February 15, 2007

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UCD Health System

SUBJECT: Electronic Medical Records
Internal Audit Services Project #04-44

Attached is the final report from our review of the UC Davis Health System (UCDHS) Electronic Medical Records (EMR) Program. The purpose of the review was to assess project management oversight of the EMR Program to determine if a plan existed that outlined goals, objectives, milestones, resources and timelines for monitoring program development and costs. We also determined if EMR expenses, including the cost of external consultants and discretionary spending, in Fiscal Years 2005 and 2006 were appropriate and necessary for the development of the program and were in accordance with University policy.

The report contains four observations concerning the need to:

- Improve EMR Program oversight
- Develop a formal process for evaluating the use of internal staff with specialized technical capabilities prior to engaging outside consultants
- Strengthen procedures for ensuring expenditures for EMR program are documented, reviewed and approved in accordance with University policy
- Establish a proactive and standardized budgeting process that will allow for effective monitoring of Clinical Information System and EMR project activities.

The report contains the corrective action plans that have been implemented to address the above matters. In accordance with UC wide audit policy, our office will be following up in the next 60 days to confirm that the corrective actions have been taken and are properly addressing the issues presented in the report. In closing, I want to thank you and your staff, especially John Cook, Alyssa Manprin and JoAnne Hancock, for the outstanding cooperation and assistance our office received in getting this project completed.

If you have any questions, please contact me.

Sincerely,
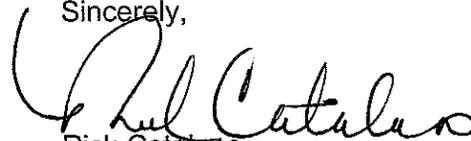
Rick Catalano
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UNIVERSITY OF CALIFORNIA, DAVIS
INTERNAL AUDIT SERVICES

University of California Davis Medical Center
Electronic Medical Records
Project #04-44

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Fieldwork Performed by:

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<u>**MANAGEMENT SUMMARY**</u>

Internal Audit Services (IAS) has completed an audit assessment of the UC Davis Health System (UCDHS) Electronic Medical Records (EMR) Program. The purpose of this examination was to review project management oversight of the EMR program to determine the following:

- An EMR program plan exists that outlines goals, objectives, milestones, resources and timelines to monitor and maintain control over the program and includes a method of monitoring the time and costs incurred throughout the life of the program.
- EMR expenses, including the cost of external consultants and discretionary spending, in FY05 and FY06 were appropriate and necessary for development of the program and were in accordance with University policy.

To conduct our examination, we reviewed the general process of defining, authorizing and executing the program plan, reviewed budget and actual program timelines and expenditures, reviewed University and UCDHS policies and procedures established to monitor and control project development and related disbursements, reviewed EMR project status reports of planning/steering committee meetings, and interviewed EMR project executives and sponsors. We also reviewed EMR expenditures, including expenditures for external consultants, for FY03 through FY06, and selected a sample of EMR expenditures from FY05 and FY06 for further analysis. Our review did not include a detailed evaluation of any EMR projects or any products provided by the external consultants. Fieldwork was completed between July and October 2006.

Clinical Information Systems (CIS) was formed in July 2001 to oversee the development and implementation of clinical information applications and to administer development of an EMR system. CIS initiated planning for the implementation of the current EMR program in July 2002. The original implementation plan reflected a completion date of December 31, 2006, and a total cost of approximately $76 million. According to CIS records, four EMR projects were implemented and four EMR projects were in process for a total cost of approximately $48 million through June 30, 2006. As of that date, CIS expenditures for the overall development and implementation of an EMR system, including overhead, depreciation, ongoing system maintenance, infrastructure assessment, selection of software, and other ancillary projects total approximately $85 million.

UCDHS should implement a more rigorous oversight process with greater involvement from a broader leadership group that would improve the project planning and implementation process, assist in reducing project costs, and provide greater assurance regarding the successful implementation of the overall EMR program plan. Our review disclosed that CIS complied with University policies and procedures in hiring consultants. However, UCDHS should implement a formal process for demonstrating that the services provided to CIS by external consultants can not be performed economically or satisfactorily by existing Information and Communication Services technical staff during the course of their normal University responsibilities or duties.

UCDHS should also implement a budget methodology that allows for effective monitoring of CIS and EMR project activities. Finally, CIS financial procedures should be strengthened to ensure costs charged to the department were accurate and in compliance with University financial management policies. Our observations and recommendations are presented within the body of this report along with corresponding management actions.

