B: PATIENT INFORMATION

Legal First Name*: _____

Legal Middle Name: _____

Legal Last Name*: _____

Date of Birth*: _____

Marital Status*:

- Single
- Married
- Divorced
- Widowed

Gender*:

- Male
- Female
- Other

Ethnicity/Race*:

- Hispanic/Latino
- White
- Native Hawaiian/Pacific Islander
- Black/African American
- Asian
- American Indian/Alaskan Native
- Other

City, State, Street Address, and Zip Code*:

Primary Phone Number*: _____

E-mail*: _____

Social Security Number*: ____ - ____ - _____

Preferred contact method*?

- Phone Number
 - E-mail
 - Paper mail
 - Other _____
-
-

INSURANCE INFORMATION

Primary Insurance Provider: _____

Group ID Number: _____

Policy Number: _____

Primary Insurance Type:

- HMO
- PPO
- Medicare
- Medicaid
- Other: _____

Policyholder Full Name: _____

Policyholder Relationship to Patient: _____

- Policyholder is the patient

SECONDARY INSURANCE PROVIDER INFORMATION (IF APPLICABLE)

Secondary Insurance Provider: _____

Group ID Number: _____

Policy Number: _____

Secondary Insurance Type:

- HMO
- PPO
- Medicare
- Medicaid
- Other: _____

Policyholder Full Name: _____

Policyholder Relationship to Patient: _____

- Policyholder is the patient

EMERGENCY CONTACT INFORMATION

First Name: _____

Middle Name: _____

Last Name: _____

Relationship To Patient: _____

Phone Number: _____

E-mail Address: _____

PATIENT HEALTH HISTORY

Do you have any allergies? (If none, write N/A) *:

Are you currently taking any medications? (If none, write N/A):

Do you smoke cigarettes/tobacco products or vape? *:

- Yes
- No

Do you drink alcohol? *:

- Yes
- No

If yes, how many drinks per week? *: _____

Are you sexually active*?

- Yes
- No

Do you use any drugs? *:

- Yes: _____
- No

Is there any family history of chronic illness? *: _____

Have you had any surgeries? *:

- Yes: _____
- No

Primary Care Physician Name: _____

Primary Care Physician Phone Number: _____

Primary Care Physician Office Address: _____

Other Treating Physicians: _____

EMPLOYER INFORMATION

Employment Status (check any that apply) *: _____

- Unemployed
- Employed Part-Time
- Employed Full-Time
- Part-Time Student
- Full-Time Student

Legal Name: _____

Address: _____

Phone Number: _____

Parent/Guardian Name (Print): _____

Parent/Guardian Signature: _____

Patient Name (Print)*: _____

Patient Signature*: _____

Date: _____

Data Entry Screens

New Century Patient Data Submission

Parent/Guardian Data Input		
Parent/Guardian First Name	Parent/Guardian Middle Name	Parent/Guardian Last Name
Parent/Guardian Street Address	Parent/Guardian Zip Code	Parent/Guardian Birth Date
Parent/Guardian Phone Number	Parent/Guardian Preferred contact method. Phone E-Mail Paper Mail Other	Parent/Guardian E-mail Address
Parent/Guardian's Relationship Towards Patient? Parent Grandparent Relatives Other		
Patient Info Data Input		
Patient First Name*	Patient Middle Name	Patient Last Name*
Patient's Gender* Male Female Other	Patient's Ethnicity or Race* Hispanic/Latino White Native Hawaiian/Pacific Islander Black/African American Asian American Indian/Alaskan Native Other	Patient/Guardian Birth Date
		Patient's Marital Status*
Patient's State Residence*	Patient's City of Residence*	
		Patient Street Address*
		Patient's Zip Code*
		Patient Phone Number*
Patient's Preferred Contact Method* Phone E-Mail Paper Mail Other		→
		Patient Social Security Number*

New Century Patient Data Submission		
Primary Insurance Company Data Input		
<input type="text" value="Primary Insurance Provider"/>	<input type="text" value="Primary Insurance's Group ID Number"/>	<input type="text" value="Primary Insurance's Policy Number"/>
<input type="checkbox"/> Primary Insurance Type HHO PPO Medicare Medicaid Other		
<input type="text" value="Primary Insurance Policyholder's Full Name"/>	<input type="text" value="Primary Insurance Policyholder's Relationship to the Patient"/>	
Secondary Insurance Company Data Input (if applicable)		
<input type="text" value="Secondary Insurance Provider"/>	<input type="text" value="Secondary Insurance's Group ID Number"/>	<input type="text" value="Secondary Insurance's Policy Number"/>
<input type="checkbox"/> Secondary Insurance Type HHO PPO Medicare Medicaid Other		
<input type="text" value="Secondary Insurance Policyholder's Full Name"/>	<input type="text" value="Secondary Insurance Policyholder's Relationship to the Patient"/>	
Emergency Contact Information For the Patient		
<input type="text" value="Patient's Emergency Contact's First Name"/>	<input type="text" value="Patient's Emergency Contact's Middle Name"/>	<input type="text" value="Patient's Emergency Contact's Last Name"/>
<input type="text" value="Patient's Emergency Contact's Relationship to the Patient"/>	<input type="text" value="Patient's Emergency Contact's Phone Number"/>	
<input type="text" value="Patient's Emergency Contact's Email Address"/>		

New Century Patient Data Submission		
Patient's Health History		
Patient's Allergies*	↓	Patient's Medications*
Has Patient been exposed to smokers in their household?* (Y/N)	↓	Is there family history of chronic illness?* (Y/N) If yes to the history of chronic illnesses, list them.
Is Patient Sexually Active?* (Y/N)	Does the patient use drugs?* (Y/N) If yes to taking drugs, what drugs do you take?	Does the Patient drink alcohol?* (Y/N) If yes to drinking alcohol, how many per week?
↓ Primary Care Doctor and Employer Information		
Primary Care Doctor First Name	Primary Care Doctor Middle Name	Primary Care Doctor Last Name
Primary Care Doctor Office Address	Primary Care Doctor Phone Number	Primary Care Doctor E-mail
Is there any other treating physicians?		
What's your employment status?		
Employer First Name	Employer Middle Name	Employer Last Name
Employer Office Address	Employer Phone Number	Employer E-Mail Address
Confirm		
Cancel		

New Century Wellness Employee Data Entry for Patients

<https://www.newcenturywellness.org/staff/patiententry/>

Patient's Parent/Guardian Form Entry

Only fill out if it's applicable.

Within the fields, enter the data that was received from the new patient entry form. Areas marked with an asterisk (*) must be filled in.
 Arrows indicate the expected flow of the diagram, or how information is supposed to be entered in order.

First Name <input type="text" value="Insert Parent/Guardian's First Name"/>	Middle Name <input type="text" value="Insert Parent/Guardian's Middle Name"/>	Last Name <input type="text" value="Insert Parent/Guardian's Last Name"/>
Street Address <input type="text" value="Insert Parent/Guardian's Street Address (### anything street)"/>	Zip Code <input type="text" value="Insert Parent/Guardian's Zip Code (#####)"/>	Birth Date <input type="text" value="Insert Parent/Guardian's Birthday (##/#/#/####)"/>
Phone Number <input type="text" value="Insert Parent/Guardian's Phone Number (###-###-####)"/>	E-mail Address <input type="text" value="Insert Parent/Guardian's E-mail (www.aaaaaa@bbbbbb.com)"/>	
Preferred Contact Method <input type="radio"/> Phone <input type="radio"/> E-mail <input type="radio"/> Paper Mail <input type="radio"/> Other <input type="text" value="Specify if other is selected*."/>	What is the relationship towards the patient? <div style="border: 1px solid black; padding: 5px;"> <input type="button" value="Parent/Guardian Relationship Towards Patient"/> Mother/Father Grandmother/Grandfather Brother/Sister Niece/Nephew Aunt/Uncle Guardian Other _____ </div>	

New Century Wellness Employee Data Entry for Patients
<https://www.newcenturywellness.org/staff/patiententry/>

Patient Form Entry

First Name* Middle Name Last Name* Birth Date*

What is the patient's gender?*

Male
 Female
 Other

What is the Patient's Ethnicity or Race?

