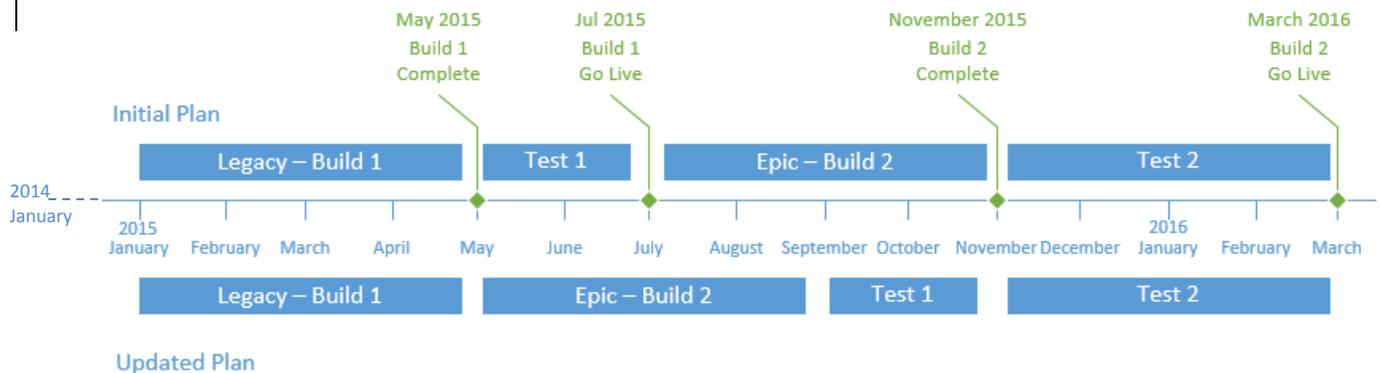


16-401 Cerner Implementation Program Development Assessment

EXECUTIVE SUMMARY

MD Anderson implemented Cerner Millennium on November 6, 2015 to replace its legacy lab application, Cerner Classic. Cerner is used to maintain and track lab orders. The Cerner Millennium project was initiated in late 2013 consisting of two phases to integrate first with legacy systems and then with Epic. Phase 1 of the project was initially set to go-live in July 2015, but was postponed to November 2015 to allow the project team additional time to work on the integration between Millennium and Epic.

As noted in the timeline below, the updated planned sequence of events moved up the build of phase 2 and delayed testing of phase 1; however, the overall timeline did not shift. Please note the project started January 2014; however, the timeline focuses on the time period where the project plan changed. Refer to Appendix C for additional background information.



Internal Audit performed a post-implementation assessment of the Cerner Millennium System Development Life Cycle (SDLC) process to determine if the implementation aligned with the Operational Change Management Policy and industry standard best practices. Effective SDLC controls are paramount to the success of significant system upgrades and implementation. The SLDC sets the expected governance steps for proper project planning and execution from the inception of the project through post go-live support.

Implementing a lab system is a significant undertaking. Management considered implementing the new system a success from a functionality and lab operations perspective; however, Internal Audit did not evaluate the overall functionality of the application. This assessment relates to the system project implementation process and governance framework and is not a comprehensive application review of Cerner Millennium or an assessment of lab operations. The assessment was focused on phase 1 of the project (i.e. Cerner Millennium go-live in November 2015 and integration with the legacy CARE and IDX applications). Refer to Appendix A for further details on the scope.

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Audit Results:

Project management of the Cerner Millennium implementation demonstrated several key areas for improvement, including the need to retain documentation to support an effective project implementation methodology and governance framework. Although the implementation did not result in significant operational disruption, there were billing issues that could have been prevented or minimized had the project governance process been more effective. Management noted that these billing issues led to the holding of claims post go-live, a loss of \$2-2.5 million monthly charge volume, and several instances of overcharging or inaccurate charging on over 30,000 charges, which was later corrected per management. Manually reviewing and resolving these issues led to additional resource costs after go-live.