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I. BACKGROUND

Clinical Information Systems (CIS) at the UC Davis Health System (UCDHS) was formed in July 2001 to oversee the development and implementation of clinical information applications and to administer the joint development of an Electronic Medical Record System (EMR) with the Oracle Corporation (Oracle). The joint development project with Oracle was abandoned in October 2001. In November 2001, the Information Systems Oversight (ISO) Committee adopted a CIS proposed process for reviewing and prioritizing clinical information proposals and established the CIS Project Lifecycle Committee for this purpose. Following the termination of the Oracle collaboration, UCDHS initiated a process to select a commercial EMR product. The selection process resulted in a contract with the Epic Systems Corporation (Epic) in June 2002 for the current EMR.

UCDHS initiated planning for implementation of the current EMR program in July 2002. The original implementation plan reflected a completion date of December 31, 2006, and a total cost of approximately $76 million. According to CIS records, four EMR projects were implemented and four EMR projects were in process for a total cost of approximately $48 million through June 30, 2006, with additional expenditures totaling approximately $9 million for eight ancillary projects. As of that date, CIS expenditures for the overall development and implementation of an EMR system, including overhead, depreciation, ongoing system maintenance, infrastructure assessment, selection of Epic, and other ancillary projects total approximately $85 million.

The ISO Committee, which is charged with overseeing the major planning and policy decisions regarding information services operations at UCDHS acted as the steering committee for the EMR program from July 2002 through December 2002. In January 2003, the EMR Preparedness Group (EMRPG) was formed to perform the function of an EMR program steering committee.

II. PURPOSE AND SCOPE

The purpose of this examination was to review project management oversight of the EMR program to determine the following:

- An EMR program plan exists that outlines goals, objectives, milestones, resources and timelines to monitor and maintain control over the program and includes a method of monitoring the time and costs incurred throughout the life of the program.
- EMR expenses, including the cost of external consultants and discretionary spending, in FY05 and FY06 were appropriate and necessary for development of the program and were in accordance with University policy.

To conduct our examination, we reviewed the general process of defining, authorizing and executing the program plan, reviewed budget and actual program timelines and expenditures, reviewed University and UCDHS policies and procedures established to monitor and control project development and related

disbursements, reviewed EMR project status reports of planning/steering committee meetings, and interviewed EMR project executives and sponsors. We also reviewed EMR expenditures, including expenditures for external consultants, for FY03 through FY06, and selected a sample of EMR expenditures from FY05 and FY06 for further analysis. Our review did not include a detailed evaluation of any EMR projects or any products provided by the external consultants. Fieldwork was completed between July and October 2006.

III. **CONCLUSION**

CIS successfully implemented four EMR projects and four EMR projects were in process as of June 30, 2006.   However, the EMR development and implementation does warrant a more rigorous oversight process with greater involvement from a broader leadership group that would improve the project planning and implementation process, assist in reducing project costs, and provide greater assurance regarding successful implementation of the overall EMR program plan.

CIS decisions to employ outside consultants were properly approved, acquired in accordance with University policy and procedures, and justified relative to the special expertise provided. However, UCDHS does need to implement a formal process for demonstrating that the services provided to CIS by external consultants can not be performed economically or satisfactorily by existing Information and Communication Services technical staff during the course of their normal University responsibilities or duties.

Finally, appropriate documentation was not always maintained in support of CIS expenditures, and controls necessary to ensure compliance with University policy were not fully applied. Moreover, current budgetary practices do not afford sufficient oversight to ensure that EMR project expenditures are prudent and necessary for the successful implementation of each project.

Observations and recommendations are presented below with corresponding management actions.

IV. **OBSERVATIONS, RECOMMENDATIONS AND MANAGEMENT CORRECTIVE ACTIONS**

A. **PROJECT MANAGEMENT & OVERSIGHT**

   The current project management and program oversight structure does not ensure efficient implementation of the EMR system.

   The review identified the following issues involving project management and program oversight that may have had an adverse impact on the efficient implementation of the EMR System.

1. The EMRPG does not include broad representation from the UCD Medical Center (UCDMC) and School of Medicine (SOM) departments and programs. EMRPG currently consists of selected members of the UCDHS executive team with limited participation on the part of management from certain major divisions involved in the various EMR projects. In contrast, the ISO Committee and CIS Lifecycle Project Committee have representatives from a broad spectrum of UCDMC and SOM programs and functions. Recognizing the significant impact the EMR system has and will have on patient care, limiting representation on the EMRPG does not afford sufficient guidance and participation for effective development of the system. CIS reported encountering various impediments (e.g., process complexities and variations and incompatible legacy systems) throughout the EMR program implementation. A more rigorous oversight process with greater involvement from a broader leadership group may have facilitated overcoming these obstacles through the early identification and resolution of system and process issues, would improve the project planning and implementation process, assist in reducing project costs, and provide greater assurance regarding the successful implementation of the overall EMR program plan.