Hispanic/Latino
 Black/African American
 White
 Asian
 Native Hawaiian/Pacific Islander
 American Indian/Alaskan Native
 Other

What is the Patient's Marital Status?

Married
 Single
 Widowed

State*

Alabama
 Alaska
 Arizona
 Arkansas
 California
 ...

City*

Street Address*

Zip Code*

E-mail Address* Phone Number*

Preferred Contact Method*

Phone
 E-mail
 Paper Mail
 Other

SSN

New Century Wellness Employee Data Entry for Patients
<https://www.newcenturywellness.org/staff/patiententry/>

Primary Insurance Form Entry

 Only fill out if it's applicable.

Insurance Provider <input type="text" value="Insert Primary Insurance Provider Name"/>	Group ID Number <input type="text" value="Insert the Group ID number"/>	Policy Number <input type="text" value="Insert Policy Number"/>
Primary Insurance Type		
<input type="radio"/> HHO	<input type="radio"/> PPO	<input type="radio"/> Medicare
<input type="radio"/> Medicaid	<input type="radio"/> Other:	<input type="text" value="Specify if other is selected*."/>

Policyholder First Name <input type="text" value="Insert Policyholder's First Name"/>	Policyholder Middle Name <input type="text" value="Insert Policyholder's Middle Name"/>	Policyholder Last Name <input type="text" value="Insert Policyholder's Last Name"/>
Policyholder's Relationship to Patient: <input type="checkbox"/> Policyholder is the patient		

Secondary Insurance Form Entry

 Only fill out if it's applicable.

Insurance Provider <input type="text" value="Insert Secondary Insurance Provider Name"/>	Group ID Number <input type="text" value="Insert the Group ID number"/>	Policy Number <input type="text" value="Insert Policy Number"/>
Secondary Insurance Type		
<input type="radio"/> HHO	<input type="radio"/> PPO	<input type="radio"/> Medicare
<input type="radio"/> Medicaid	<input type="radio"/> Other:	<input type="text" value="Specify if other is selected*."/>

Policyholder First Name <input type="text" value="Insert Policyholder's First Name"/>	Policyholder Middle Name <input type="text" value="Insert Policyholder's Middle Name"/>	Policyholder Last Name <input type="text" value="Insert Policyholder's Last Name"/>
Policyholder's Relationship to Patient: <input type="checkbox"/> Policyholder is the patient		

New Century Wellness Employee Data Entry for Patients
<https://www.newcenturywellness.org/staff/patiententry/>

Emergency Contact Information Form Entry

Only fill out if it's applicable.

First Name Middle Name Last Name

Relationship to the Patient Phone Number

E-Mail

Patient Health History Form Entry

Does the patient have allergies? (If you don't know, type N/A)*
 Is the patient on medications currently? (If none, write N/A)*

Was the patient in a household where they or a relative was a smoker or vapes?*
 Yes No Does the patient's family have a history of chronic illness? (If they don't know or has none, type N/A)*

Is the patient sexually active?* Yes No Does the patient use drugs?* Yes No Does the patient drink alcohol?* Yes No

Has the patient had any surgeries?*
 Yes
 No

New Century Wellness Employee Data Entry for Patients

<https://www.newcenturywellness.org/staff/patiententry/>

Patient's Primary Care Doctor Form Entry

Only fill out if it's applicable.

First Name	Insert Patient's Primary Care Doctor's First Name	Middle Name	Insert Patient's Primary Care Doctor's Middle Name	Last Name	Insert Patient's Primary Care Doctor's Last Name
Street Address	Insert Patient's Primary Care Doctor's Street Address (### anything street)			Zip Code	Insert Patient's Primary Care Doctor's Zip Code (#####)
Phone Number	Insert Patient's Primary Care Doctor's Phone Number (###-###-####)			E-mail Address	Insert Patient's Primary Care Doctor's E-mail (www.aaaaaa@bbbbbb.com)
Other Treating Physicians (If there's none, leave it blank) List any other treating physicians if they are assigned to the patient, separated by a comma.					

Patient's Employer Form Entry

Only fill out if it's applicable.

First Name	Insert Patient's Employer First Name	Middle Name	Insert Patient's Employer's Middle Name	Last Name	Insert Patient's Employer's Last Name
Office Street Address	Insert Patient's Employer's Office Street Address (### anything street)			Zip Code	Insert Patient's Employer's Office Zip Code (#####)
Phone Number	Insert Patient's Employer's Phone Number (###-###-####)			E-mail Address	Insert Patient's Employer's E-mail (www.aaaaaa@bbbbbb.com)
<input type="button" value="Confirm and Finish"/> <input type="button" value="Cancel and Go Back"/>					

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Use of Validation and Control Features

To ensure the validity of the data being entered into the database, multiple validation and control features will be put up to aid in data entry at the data entry interface for the company's staff. This must be done to prevent a loss of productivity due to errors in data entry, which will, in turn, cost the company potential money, and it will add up to more errors that have been made unless these features have been implemented. These are an initial set of checks, and these might not be final. Additional checks may be implemented once development of the system continues along. Here are a few examples of the checks that will be implemented:

