“Cloud-Based” Decision Support: Enabling Decision Support for a Commercial Electronic Medical Record System Using Web Services

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Abstract
Clinical decision support is an important component of the health information technology strategy and it is required for demonstrating meaningful use of electronic health records. In this project we used Web service technology to create a shareable, scalable decision support resource that provided decision support recommendations for a commercial electronic health record product. This Web service decision support resource has been deployed to 30 practices and is being expanded to add additional rules and functionality.

Introduction
Clinical decision support (CDS) has been identified as a critical component of the health information technology infrastructure for improving care quality and safety.1 Unfortunately, however, CDS is not widely used in part because most CDS systems are not portable or sharable across applications and institutions.2 In this study we describe the implementation and use of CDS in a commercial electronic health record (EHR) system through the Internet Cloud using Web services. The Web service approach allows the CDS resource to exist external to the EHR application where it can also be shared with other EHR systems.

Methods
Decision Support Service. We created the CDS resource as Web service by wrapping the open-source Drools decision engine in a .NET wrapper to enable the use of the simple object access protocol (SOAP) for exchanging data. Rules derived from HEDIS-based best practices for diabetes mellitus, asthma, congestive heart failure (CHF), and preventive services were written in the Drools scripting language using simple data types (integers, strings, etc.) so that clients not written in .Net could also access the services. The underlying data model was based on the Continuity of Care Document (CCD). To accommodate diverse terminologies, rules contained a clinical concept place holder that could be translated into the vocabulary used by the client as delineated in the client profile and accessed by a unique client identifier. Web service interactions were stateless and required no patient identifying information.

Electronic Health Record System. Patagonia Health EMR (Patagonia Health, Inc., Cary, NC) is a software as a Service (SaaS). Web-based, meaningful-use certified EHR. It is specifically designed to meet the needs of small (< 5 clinician) medical practices and is marketed on a subscription basis. Patagonia Health EMR provides a configurable screen layout using widgets including a display for CDS.

Web Service Transaction for Decision Support

Results
We initially created the Web service prototype for Patagonia Health EMR using four rules for diabetes care that were made available for 30 practices. The Web service interface has sub-second performance. Patagonia Health EMR v 3.0 achieved 2011 meaningful use certification as a complete ambulatory EHR by Drummond Group in December, 2010. Because of the success of the initial decision support rules, we are subsequently adding additional rules for asthma, CHF and preventive services.

Discussion
Through this study, we have successfully enabled CDS for a commercial EHR using Web services technology. The Web services approach is external to the client application and is potentially portable, sharable and scalable across multiple applications. The Web service approach enabled the commercial EHR product to achieve meaningful use certification. The decision support design is configurable so that the client can select the desired rules to target specific care issues. The Web service interaction requires no sharing of protected health information.

Conclusion
In this study we have demonstrated that service technology can enable decision support functionality through the Internet Cloud that is independent of the client application.

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References