Certain elements of the System Development Life Cycle process were effective, such as execution of the cutover plan, the appropriate provisioning of user access in the new system, and the existence of user training / readiness material. Several other elements of the SDLC process and project governance framework were found to be ineffective and needed improvement as follows:

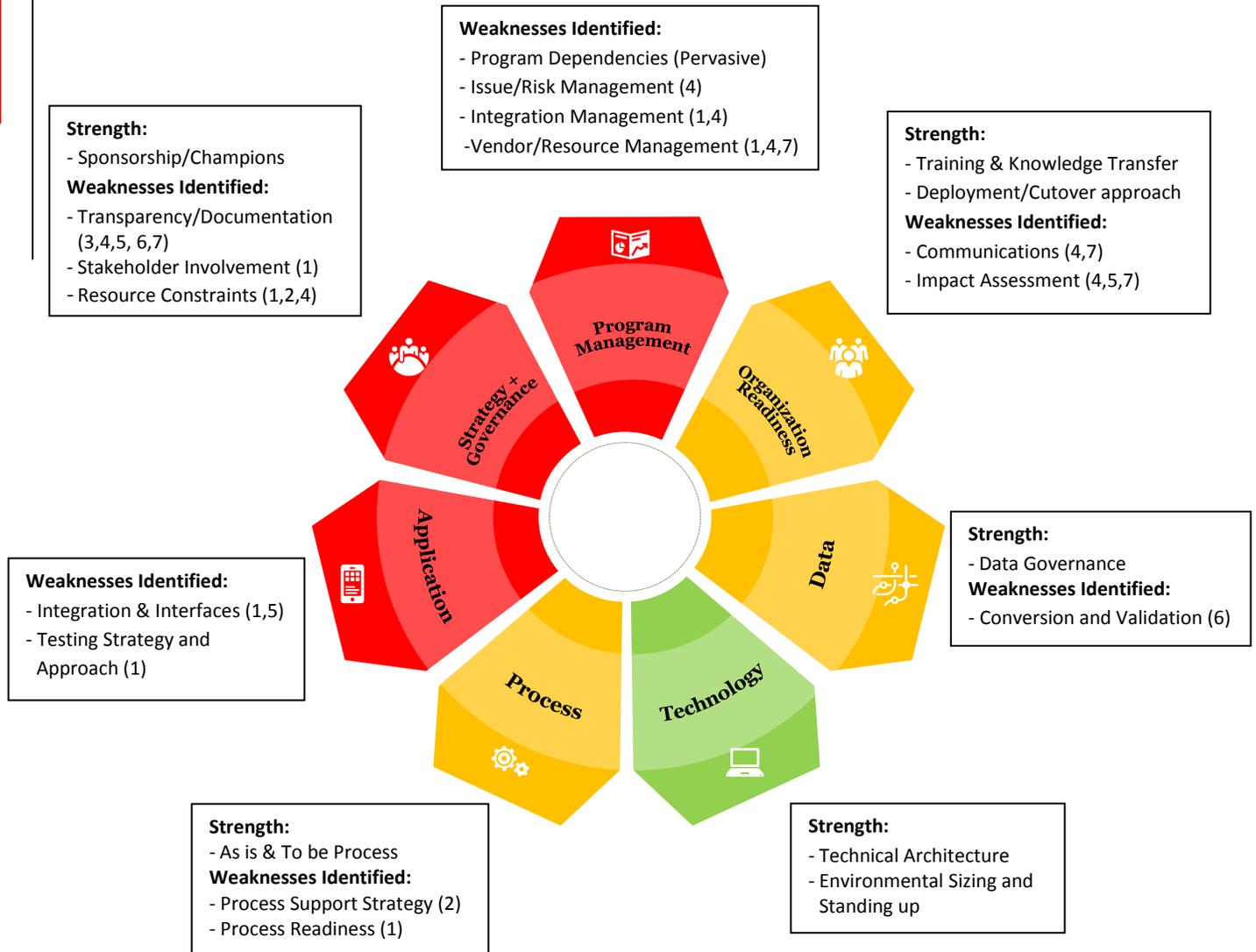
- The planning, execution, and tracking of testing was not comprehensive. Test cases did not provide a sufficient representation of possible scenarios in the production environment, and insufficient time was allocated for testing billing processes and related functionalities. **(Priority Finding)**.
- Adequate resources were not committed to support the Cerner upgrade post go-live to ensure the stability of the system and to address production issues. **(Priority Finding)**.
- The Project Team did not adequately prepare and retain detailed project documentation for key phases of the project. Internal Audit was unable to locate sufficient documentation to support the adequate consideration of the assessment and mitigation of project risks, ongoing defect tracking and resolution, data migration procedures, and key decisions such as the go-live decision.

Internal Audit noted the primary root causes for the challenges during the implementation were ineffective project planning, governance, management, organization, and communication. Managing Cerner as a separate project from Epic also created competing priorities and deadlines. Additionally, management attributed many of the issues to the fact that they were working on a tight timeline as contracting and other issues delayed the project start to January 2015.