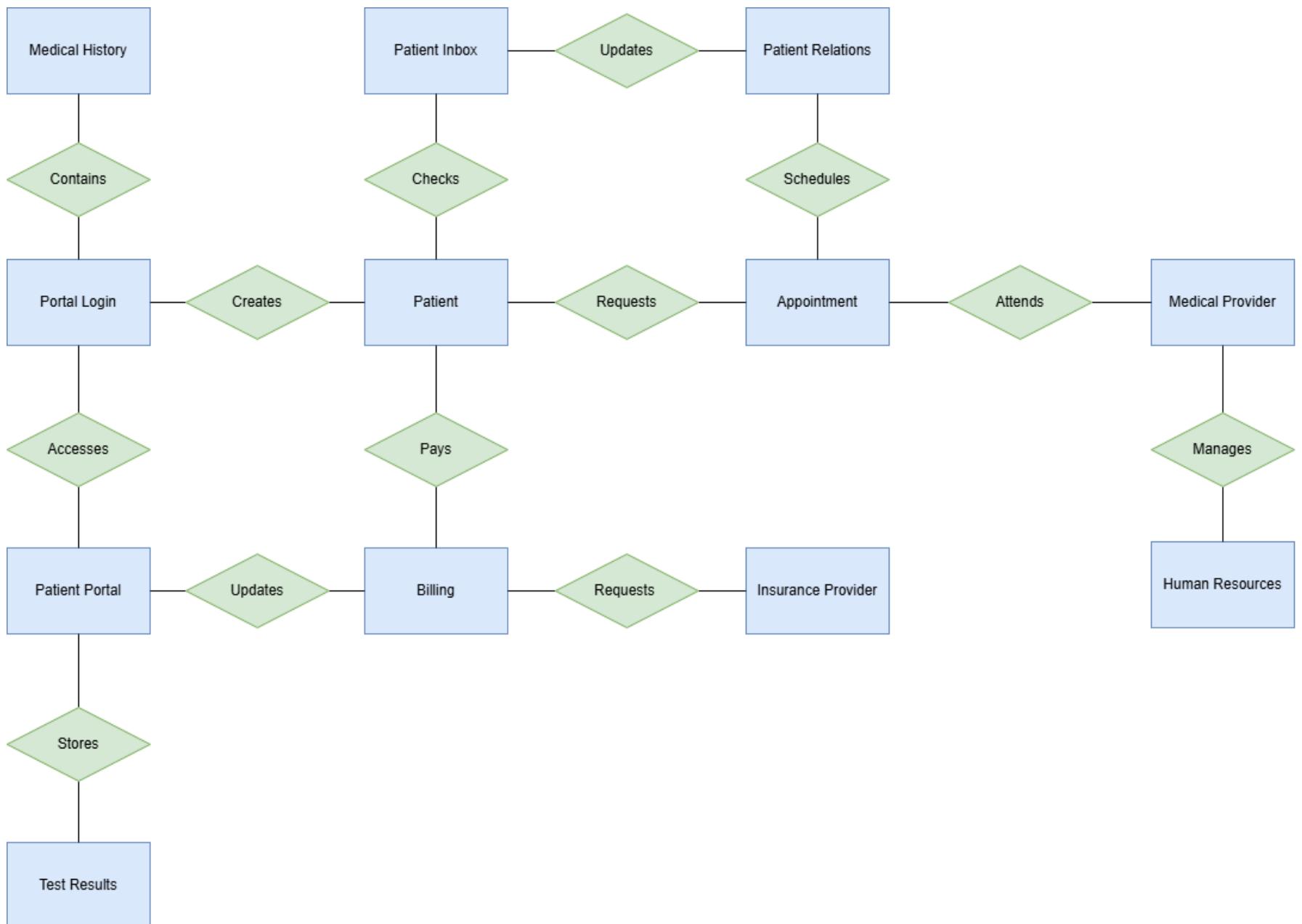
- A data type check is a validity function that will make sure the data entered fits the required data type. Data entry areas that require only letters, such as filling in a patient, a patient's parent or guardian, and a policyholder's name will be enforced. Also, other data that is only numbers, such as a social security number, Group ID number, and phone numbers, will also be enforced to make sure only numbers are fit into those fields. Certain fields that might require both, like a street address, will be enforced as well.
- A reasonableness check will identify values that seem questionable but are still technically right. A prime example of a field this will be enforced is the date of birth field. Inputting in the field the date of birth of someone at 8/25/1900 may technically be right, but it is questionable and may be marked as such.
- A range check will enforce data items that must fall between a certain minimum and maximum value. The date of birth is a good example of enforcing it. There are only twelve months within the year, and 31 days per month at most. With this check enforced, the minimum value the employee can enter is 1 for the month, and the max will be 12. The minimum value for the day will be 1, and the maximum value will depend on the month; certain months' max number of days will be 31, some will be 30, and for February, it will depend on the year. The year value will not be strictly enforceable; however, it can determine how many days February may have.

With some of these examples, this may help to show how these control features might be able to help New Century prevent errors in the company database and cost the company time and money.

Section 8

Initial ER Diagram

The following initial ER diagram outlines the relationships between all essential entities within the system. This diagram walks through the steps taken from patient scheduling to treatment, the billing and insurance collection and documentation of materials and patient satisfaction. The first entity used to store data is the patient relations entity, which represents the patient relations department that oversees patient scheduling, intake, and processing. This entity is related to the patient entity through scheduling. The patient relations entity also works directly with the compliance department, and the two share and store data related to HIPPA forms, patient complaints, and secured medical records. These entities document each other. Once the patient is scheduled, they must be treated by the medical provider entity. The medical provider uses tools and equipment to service the patient, which is documented by the facilities entity. This entity stores information on what was used, what quantity of each item was used, and what the remaining stock of the product is. Once treated, the patient pays the accounting department. The accounting entity stores and sends data to the patient regarding copays, current balances, and paid balances. Before billing the patient, the accounting entity sends the bill to the insurance provider entity, who stores this data and returns its portion of the bill payment to accounting. The final relationship is between the medical provider and the human resources entity. The medical provider entity contains data relating to salary, time worked, compliance paperwork, and performance reviews, all of which is needed by the HR entity. In this sense, these two entities manage each other, as the medical provider must remain compliant and report all hours, and the HR department must provide the medical provider with necessary paperwork and information.

