Use of Affordable Open Source Systems by Rural and Small-Practice Health Professionals

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Summary: National efforts focus on improving medical quality and reducing costs by implementing standardized electronic health records (EHRs), which can support the secure exchange of health information between different systems. However, rural health care providers and providers with small practices may not have the financial resources or expertise to purchase and maintain expensive hardware and software applications to participate in this effort.

Dr. Williams and her research team seek to meet the EHR application needs of rural and small-practice ambulatory health care providers throughout the United States using open-source EHR applications that are reliable, secure, confidential, standards and regulations-based, and able to be integrated with other health care systems. Hardware and software installation, usage, and maintenance costs will be optimized to maintain affordability.

The research team has conducted telephone interviews to assess the needs of rural and small practice doctors and is also making detailed assessments of promising open-source EHR applications. These assessments evaluate the functionality, trustworthiness, interoperability, performance, compliance, and affordability of open-source EHRs. In addition, the research team is developing an automated testing process that software engineers can use to evaluate existing open-source EHR applications and remove faults and vulnerabilities.

Ultimately, the team hopes to implement servers using open-source EHR applications that enable rural and small medical practices to obtain the benefits of EHR technology. However, even if promising open-source EHR applications are not identified, the platform being developed will function as a testbed system so that practitioners and their support staff or other researchers can continue to research a variety of health care applications.

Specific Aims:

- Conduct an assessment of the needs of rural and small-practice doctors with regard to the capabilities, strengths, and limitations of existing open-source EHR applications. **(Achieved)**
- Identify and evaluate promising open-source EHR applications. **(Ongoing)**
- Develop and disseminate a process for evaluating the functionality, trustworthiness, interoperability, performance, compliance, and affordability of existing open-source EHR applications. **(Ongoing)**

- Advance software engineers' understanding of best practices for developing new or enhancing existing EHR applications. **(Ongoing)**
- Implement servers using open-source EHR applications that enable rural and small medical practices to obtain the benefits of EHR technology as they run their offices and securely store, utilize, and share patient data. **(Ongoing)**

2011 Activities: The research team continues to work on developing a standardized approach for an automated testing process to examine whether an application is compliant with requirements of the Security Rule under the Health Insurance Portability and Accountability Act (HIPAA). These procedures will use open-source technologies so that software engineers can adopt these procedures to test their own EHRs. However, in fall 2011, the research team realized that there is no comprehensive set of test cases to make sure an application is HIPAA compliant, which would have allowed them to build their testing process. Instead they will develop a process to do a partial test for basic HIPAA compliance, which could eventually be expanded. This process will provide an outline for a more comprehensive set of test cases for HIPAA. The research team also continued to conduct security testing of open-source systems. However, a secure open-source system has not yet been found.

The research team continues to work on the physician needs assessment. Data collection for the physician needs assessment was completed in 2010 and included physicians and support staff from four practices. Research results were presented in a poster in December 2011 and Dr. Williams continues work on a manuscript.

The project team made some changes to the virtualized platform developed in 2010, through which practitioners and their support staff or other researchers can access and conduct research on five different health care applications. Changes were made to remove any possible interaction between the EHR images of the different applications.

The team also performed some research indicating that the logging provided by open-source electronic health records is inadequate. They published a paper detailing this research, to be presented in early 2012.

As last self-reported in the AHRQ Research Reporting System, project progress and activities are mostly on track. The project budget funds are somewhat underspent, and will be used to support additional time for student researchers. Due to the mid-semester start and end dates of the grant, a 1-year no-cost extension will be used. Students were hired to work on the automated testing process and to develop a portal for software engineers and health care IT staff that will include papers, links, information on meaningful use and missed criteria, plus a discussion forum.

Preliminary Impact and Findings: The research team presented a paper at the 2012 International Health Informatics Symposium demonstrating that the logging provided by three open-source electronic health records is inadequate, and as such that EHR systems remain vulnerable to undetected misuse. In this paper, the research team recommends that EHR system developers focus on specific auditable events for managing protected health information, instead of general events derived from guidelines.

Target Population: General

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve health care decisionmaking through the use of integrated data and knowledge management.

Business Goal: Knowledge Creation