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The following seven SDLC dimensions were assessed for overall effectiveness according to the following legend. See identified strengths and weaknesses for each dimension as well as the mapping to observations within the report. See Appendix B for considerations within each dimension

- Green: Effective
- Yellow: Needs Improvement
- Red: Ineffective



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Management Summary Response:

Management agrees with the observations and recommendations and has developed action plans to be implemented on or before August 31, 2017.

Appendix A outlines the methodology for this project.

Number of Priority Findings to be monitored by UT System: *Two*

A Priority Finding is defined as *“an issue identified by an internal audit that, if not addressed timely, could directly impact achievement of a strategic or important operational objective of a UT institution or the UT System as a whole.”*

The courtesy and cooperation extended by the personnel in Information Technology and the Division of Pathology / Laboratory Medicine are sincerely appreciated.



Sherri Magnus, CPA, CIA, CFE, CRMA
Vice President & Chief Audit Officer
March 16, 2017

Observation 1:**Insufficient Billing Testing****RANKING: Priority**

The testing phase was not well planned and executed. Management dedicated resources for testing lab functionality for orders and lab processing to minimize patient impact. However, insufficient time was devoted to testing charge and billing processes due to delays in functional testing. In addition, test cases were not fully representative of complex production scenarios due to inadequate planning and coordination with stakeholders.

Insufficient testing resulted in undetected and unresolved defects at go live. According to management, it is estimated that the institution lost an average of \$2 – 2.5 million in charges that cannot be recovered due to Cerner build and integration defects. Additionally, approximately 30,000 charges were inaccurate or overcharged which were subsequently corrected according to management.

Recommendation

In future implementations, management should allocate sufficient time for testing as part of project planning and enforce strong change management processes for defect management. In addition, affected stakeholders, including the user group and those further downstream, should help develop the test plans to ensure scenarios are comprehensive and representative of real-world scenarios.

Management's Action Plan:

Responsible Executive: Dan Fontaine

Owner: Wes Vanderhoofven

Due Date: 8/31/2017

The IS Division has initiated a Project Excellence effort to establish standards for project management at MD Anderson. These standards will include comprehensive testing plans for unit testing, mapped record testing and integrated testing.

Observation 2:**Insufficient Post Go-Live Support****RANKING: Priority**

Adequate resources were not committed to support the Cerner Millennium implementation post go-live, because resources were shifted to support the Epic project. After go-live, management accepted the risk of some unremediated issues and reduced post-go live support in order to fully support Epic with a goal of resolving Cerner issues as part of the Epic implementation in March 2016. Management struggled to correct issues timely due to insufficient post go live support.

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Recommendation

In future implementations, management should allocate sufficient time and resources for post go-live support. Post go-live support should be documented in the project plan, including time and resources needed.

Management's Action Plan:

Responsible Executive: Dan Fontaine

Owner: Wes Vanderhoofven

Due Date: 8/31/2017

MD Anderson signed an agreement with Cerner AMS to assist with support after go-live. For future projects, we will identify support resource needs during analysis and planning, and refine the resource needs during execution. The IS Division has initiated a Project Excellence effort to establish standards for project management at MD Anderson. These standards will include requirements for defining adequate post go-live support plans.

Observation 3:

Go-Live Sign-off Not Documented

RANKING: High

The Project Team could not provide documentation of the go-live decision details to demonstrate that it considered the results of testing, outstanding defects, and mitigation strategies in making the decision to move to production. As a result, it is not clear that management fully understood the outstanding risks and the impact defects could have on the operational functionality and the revenue cycle.

Insufficient consideration and documentation of the go-live decision, including critical elements such as the readiness of fully tested functionality and resolution of critical errors prior to implementation could lead to an uninformed decision to go-live. This in turn could lead to implementing a system with large scale or partial operational issues.

Recommendation

In future implementations, the go-live decision should be clearly documented. The decision should consider and supporting documentation should include key elements such as results of testing, known defects, and mitigation strategies. Management should define mitigation strategies and post go-live support plans to address known risks and defects.

Management's Action Plan:

Responsible Executive: Dan Fontaine

Owner: Wes Vanderhoofven

Due Date: 8/31/2017

The IS Division has initiated a Project Excellence effort to establish standards for project management at MD Anderson. These standards will include documentation of go-live decision details such as risk and defect review and mitigation strategies.

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Observation 4:**Project Risk Register Not Maintained****RANKING: High**

The Project Team did not provide a risk register detailing risks that arose during the project and how they were remediated. Some project risks were noted at a high-level or documented on certain status updates for the project stakeholders. However, no evidence was available to demonstrate that management considered and ranked risks throughout the life of the project from the point of identification through proper containment and mitigation.