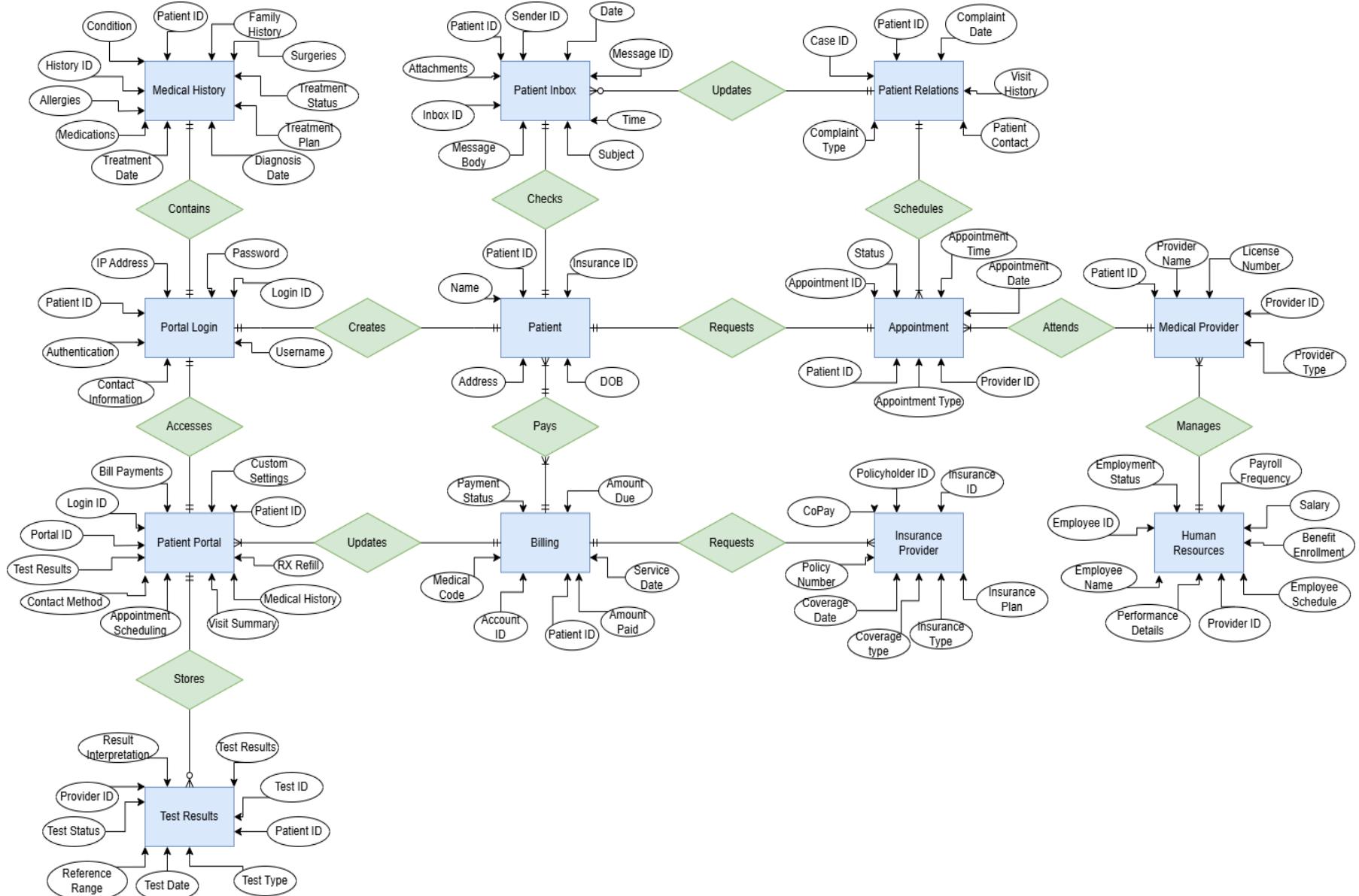


ER Diagram with Relationship Types

The following ER diagram provides more details of the system and its relationships. Each entity now has attributes, which describe the function and data stored within said entity. Each entity will need a large amount of data stored in each entity, and the attributes describe this. For example, the patient entity is described as having a date of birth (DOB), name, insurance ID, patient ID, address, etc. The relationships between each entity now have the standard crows-feet notation applied, showing the nature of each relationship.

There is a key in our final diagram explaining the relationship symbols. The patient relations entity has a one-to-many relationship with the patient entity, as one patient relations department schedules one appointment per patient, but has many patients to do this for. Each patient only has one appointment at a time. The patient relations entity has a many-to-many relationship with the compliance department entity, as there will be many documents being passed between them. There can be many patient complaints and forms and compliance documents at any given time. A patient has only one bill (which may be cumulative) at a time, while the billing entity contains bills for many different patients at once. This explains the many-to-one relationship where the patient has one bill, and the billing department has many patient bills/payments.

Similarly, the accounting department sends a bill to many different insurance providers, but each provider makes one payment per transaction to the accounting department. Each medical provider has multiple patients, while each patient has only one medical provider. When treating patients, one provider uses many tools within the facilities entity. Finally, each medical provider reports to one human resources department but the human resources department watches over multiple medical providers.



Relationships and Mandatory/Optional Arrangements.

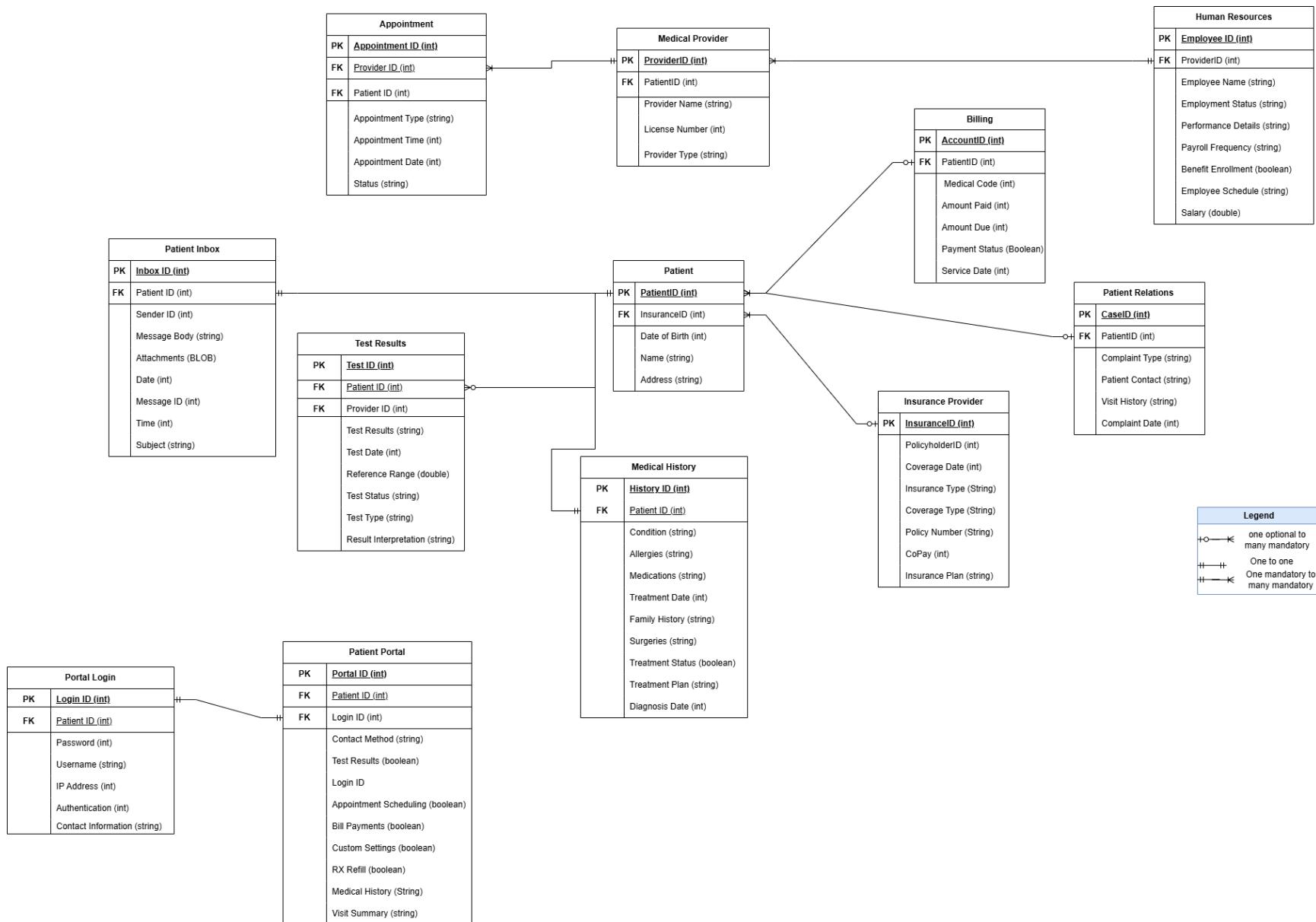
The following ER diagram shows the relationships between entities with standard notation and the key values associated with each attribute. The primary key values in each table store are unique values that identify their respective rows. The primary key in one table serves as the foreign key in the connected table, which shows how the data is linked together. In our table, the ID numbers for each table are used as the primary keys, as they are completely unique identifiers that describe that specific data. The relationships are described as mandatory or not mandatory, which is displayed in our key included in the table. Mandatory relationships require both entities to participate all the time, whereas non-mandatory relationships do not require both to participate.

Within the table, a patient is mandatory for all of the relationships related to it, such as the accounting section, where the hospital will need money from patients when they have given them their services to aid them, patient relations have a relationship with patients so that they can fill out certain forms correctly and remind them if they have any appointments, and an insurance provider so that they can cover a portion of the patient's balance. Although these may be mandatory for each entity to require a patient, a patient does not necessarily always need each entity. The patient might not have insurance; thus, it might not always have a relationship with an insurance company. The patient may not always have an outstanding balance to pay to the hospital, which means it does not necessarily need the accounting department. And the patient might not always have a complaint or anything else they need to fill out, so they do not always need to have patient relations standing by. There are also many patients in these relationships, which means that at least one patient could go to patient relations for a complaint, will have an account to pay their balance to the hospital with the accounting department, and might have a certain insurance plan. One patient relations department can help many patients, one accounting department can have many patient balances due, and one insurance company can have many patients under it so they can help them.

