Midterm Project

INFO-C451

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## Introduction

For this project I’ll be proposing a System Implementation Plan for a healthcare organization called Tri-County Human Services. Tri-County is a multi-faceted healthcare organization with multiple departments including outpatient services, short-term and long-term residential units, and community focused departments that operate in the field full-time. The impetus for the transition is to move from a smaller, less interoperable electronic health record to another, specifically to Epic, which is one of the most widely utilized electronic health record systems in the industry. The goals for implementing this system are to increase clinical documentation efficiency, reduce documentation errors, and establish data interoperability so the organization can participate in a statewide health information exchange.

## SDLC

The actual “implementation” phase typically sits late in the systems development life cycle, following strategic planning and development, and the same will hold true for Tri-County Human Service’s Epic implementation. We’ll begin with the planning phase, during which we’ll outline the project scope and our primary objectives throughout the implementation. The planning phase will also include discovery meetings with staff representatives from each department to identify specific department needs and workflows within the new electronic health record. We’ll follow this phase with the configuration phase, meeting with the Epic vendors to tailor the system to Tri-County Human Service’s specific needs. Overlapping with this phase will be our testing phase, as we work through each configuration and ensure they’re fully functional before implementing. Afterwards we’ll begin the implementation phase, which will involve ensuring each workstation has the necessary computer hardware and web browser installed to access Epic. During this phase we’ll migrate existing charts into Epic and conduct training with each department. The last piece of the implementation phase will be setting a go-live date.

## Development Methodology

The proposed methodology for this project will be the Agile methodology. Given the ever-changing regulatory landscape of the healthcare industry and the need to keep pace with funding sources (Medicaid, Medicare, etc.) changes, the flexibility of the agile methodology is ideal for Tri-County Human Service’s situation.

## Planning Objectives and Strategies

Objectives will include full system deployment to each department within 6 months, with all active patient charts moved from the old electronic health record system to Epic, and all staff trained and operational within Epic. Our first strategy will be to form an implementation team, the team will include an Executive Sponsor, Project Manager, System Administrator, and Subject Matter Experts. The team will meet weekly either in person or through Microsoft Teams. During these meetings the team will track project progress with a tool like Azure Boards or Kanban Board in Jira. The team will also be responsible for budgeting and allocating organization resources to the project. Another objective for the team will be to ensure that the organization maintains compliance with the rules of the Health Insurance Portability and Accountability Act (HIPAA,) as well as the rules imposed by Federal Regulation Title 42 regarding substance use disorder patient records, in order to maintain the confidentiality of patient records at all times. Another objective for the team will be to check in regularly with each department to ensure that regular workflows and billing aren’t impacted by the ongoing implementation.

## Risk Assessment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Category** | **Description** | **Probability** | **Impact** | **Mitigation Plan** |
| Operational | Staff resistance to adoption | Medium | High | Establish regular training sessions |
| Regulatory | Failure to comply with HIPAA guidelines | Low | Impact | Establish internal auditing team to perform regular compliance audits |
| Financial | Budget overrun rising from project delays | Medium | Medium | Weekly project team meetings to monitor costs vs timelines |
| Security | Cybersecurity data breach | High | High | Establish multi-factor authentication, network firewalls |
| Operational | Loss of existing patient records | Medium | High | Project team implement ETL workflow |

## 

## Gantt ChartA screenshot of a graph AI-generated content may be incorrect.

## Installation Approach

Rather than take on the risks associated with a direct cutover, or the increased costs of a parallel approach, we’ll adopt a phased installation approach for this project. We’ll roll out the system by department, starting with the smallest department in terms of employee count, which would be our Community Programs department, then moving to the Outpatient department, and finishing with the Residential department. By adopting this approach, we can minimize disruptions to the patients’ experience and easily adapt to any issues that arise in the early phases.

## Installation Schedule

For the two-month period of the project timeline identified for the full department rollout, we’ll break it down into the following steps:

* **Week 1-4 (Month 4):** Hardware installation and user training
* **Week 5-8:** Community programs rollout
* **Week 9-12:** Outpatient rollout
* **Week 13-16:** Residential rollout and system optimization

## Data Migration Plan

Given that both the legacy electronic health record and the new system Epic have the same basic framework, data migration should be a smooth process. To handle the ETL process we’ll plan for the following:

* **Extract:** Data pulls from the legacy system with CSV exports and SQL Server integration, will pull patient charts, service records, and historical billing data
* **Transform:** Map fields to ensure standardization (date formats, removing hyphens from social security number records, etc.) and validate to ensure no record duplication
* **Load:** Import data to Epic in batches

## ETL Diagram

A diagram of a diagram

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## 

## Test Plan

During the testing phase the project implementation team will handle the initial testing with the system administrator along with support from the Epic vendor and then expand the testing to the subject-matter experts. The test plan will outline the following:

* **Scope:** Test system stability, administrative user functions, end user functions and workflows
* **Objectives:** ensure system stability, reliability, and usability
* **Tools:** Selenium and Postman
* **Responsibilities:** System administrator will lead the testing team, configuration adjustments will be handled by the system administrator, bugs will be reported to the Epic vendor for fixes, subject-matter experts will validate fixes.

Concurrently with the testing phase, part of the team will be organizing and conducting training sessions by department to prepare staff for the new system. The training will be a mix of presentations and hands-on demos conducted in a test sandbox for Epic so that staff can get a feel for the new system.