Lack of robust consideration, documentation, and monitoring of project risks could lead to a false sense of progress or certain project risks not receiving the necessary and continuous attention from the project team or executive management. This could in turn impact budgets, resources, timeline, and proper system development. Examples of risks related to the Cerner upgrade included: resource challenges, billing integration and charge complexity, Epic integration dependencies, and FDA certification timeline. There wasn't sufficient evidence available to demonstrate that these risks and others were fully understood, assessed, tracked, mitigated, and communicated to executive leadership.

Recommendation

In future implementations, project risks should be documented and monitored throughout the life of the project. This should include considering all relevant risks, ranking the risks, presenting the risks to the project sponsors, and tracking the risk status until the risk is mitigated.

Management's Action Plan:

Responsible Executive: Dan Fontaine

Owner: Wes Vanderhoofven

Due Date: 8/3/2017

The IS Division has initiated a Project Excellence effort to establish standards for project management at MD Anderson. These standards will include documentation, monitoring and review of risks.

Observation 5:**Comprehensive Defect List Not Maintained****RANKING: Medium**

The Project Team did not demonstrate to Internal Audit that defects throughout all phases of the project, especially during the different phases of testing, were documented and tracked through resolution. While a defect list did exist, it did not consistently demonstrate the details of issues noted from the point of identification through resolution. In addition, management could not present the status of all defects at the time of go-live, including mitigation strategies for unresolved defects.

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Lack of a continuously updated and comprehensive defect list throughout the project increases the likelihood of issues arising, without receiving the necessary attention needed for resolution prior to implementation. Issues identified during billing and charge testing were not documented on the defect list which resulted in unresolved billing defects in the post go-live environment, including dropped charges and duplicate and triplicate billings affecting the revenue cycle.

Recommendation

In future implementations, a comprehensive defect list should be maintained throughout the life of the project. The defect list should include details such as date of the issue, issue details, root cause analysis, and status of the remediation efforts. The defect list should be updated, and a summary should be presented as part of the go-live decision.

Management's Action Plan:

Responsible Executive: Dan Fontaine

Owner: Wes Vanderhoofven

Due Date: 8/31/2017

The IS Division has initiated a Project Excellence effort to establish standards for project management at MD Anderson. These standards will include documentation, monitoring and review of known defects.

Observation 6:

Insufficient Data Migration Validation

RANKING: Medium

It was not evident that the Project Team performed adequate data migration validation for accuracy and completeness of relevant data elements. Management claimed that procedures were performed to ensure that all data migrated to Cerner Millennium completely and accurately; however, documentation was only provided for the validation of the accuracy of data migration from MAK Blood Bank to Cerner. External service providers were brought in to validate the completeness of the data upload from MAK to Cerner Millennium; however, evidence of the validation was not retained.

Lack of sufficient data migration procedures could lead to data issues, such as missing or inaccurate records in the new system.

Recommendation

In future implementations, adequate data validation procedures should be planned, executed, and documented to ensure that data is migrated completely and accurately. Management should retain evidence of data migration testing.

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Management's Action Plan:

Responsible Executive: Dan Fontaine

Owner: Wes Vanderhoofven

Due Date: 8/31/2017

We will ensure that standards are adopted that will include maintenance of documentation validating accuracy of data migration for future projects.

Observation 7:**Insufficient Project Governance and Documentation****RANKING: Low**

The Project Team did not maintain detailed project documentation for key phases of the project. Most project documentation could not be provided after August 2015. Certain key project documents were not available or did not exist, including the following:

- A project risk register was not centrally maintained and tracked.
- A central defect list was not maintained.
- Meeting minutes and presentations to executive management demonstrating communication of the status of the project.
- Formal and detailed go-live signoff from all key stakeholders.

Without documentation of key events in the project, it was not evident that sufficient project governance was in place. Internal Audit was unable to conclude whether communication of time constraints, the complexity of testing, resource constraints, or the significance of unresolved defects were effectively and consistently communicated to key stakeholders. Overall, this may have affected transparency when reporting results to executive management for consideration at the time of making key decisions such as the go-live decision.

Recommendation

In future implementations, management should abide by a robust project governance framework, adhering to institutional policies and documentation requirements. All project planning, consideration of risks and issues, significant decisions, and stakeholder communications should be documented and retained.

Management's Action Plan:

Responsible Executive: Dan Fontaine

Owner: Wes Vanderhoofven

Due Date: 8/31/2017

The IS Division has initiated a Project Excellence effort to establish standards for project management at MD Anderson. These standards will address the noted defects.