A mandatory one-to-one relationship is the relationship between the patient and the patient portal and login. There is only one unique set of login credentials per patient, and each patient portal is unique to said patient. In this case, the patient creates a unique login required to access the portal.

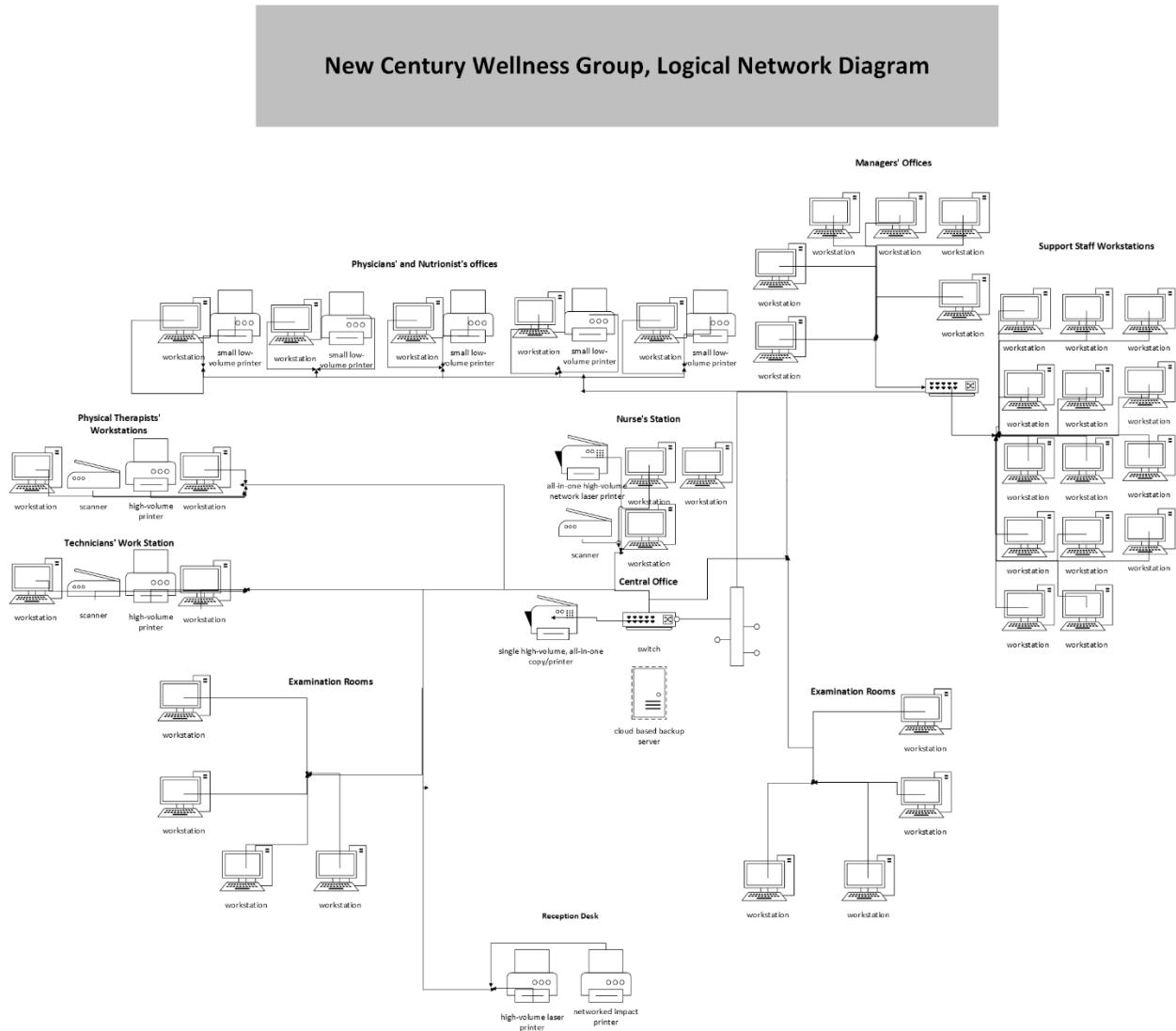
The medical providers in the hospital (doctors, surgeons, physicians, etc.) need the HR department to help do their jobs and patients to treat them with any complications. There are many medical providers but just one of each of the departments needed, making it a many-to-one relationship. Also, one doctor can be assigned to many patients, which would make it a one-to-many

relationship. Since it is needed all the time to do their job, it is a mandatory relationship as well. Without the HR department, the medical providers effectively would not have been able to be hired at New Century; and without the medical providers, New Century would be on a fast track to shutting down, which is not a good thing. The medical history and test results entities are aspects of the user interface which are essential in creating a dynamic and all-inclusive patient portal. These values are both unique to each patient, and the test results are a non-mandatory relationship as not all patients have test results at any given time. Without medical providers, not only will the hospital be on the verge of closing, again, but also a bunch of medical supplies would be lying about with no usage, draining the money that New Century has. Finally, A mandatory relationship between a medical provider and patient exists. Without medical providers, patients would not come to the practice seeking current services and any additional efforts New Century may undertake. If there are no patients to treat, then there is effectively no reason for the medical providers to be there except to do any other tasks within the practice. The patients are the clinic's core focus, and having these services around will help retain them and aid them in any endeavor that New Century may help them with.



Section 9

New Century Logical Network Diagram.



Itemized Bill

<i>3x High-volume printer...</i>	\$1,650.00
<i>20x Workstation...</i>	\$18,000.00
<i>Professional installation & software configuration fee...</i>	\$14,600.00
<i>Shipping & delivery fee...</i>	\$600.00
<i>California sales tax...</i>	\$2,439.50
Total...	\$37,289.50

<i>Installation time for printers...</i>	<i>1.5 hours</i>
<i>Installation time for workstations...</i>	<i>20 hours</i>
Total installation time...	21.5 hours

Benefits and Drawbacks of a Wireless Network.

New Century inquired about installing and using a wireless network within their offices. Wireless networks are becoming better as internet companies pour more resources into developing them. Wireless networks are cost efficient, allow for flexibility and mobility, have minimal installation and maximum scalability, and can improve the collaboration of New Century's workforce. While wireless networks have many amazing advantages, New Century must be aware that wireless networks can prove to be a security risk if not appropriately managed. While being a potential security risk, wireless networks also can have weakened signal strength due to walling and devices, have potential of data loss, and need a dedicated IT team. If New Century would like to switch to a wireless network, they would need to designate a dedicated IT team to ensure the wireless network has strong security, monitor network signals, and manage the access points and performance of the network. Our professional opinion is that New Century should consider switching over their network operations to a wireless network as it will improve the quality of patient care, improve fluidity of operations, and allow staff to work more effectively. If New Century chooses to switch over to a wireless network and allow staff access to tablets and similar devices, we advise New Century to use 2FA, or 2 Factor Authentication, amongst staff members. Two factor authentication simply means that anyone requires two different forms of identification to access certain resources

tied to the person trying to log in. For example, a person might need a fingerprint scan and a security key to access their accounts. In addition to 2FA, New Century should also consider using a separate network for medical devices to ensure network signals stay strong across the networks, ensure network security stays up to date, and implement a wireless network architecture that allows for plentiful access points across the office while also not being within physical reach. This will discourage physical tampering of the access points and enhance the security of the network. If New Century chooses to act on our advice and switch their wired network over to a wireless network, then we speculate that this will effectively save New Century money regarding less physical upkeep for wiring, employee effectiveness, patient satisfaction, and easier scalability.