2. No formal records were maintained to demonstrate that the EMRPG was meeting its role in monitoring and overseeing the program. Although meeting agendas and handouts were provided for review, no formal documentation was available to provide confirmation of management concurrence on critical decisions or changes in project direction. For example, project delays occurred as a result of budgetary constraints, insufficient resources, competition for available resources, and incomplete documentation regarding processes and procedures, information systems and information systems infrastructure. These issues were apparently brought to the attention of the EMRPG; however, no formal minutes were maintained reflecting deliberations of the EMRPG or any decisions/directives regarding the EMR projects.

3. CIS developed a project management framework and methodology for the EMR program. However, a standard project management plan to facilitate the monitoring of critical milestones and costs for each project phase and to measure progress was never formally adopted to allow for effective monitoring of EMR projects.

Recommendations

The UCDHS should adopt a program management oversight process for the EMRPG that provides for the following:

Program Oversight

- A formal charge to the EMRPG to oversee and monitor development of the EMR program that includes monitoring project status on a regular basis, approving continuation at each project phase and/or modifications to project plans, and reporting on program results to the ISO Committee and executive management.

- An augmentation of the existing EMRPG steering committee with management representatives from critical UCDMC and SOM programs and departments involved in the various EMR projects.

Project Oversight

The adoption of a standard project management framework, which defines the roles and responsibilities of the project management team, the scope and boundaries of managing projects and the project management methodology to be adopted and applied to each project undertaken, that includes the following:

- A project management charter that identifies project executive leadership and project team members.

- A clear written statement defining the nature and scope of the project before work on the project begins, and a formal project risk management program for eliminating or minimizing risks associated with individual projects.

- A formal project plan for each approved project to facilitate the monitoring of milestones and costs incurred for each project phase throughout the life of the project and permit management to measure progress.

- An appropriate level of user participation during project planning, design, and validation phases, and approval on the part of designated managers of the user and IT functions of the work accomplished in each phase of the cycle before work on the next phase begins.

- The basis for assigning staff to the project and defining the responsibilities and authorities of the project team members.

- Test and training plans for every project, and post-implementation reviews to ascertain whether the project has delivered the planned benefits and identify opportunities for improvements in future projects.

Management Corrective Action

The EMRPG steering committee will be formally charged with overseeing and monitoring development of the EMR program. The EMR program management group currently meets with the EMRPG on a monthly basis. The steering committee will be provided status for each EMR program project including key activities and accomplishments, upcoming events, projects risks and mitigation plans, percentage completion of project milestones and a financial review of expenses. Meeting minutes will be recorded during each meeting. Minutes will be approved at each subsequent meeting, published and recorded in the EMR Program Management Governance binder, effective February 1, 2007.

The EMRPG steering committee membership has been expanded and currently includes the Chief Executive Officer, Chief Information Officer, Chief Financial Officer, and representatives from Patient Care Services, School of Medicine, Ambulatory and Clinical Operations, Ancillary Services (e.g., Laboratory, Radiology, Pharmacy, etc.), Clinical Care (e.g., Emergency Department, Perioperative Services, etc.) and the Chair of the Council of School of Medicine Department Chairs.

Effective February 1, 2007, each CIS Project Manager will maintain an individual core project binder. The project binder will include the following:

- Project charter – Objective, responsibilities, scope, assumptions, dependencies and constraints, risks and mitigation, success factors, major milestones, leadership, members and approvals.

- Project Plan – Detailed MS Project work plan providing task breakdowns and timelines.

- IS Requests – Formal request for internal resources from Information and Communication Services.

- Meeting Minutes – Approved meeting minutes for every project meeting.

- Application Design Document - Description of how the application will meet business requirements with staff assignments.

- Design Documents – Tools and templates with visual representation of user approved current and future workflows and application configuration.

- User Acceptance – Documented content and workflow validation sessions.

- Test Plans – Detailed test plan including testing scenarios, activities and dates.

- Training Plans – Detailed training task breakdown including curriculum development, documentation, registration and training execution.

- Readiness Review Plan – Project assessment review documents for go-live readiness.

- Communication Plan – Detailed plan including all communication activities that occur prior to and during project deployment.

- Business Continuity Plan – Detailed plan defining methods of operation during any downtime to the application or dependent applications being implemented.

- After Action Analysis – Post deployment evaluation of project.