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Appendix A

Objective, Scope and Methodology:

Effective SDLC controls are paramount to the success of significant system upgrades and implementations and include proper project planning and execution from the inception of the project through post go-live support. This assessment relates to the system project implementation process and governance framework and is not a comprehensive application review of Cerner Millennium or an assessment of lab operations. This assessment focused on the implementation of Phase 1 – Cerner Millennium Legacy integration with legacy systems (IDX/Care); rather than Phase 2 – Cerner Millennium Epic integration.

Our scope included gaining an understanding and performing testing of following areas:

- Project Planning
- Privileged Access
- User Role Assignment and segregation of duties
- Data Migration
- Testing results and defects
- Interfaces & dependencies
- Incident/Defect management
- Cut-over Plan
- Go-live sign offs
- Post go-live support
- User readiness & training

Our procedures included the following:

- Interviewed key personnel to gain an understanding of the SDLC process, team perspectives, and overall results of implementation:
 - CAS Group (Clinical Applications & Support)
 - PBS Group (Professional Billing Services)
 - Project Team (Including Pathology Lab Medicine – PLM)
 - Project Steering Committee
 - EHR Steering Committee
- Inspected supporting evidence to assess the effectiveness of the SDLC process.

Our internal audit was conducted in accordance with *the International Standards for the Professional Practice of Internal Auditing and Government Auditing Standards*.

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Appendix B

Project Readiness Dimensions and Definitions

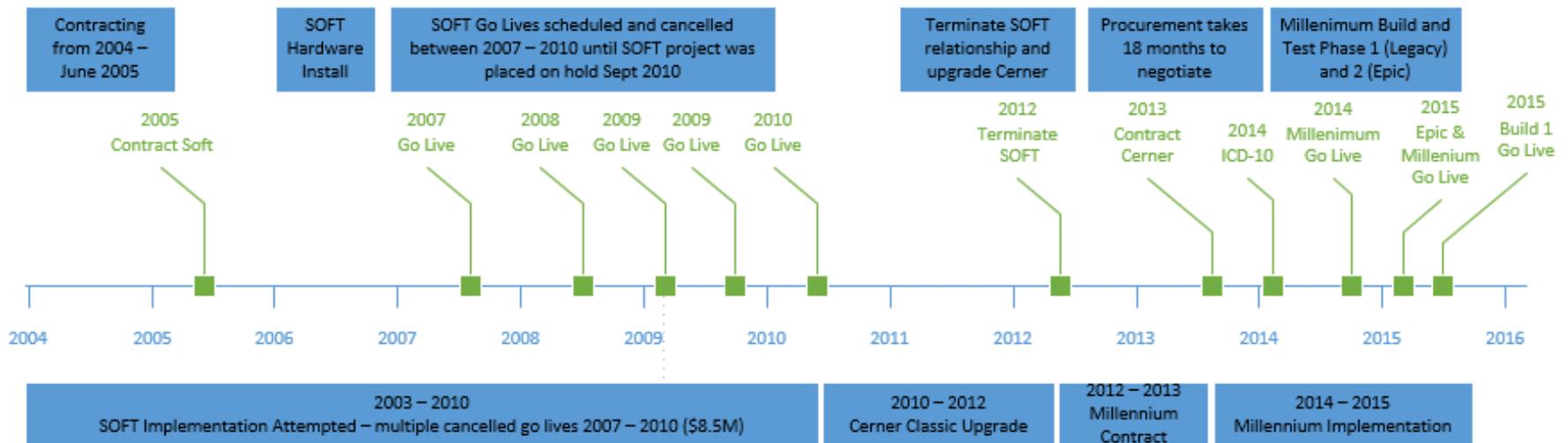
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Appendix C

Lab Systems Background

MD Anderson implemented Cerner Millennium due to the expiring system support from the Cerner vendor on the legacy Classic system. Pathology Lab Medicine initiated a system replacement project in 2003 and attempted to implement SOFT between 2005 and 2010; however, the anticipated SOFT application did not meet Institutional needs and the relationship with SOFT was terminated in 2012. Cerner Classic was upgraded in 2011 after the decision to postpone SOFT; however, in 2016 Cerner Classic would no longer be supported and could not interface into Epic. Cerner Millennium needed to be in place for the Epic go live March 4, 2016. Several factors such as the failed SOFT implementation, significant contracting time with Cerner, and transitions in the Clinical Application Support organization, led to a complex project timeline compressed between other significant projects at the institution such as ICD-10 and the Epic implementation.



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