Section 10

Selection of application development methods.

Considering the nature of information and the essential functions of New Century Wellness Group it is crucial that the application development approach prioritizes reliability, security, and compliance with healthcare laws like HIPAA while also facilitating development for enhancements and testing. The methodology chosen is Agile with Scrum Framework. Agile enables refinement through iteration, which is a crucial aspect for integrating feedback and adapting to user needs and test results effectively. Agile adaptability is a fit for the changing demands in the healthcare sector since requirements can shift due to updates in regulations or feedback from users. The Scrum methodology encourages teamwork by organizing sprints and stand-up meetings to keep all team members, programmers, testers, and stakeholders coordinated. Agile methodology focuses on test driven development (known as TDD) and continuous integration to guarantee that every phase of the system is extensively tested and dependable.

In creating the phase 1 system we plan to use a mix of tools and programming languages, like Java and Python for the backend to ensure strength in security and scalability factors while JavaScript (React) will be the go-to, for frontend to offer user experience. When it comes to database management MySQL will be considered for their handling of data.

Throughout the development process, we will use Integrated Development Environments (IDEs) like IntelliJ IDEA for Java and Visual Studio Code for JavaScript. Version control will be overseen using GitHub, which allows for collaboration among team members. Testing procedures will incorporate tools including JUnit for Java unit testing, Selenium for automated testing of the web interface, and Postman for API testing purposes.

In managing projects within a team setting, JIRA is utilized to oversee project advancement and task completion alongside testing phases. Confluence is employed for documentation purposes and fostering collaboration among team members. IDEs aid in coding efficiency through error detection and debugging functionalities. Lastly, Git is responsible for overseeing code versions to enhance team collaboration efforts.

Basic Testing Plan

Ensuring the effectiveness and satisfaction of users with the phase 1 system necessitates a defined testing strategy that incorporates unit testing, integration testing and system testing to evaluate all aspects of the software thoroughly. The initial phase will involve Unit Testing where Bill Miller and Celia Goldring will be responsible for writing and executing unit tests and for their code using JUnit in the Java language to ensure the components of the code are correct independently. After that comes Integration Testing to examine the interaction between components of the software to ensure they work harmoniously together. Senior developers will oversee this testing phase which includes automated and manual tests for integration. During the stage of software development, known as System Testing, a comprehensive evaluation is conducted on the software system to ensure that it fulfills all the specified requirements. This phase encompasses tests covering aspects such as functionality, performance, security, and usability. The responsibility of overseeing this phase lies with a Quality Assurance team. Executing the Testing Plan requires steps to be taken by team members including developers and QA team members who will create test scripts using tools such as Selenium for UI testing and Postman for API testing purposes. Any identified issues during the testing phase will be logged in JIRA for action by the developers in sprints. Following the resolution of these issues in sprints comes the execution of regression tests to validate that no fresh bugs have been introduced into the software system and to maintain its stability.

Groups That Will Need Training

Healthcare professionals, such as doctors and nurses, will undergo training in handling patient records and appointments, as well as learning about security measures in place to safeguard sensitive information before the system is fully operational for providing daily patient care services. The training for the Administration staff will cover responsibilities like invoicing clients and organizing schedules/reports effectively. They will be trained after the medical staff. The IT personnel will undergo training in handling system maintenance issues and providing user support and troubleshooting assistance. They will be trained together with the Administration staff to ensure they are well prepared to deliver support whenever it is required. Patients will be provided with resources like brochures or videos to guide them on using patient portals or kiosks, for accessing their records and booking appointments.

Section 11

Addressing Slow Response Times

Memo: Understanding and Resolving System Performance Issues

To: New Century Wellness Group Staff

From: IT Consultant

Subject: Understanding and Improving System Performance

Overview of the Issue:

System slowdowns, particularly during peak usage times, can disrupt workflows and reduce efficiency. Potential causes for the slow response times include:

- **High Data Traffic:** Multiple users accessing or inputting data simultaneously during peak hours.
- **Server Overload:** Insufficient server capacity or bandwidth to handle concurrent requests.
- **Inefficient System Queries:** Unoptimized database queries causing delays in retrieving or saving data.
- **Hardware Limitations:** Aging hardware that struggles to meet the demands of the new system.

Steps to Address the Issue:

1. Performance Monitoring:

- a. Use system monitoring tools to identify peak usage times and resource bottlenecks.
- b. Track metrics such as server CPU usage, memory usage, and response times.

2. Database Optimization:

- a. Analyze and optimize database queries to reduce delays.

- b. Regularly defragment and index the database to improve retrieval times.

3. Infrastructure Improvements:

- a. Upgrade server hardware to accommodate increased workloads.
- b. Transition to cloud-based or hybrid systems for scalability during peak periods.

4. Load Balancing:

- a. Distribute workloads across multiple servers to prevent overload on a single system.
- b. Schedule resource-intensive tasks (e.g., report generation) during off-peak hours.

5. User Training:

- a. Educate staff on efficient system usage to minimize unnecessary data traffic.

Commitment:

We will perform a detailed analysis of the system's performance and implement the necessary upgrades and optimizations. This will ensure smoother operations and better alignment with your needs.

Types of Maintenance

Memo: Types of System Maintenance

To: New Century Partners

From: IT Consultant

Subject: Maintenance Strategies for the New System

Introduction:

To ensure the system continues to meet your needs, it is essential to understand and plan for several types of maintenance. Here are the four main categories, along with examples tailored to suit your practice:

1. Corrective Maintenance:

- a. Resolves errors or bugs encountered during system use.
- b. **Example 1:** Fixing a bug where patient insurance data fails to save correctly.
- c. **Example 2:** Addressing a system crash when generating end-of-day financial reports.

2. Adaptive Maintenance:

- a. Modifies the system to accommodate changes in the operating environment.
- b. **Example 1:** Updating the system to comply with new HIPAA regulations.
- c. **Example 2:** Integrating new insurance provider's data requirements into the billing module.

3. Perfective Maintenance:

- a. Enhance system performance or user experience.
- b. **Example 1:** Adding a feature for patients to request prescription refills through the portal.

- c. **Example 2:** Improving the layout of the appointment scheduling interface to reduce errors.

4. Preventive Maintenance:

- a. Proactively addresses potential issues to reduce downtime.
- b. **Example 1:** Performing regular database backups to prevent data loss.
- c. **Example 2:** Scheduling routine updates to patch security vulnerabilities.

Recommendation:

We are proposing a structured maintenance plan combining regular preventive updates with responsive corrective, adaptive, preventive, and perfective maintenance. This approach will ensure the system remains reliable and effective as your practice evolves.

Maintenance Release Methodology

Should New Century Use Maintenance Release Methodology?

Adopting a **maintenance release methodology** is highly beneficial for managing system updates efficiently.

Benefits:

- **Efficiency:** Groups multiple noncritical changes and enhancements into scheduled updates, minimizing interruptions.
- **User Preparation:** Allows users to anticipate changes and adjust workflows accordingly.
- **Cost Control:** Reduces the overhead of frequent, small updates.