B. EFFECTIVE USE OF EXISTING TECHNICAL RESOURCES

A formal process does not exist for evaluating the use of internal technical resources within Information and Communication Services (ICS) before engaging outside consultants to perform needed EMR work.

CIS engaged a number of external consultants to assist in the development and implementation of EMR projects. University records showed that, for FY03 through FY06, the EMR project had incurred approximately $17 million in expenses for external consultant services. Records reviewed demonstrated CIS compliance with appropriate University policies and procedures in hiring the consultants. CIS and ICS reportedly collaborated informally regarding the availability of suitable internal technical resources before engaging the external consultants. However, there was no formal documentation demonstrating a determination that the services provided to CIS by the external consultants could not be performed economically or satisfactorily by existing ICS technical staff during the course of their normal University responsibilities or duties.

Recommendation

UCDHS should implement a policy that requires the formal evaluation of available internal technical resources in connection with the planning phase of each project prior to engaging outside consultants.

Management Corrective Action

The EMR program has established a written procedure requiring all CIS Project Managers to submit an ICS service request for services. The service request describes the requirements, timelines and knowledge required for the requested service.

C. FINANCIAL MANAGEMENT

CIS did not have appropriate procedures in place to ensure costs charged to the department were accurate and in compliance with University financial management policies.

The review of expenditures incurred for EMR projects and CIS administration found that expenses were incurred for legitimate University business purposes. However, the review did disclose certain CIS financial practices that were not in compliance with University policies and/or did not ensure appropriate financial oversight.

1. CIS was not performing an effective review of expenditures charged to the department in compliance with UCDHS Policy #1816, *Department Financial Management Controls and Separation of Duties*. The policy requires a monthly review of Davis Financial Information System (DaFIS) reports to determine the validity of charges and credits recorded to department accounts. We noted that CIS had not identified a $5,855 payment to a community college district that was erroneously posted to a CIS account.

2. CIS was not always maintaining the appropriate documentation to support certain expenditures. For example, CIS incurred $3,002 in catering expenses for an employee recognition event at the UCDMC; however, CIS did not maintain documentation identifying the participants in accordance with University policy. Moreover, CIS selected outside vendors for catering services when such services may have been available from the UCDMC Food and Nutrition Services Department for onsite events. Finally, documentation was also not available to demonstrate the business purpose for certain expenditures made at the UCD Bookstore.

Recommendation

CIS should implement procedures to ensure that all expenditures for the EMR program are properly documented, reviewed and approved in accordance with University policy.

Management Corrective Action

CIS has established a written procedure requiring all project managers to review expenditures incurred under their cost center on a monthly basis including payroll listing, transaction listing and telecom charges. Upon completion of the review, the project manager signs, dates and returns the original copy to the CIS financial controller, who is ultimately responsible for reviewing and reconciling the general ledger accounts in accordance with UCDHS Policy and Procedure Section #1816.

D. DEPARTMENT AND PROJECT BUDGETING

UCDHS is not following a budget methodology that allows for effective monitoring of CIS and EMR project activities.

Currently, UCDHS Financial Services allocates a lump sum budget amount for CIS operating expenses and for the costs to be incurred and subsequently capitalized for the EMR program. The broad expectation is that CIS not incur operating or system development costs that exceed the total annual budgeted amount. CIS exceeded its official operational budget by a total of approximately $7 million over four of the last five fiscal years. This was deemed acceptable by UCDHS executive management because total CIS expenditures did not exceed the combined totals budgeted for operations and capitalized expenditures.

The EMR development consists of implementation of distinct major projects that typically cross fiscal years and impact the operation of various hospital departments. For example, in FY06, CIS finished the implementation of the Admission Assessment and Flowsheet Project in the UCDMC Main Hospital. Currently, CIS is not required to budget department and system development costs by major project. This practice does not afford sufficient budgetary oversight and allow executive management to monitor project and EMR system costs.

Recommendation

The UCDHS should establish a proactive and standardized budgeting process for CIS that aligns the estimated operating and capital expenditures for each approved project to the annual operating plan, and an adequate system for routinely recording, processing and reporting on the costs for each project phase, using expenditure categories that are comprehensive, appropriate and properly classified.

Management Corrective Action

CIS has divided each EMR project into four capital phases (Analysis, Build/Unit Test, Functional/Integrated Test, and Training Development) and two operational phases (Training Execution and Deployment), and has established budgets for each phase. This process will be used to forecast subsequent CIS budgetary requirements. Effective February 1, 2007, all monthly project expenses, including staff salaries, will be allocated to each project phase based on the project's activity and progress. CIS will also provide this information to the UCDHS Financial Services Administration on a monthly basis.

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