## Test Cases

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Case ID** | **Case Description** | **Test Steps** | **Expected Result** |
| TC01 | User login validation | 1. User enters valid username and password  2. User clicks login button | Successful login to homepage |
| TC02 | Patient record update | 1. User searches for patient record  2. User clicks view record button  3. User clicks update record button 4. User inputs patient vitals 5. User clicks save button | Patient record updated |

## 

## Debugging and Error Handling Strategies

The project implementation team will work with the Epic vendor team to identify and adopt debugging strategies. We’ll propose using an integrated tool like the Eclipse IDE’s debugging tool to locate and analyze issues in the system code. We’ll also propose deploying try-catch blocks in the code to handle errors. We’ll also work to ensure that errors are accompanied by messages for users describing the error, and that automated error alert messages are set up to go to the system administrator. The project team will track errors in a log and work together to determine which errors will be prioritized during weekly meetings.

## Automated Testing Tools

The project implementation team will work with the Epic vendor team to leverage multiple automated testing tools to reduce manual effort and increase efficiency in the testing process. The team will propose using Selenium to test the user interface components and simulate successful user logins. The team will also propose utilizing Postman to test the data exchange API hooks for participating in the state health information exchange. Junit can also be leveraged to test any code sections developed in java.

## Data Quality Issues

The project team will work together to develop a list of potential data issues and identify possible strategies to cleanse the data effectively and mitigate the issues before they propagate. The list of potential data quality issues could include:

* Incompatible field formats (dates, timestamps, social security numbers, phone numbers)
* Inconsistent naming conventions (procedure acronyms, diagnosis codes)
* Incomplete patient records
* Duplicate patient records
* Data overload
* Unclear data management policies

The team will create a data exchange plan, taking care to identify the structure of field formats and naming conventions in both systems and identifying any inconsistencies. Once inconsistencies are identified, then the team can use SQL queries or Microsoft Excel formulas to cleanse the field inconsistencies and deduplicate any doubled records. In order to alleviate any issues with data overload, both the export and import processes will be accomplished in multiple batches to keep file sizes manageable. The project team will also be responsible for drafting clear and concise policies regarding the management and ownership of the data throughout each step of the implementation.

## Conversion Method

The project team will adopt a phased conversion approach to help reduce file sizes and errors, and work to balance the speed of the conversion with the amount of control maintained over the data. Mirroring the installation approach, the project team will segment the process by department, and begin with migrating the Community Programs department’s data, which has the smallest data footprint in the legacy electronic health record. From there the team will follow up with migrating the data from the outpatient and residential departments.

## Testing and Validation Steps

The project implementation team will test and validate the accuracy of the data in the new electronic health record Epic post-migration by comparing the records in Epic to the records in the legacy system. The team will also work with the subject-matter experts to use the internal auditing tools that the billing department employs to ensure compliance for billing purposes to conduct an initial audit on the records in Epic to check for compliance issues. The team will aim for a 99% accuracy rate for each department’s data on this initial audit. In the event that a department’s data doesn’t meet the accuracy threshold, the team will recommend that the department’s data is wiped and then migrated from the legacy system again.

## Successful Summary

The project implementation team will utilize their weekly meetings to ensure that each component and phase of the process dovetails seamlessly into the next phase. Proper planning flows into an informed timeline that then sets the stage for the phased implementation. The implementations phased by departments then line up with the testing and migration, and the ETL flow prepares the organization for the go-live date. Each component of the process gives the team opportunity to identify and mitigate issues, with the ultimate goal of reaching the final phase with minimal or no issues.

## Post-Implementation Review

The project implementation team will establish criteria to monitor post go-live to determine the continued success of the project. The criteria will include data accuracy, user satisfaction, and system uptime. The team will continue their weekly meetings for 6 months beyond the go-live date to review these criteria regularly. The team will send out satisfaction surveys to all staff monthly to determine the level of user adoption in the field. The team will also organize a “go-live celebration” for each department. The celebrations will be catered with sandwiches, cupcakes, and drinks and the team will be on-site thanking the users for their adoption and support to increase staff morale. The initial billing audit completed during the tested phase will continue to be completed monthly after go-live to ensure data accuracy. After go-live if any issues arise, the team will recommend a more targeted resolution, as opposed to the full re-migration before the go-live. The key success factors for the project will be thorough testing, robust training curriculums, and unified leadership.

## Lessons Learned

Going through an organization-wide project implementation like this imparts a number of lessons. I think chief among them is how imperative it is to get the buy-in for the new product from as many stakeholders as possible. Employee resistance can delay and derail a project like this significantly, so using the initial planning time to develop strategies to increase employee adoption is paramount. To this end having an engaged Executive Sponsor on the project implementation team is incredibly valuable, as they can help sway other executives and create a high level of influence on the organization’s overall acceptance level of the project. Another takeaway from this process is the importance of thorough planning for each step of the project before beginning the implementation. There’s an old saying in construction work that goes “measure twice, cut once” that emphasizes the importance of accurate planning, and the same proverb can hold true in system implementation. It’s important to validate the data properly through multiple phases before ultimately importing the data so that you don’t end up in a situation where you’ve brought inaccurate or “junk” data into the new system. The final lesson from going through a system implementation like this is how important it is for the team to be aligned towards their goals and have everyone on the same page throughout the process. Just like the importance of gaining end user buy-in, the human element of a project implementation can often be a much larger hurdle than any technical aspect of it. This is why it’s ideal to involve as many staff from as many different departments as possible, to really sell the product to the organization at large, and explain that even though change can be difficult, it will ultimately be for the better for everyone.