Application for New Century Wellness Group:

1. **Release Schedule:** Establish quarterly or biannual maintenance releases for system enhancements and minor fixes.
2. **User Feedback:** Collect user requests and prioritize them for inclusion in the next release.
3. **Communication Plan:** Notify users in advance about upcoming changes, with detailed documentation and training if necessary.

By adopting this methodology, New Century can efficiently manage user requests, ensuring both staff satisfaction and system reliability.

Security Concerns and Recommendations

Memo: Enhancing System Security

To: New Century Wellness Group Owners and Managers

From: IT Consultant

Subject: Addressing System Security Concerns

Introduction:

The recent concerns about data breaches and system vulnerabilities highlight the need for a robust security strategy. Medical data is a prime target for cyberattacks, making it imperative to implement stringent measures.

Primary Security Concerns and Recommendations:

1. Unauthorized Access:

- a. **Concern:** Risk of unauthorized personnel accessing sensitive patient or financial data.
- b. **Recommendation:**
 - i. Implement role-based access controls (RBAC) to restrict data access by job function.
 - ii. Use multi-factor authentication (MFA) for all users.

2. Data Breaches:

- a. **Concern:** Exposure of sensitive patient information to external threats.
- b. **Recommendation:**
 - i. Encrypt all data at rest and in transit using advanced encryption standards (AES).
 - ii. Install a firewall and intrusion detection system (IDS) to monitor and block malicious activity.

3. Insider Threats:

a. **Concern:** Potential misuse of data by current or former employees.

b. **Recommendation:**

i. Conduct background checks for new hires.

ii. Monitor and log user activity to detect unusual behavior.

iii. Deactivate accounts of terminated employees immediately.

4. System Vulnerabilities:

a. **Concern:** Exploitable weaknesses in software or hardware.

b. **Recommendation:**

i. Schedule regular vulnerability scans and patch updates.

ii. Conduct periodic third-party security audits.

5. Disaster Recovery and Business Continuity:

a. **Concern:** Potential data loss or downtime due to cyberattacks or hardware failures.

b. **Recommendation:**

i. Maintain automated daily backups stored securely offsite.

ii. Develop a disaster recovery plan, including failover systems and regular testing.

Conclusion:

By implementing these recommendations, New Century Wellness Group will ensure the confidentiality, integrity, and availability of its systems and data. We are available to assist with designing and executing this comprehensive security strategy.

Appendix A

Project Management: The Key to Success.

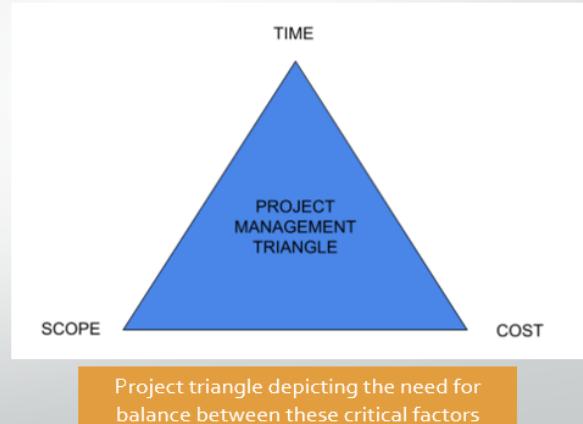
The title slide features a light gray background with a dark gray and blue diagonal striped border on the left side. The main title "Project Management: The Key to Success" is centered in a large, bold, black font. Below it, the preparation credits are listed in a smaller, black font: "Prepared by: Ella Selvaggio, Aaliyah Smiley, Zachary Sonntag, Mikerlange Ilmo, and Shaina Xhelilaj".

The content slide has a light gray background with a dark gray and blue diagonal striped border on the left side. The section title "What is Project Management?" is centered in a large, bold, black font. Below it, the sub-section title "Project management involves:" is in a bold, black font. To the right of the text, there is a simple line drawing of three people seated around a circular table, representing a team meeting or discussion.

- Defining the project and determining focus and end-goals.
- Thorough assessment of project viability and costs
- Tasks are broken down into manageable chunks to distribute to the team members.
 - Gantt and PERT/CPM charts are created.
 - Time needed to complete tasks is estimated.
 - Task dependency is outlined and progress is continuously monitored.

Project Planning

- ❖ Project management team and IT team define goals and objectives
- ❖ Communication and collaboration
 - Team members and management are on the same page
- ❖ Project tasks are identified
 - How much time will each task take to complete?
 - What will be the cost of each task?
- ❖ Resources can be allocated properly based on critical tasks and estimated times
- ❖ Time needed to complete the project is estimated

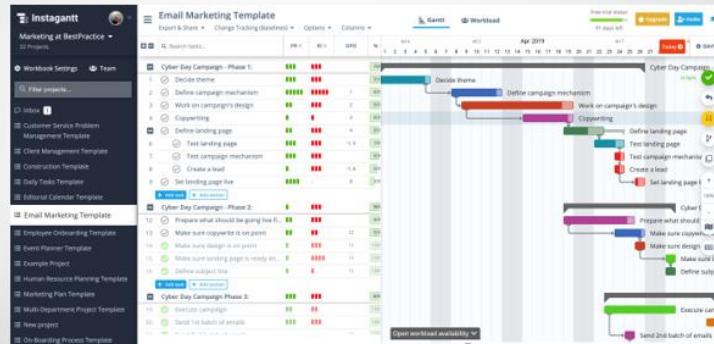


Project Scheduling

- Timelines are fleshed out
- Task dependencies and milestones are made clear through use of charts
 - PERT/CPM charts are utilized
 - Gantt charts are utilized
- Staff is assigned to bite-sized manageable tasks
 - Critical tasks that may delay the project are highlighted
- Scope is defined
- Time-management is improved
 - Tasks are less likely to slip through the cracks
 - Deadlines will not be missed

Gantt chart explanation

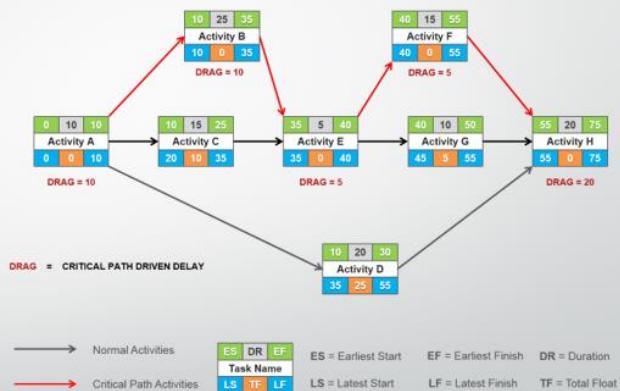
Gantt Charts are horizontal bar charts made to represent sets of tasks. Meant to simplify complex projects via task grouping. Modern Gantt charts solutions include resources that are assigned to tasks, making them more ideal than PERT/CPM charts although they are not obsolete.



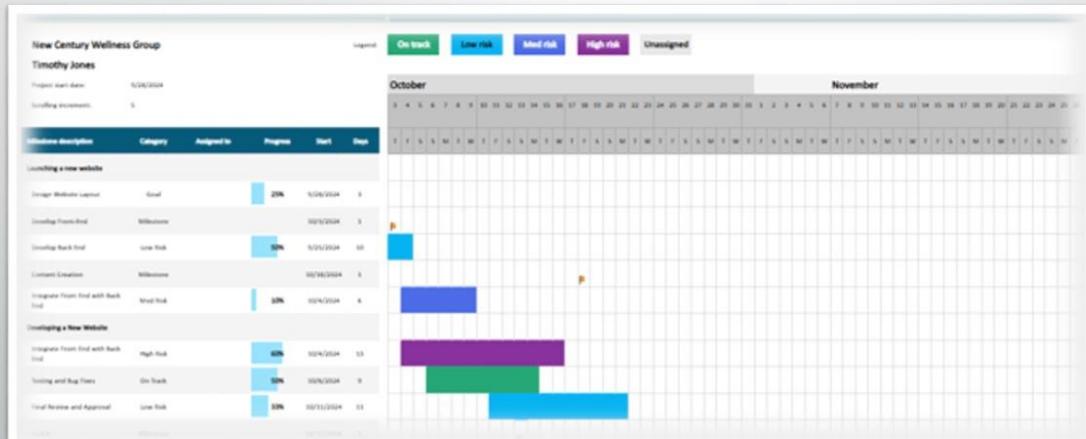
PERT/CPM Chart explanation

Used for larger models of tasks to represent them as a network diagram.

PERT/CPM Chart is a gateway to determining overall duration of the project, extensive information on tasks, and determining the critical path.



Gantt Chart



This PERT diagram represents the tasks for three case studies. This project is about putting together a team of classmates, in which the team will take on an imaginary role as systems analysts hired by a medical clinic. This PERT outlines the tasks, timeline, and description of the hypothetical project.

CIS151 Case Study 1,2,3

A PERT diagram representing the tasks for Case Study 1,2,3. This project is about putting together a team of classmates, in which the team will take on the imaginary role as a systems analyst hired by a medical clinic. This PERT diagram outlines the tasks, timeline and description of this project.



IGNITE CORPORATION

The Drifting Crafty Ninjas of the Open Web

Why Create a Work Breakdown Structure?

1. Clarifies Project Scope

- - The WBS breaks down the project into smaller, manageable components, providing a clear understanding of the scope of the project.

2. Improves Project Planning and Scheduling

- - By decomposing the project into detailed tasks, it helps in organizing the sequence of activities.

3. Enhances Communication

- - A WBS provides a common framework that allows all stakeholders, including project teams and clients, to understand the project's components.

4. Facilitates Resource Allocation

- - Breaking the project into smaller tasks allows project managers to determine the resource needs for each task, ensuring that the right people, tools, and budgets are allocated where necessary.

5. Aids in Risk Management

- - By thoroughly understanding each component of the project, potential risks or bottlenecks can be identified early. This enables the team to create contingency plans and address issues before they arise.

Task Identification in a Work Breakdown Structure

- Task or activity is any work that requires company resources and has a timeline.
- WBS includes events or milestones which acts as a reference point to monitor progress.
- Listing smaller tasks of larger tasks to breakdown work.
- Timeline of tasks should be estimated to ensure project tasks are completed on time (can be done using the weighted formula $(B+4P+W)/6$)

Project Monitoring

- Guiding, supervising, and coordinating workload
- Progress of individual tasks is monitored
 - Completion of tasks and updates to the timeline are made
 - Communication is encouraged
- Issues and potential setbacks are identified
 - When tasks and timelines are clearly defined risks can be mitigated
- Management has a clear view of where and why the project is lacking
- Project timeline can be updated with accurate and current information
 - Reports can easily be made and shared with stakeholders and team members alike

Project Reporting

- **Chain of command reporting:** Members report to manager, manager reports to upper management and users.
- **Project manager:** collects, verifies, organizes and evaluates information.
- **Before information is passed:** summarized for easier readability.
- **Status Meetings:** Scheduled regular meetings with project team.
- **Status Reports:** Regular reports to immediate supervisor, upper management, and users
- **Dealing with Problems:** Project managers must find an equal median of when to report problems to upper management to stop risks.

Summary

With Project Management

- Deadlines are always met or adjusted ahead of time
- Expectations are realistic and clear
- Risks are easily mitigated due to the planning process
- Company reputation for reliability and effectiveness is maintained
- Quality standards are met or exceeded
- Stakeholders are updated and informed
- United teams produce a product that is aligned with the needs of the company
- Growth is supported

Without Project Management

- Deadlines are missed or teams are not aware of them
- Resources are wasted on errors and uncertainty
- Company reputation is at stake
- Success and completion of projects is at stake
- Lack of communication leading to general frustration
- Quality and functionality of product is in question
- Projects go over budget
- Growth is not supported
- Project status goes unmonitored leaving all parties confused and lost

Appendix B

Project Management Key Terms

Project Management – The process of scheduling, managing, planning, and reporting within a project to ensure satisfactory work is completed efficiently and within constraints such as budget and time.

Example: A mismanaged project lacks structure. Employees are not motivated, and deadlines are missing. Proper project management techniques are applied, deadlines are clear, goals and tasks are reasonable keeping staff engaged.

Project Management Triangle – A diagram used to show the necessary balance between time, cost, scope and quality. These critical factors impact each other and one being thrown off can change the others.

Example: Team members are putting in extra effort and going beyond expectations to make their project extremely time effective. In doing so, they neglect the quality aspect in some areas. The project management triangle helps them find the balance needed to fulfill all of their requirements.

Scope - Project scope refers to the time and resources needed to complete the project.

Example: Stakeholders are wondering when the project will be completed and its extent. Management can present their findings for the project scope to give everyone a clear idea.

Critical Path – A series of tasks that will set the entire project back if delayed.

Example: In building a house, the foundation must be put down first. If the foundation is not put down, the rest of the projects and tasks are delayed until the completion of the foundation.

Task Dependencies – The different relationships between tasks that define their order of completion.

Example: A foundation must be built before the walls are painted in reference to a new house, but the walls can be painted at the same time as the shower is being tiled. Some tasks rely on completion of other predecessor tasks, and others can be done in conjunction.

Risk Analysis, Identification, and Management – Refers to the process of determining potential risks, estimating the probability of the risk occurring and mitigating the risk.

Example: I want to start my own business, but I run the risk of going into debt. Loan options are assessed to ensure debt is not acquired.

Work Breakdown Structure – The breakdown of a project into smaller, more manageable tasks.

Example: A team is feeling overwhelmed with the amount of work required for their latest project. Management implements a work breakdown structure to keep the team motivated and feeling accomplished.

Milestone – An event that marks a significant occurrence within a project.

Example: Over half of the project has been completed, which is a significant milestone for the team. Management can report this event and completion to stakeholders and motivate team members by giving them an event to feel good about.

Chain of Command Reporting – The hierachal structure of communication within a project network.

Example: As tasks are completed, teams notify their direct managers who notify the upper management and then stakeholders. Communication and timelines are more easily understood.

Project Monitoring and Reporting – Refers to the supervision and guidance given by management to a team, allowing for progress reports to be made. Consistent progress and efficiency reports are provided to all levels of management and the team.

Example: Projects need to be supervised, and team members with questions or confusion can be put back on the proper path. Areas lacking can be determined and resolved.

Project Planning – Identifying tasks within a project and estimating their cost and completion time.

Example: A project that lacks planning cannot be successful, as tasks, critical path, and resources needed are not defined.

Project Scheduling – Determining the exact timeline of each task and who is assigned to which tasks.

Example: A worker with specific skills is assigned a corresponding task, ensuring each task has the best set of employees for the job.