Agile Informatics: Application of Agile Project Management to the Development of a Personal Health Application

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Abstract
We describe the application of the Agile method--a short iteration cycle, user responsive, measurable software development approach--to the project management of a modular personal health record, iHealthSpace, to be deployed for patients and providers of a large academic primary care practice.

Introduction
Project management remains a central concern when developing clinical informatics applications, particularly in projects in embryonic domains such as patient-facing “personal health” applications in which unforeseen requirements are certain to emerge. In such projects, the ‘waterfall’ software development life-cycle which relies on heavily front-loaded planning, analysis and design prior to implementation and testing leaves little room for reevaluation and revision. We elected to apply the more adaptive, “Agile” approach to management that we anticipate will be more responsive to evolving patient and provider needs while attending to release schedules.

Description of the Agile Method
Agile is a collection of project management techniques based on brief user stories, short two to four week iterative development cycles, and test-driven development (see Fig. A). The Agile approach uses velocity to provide a measure of the rate at which stories are completed over time. Target velocities based on available project developers are used to select the appropriate scope for the iteration and to gauge actual vs. expected progress.

The Agile approach is used successfully in the software industry and supports a model of management that openly exposes the project to change. Short development cycles and iterative story assessments provide a way to manage expectations and risks inherent to an evolving software project.

Agile in iHealthSpace
We identified a set of user stories to form the core set of iHealthSpace features and estimated each story as described above. With a team of 4 half-time developers, we estimated a target velocity of 34 story points over each 3-week iteration period. Over 12 weeks a team of 4 half-time developers was able to develop registration, log-in, enrollment, medication viewing, and scheduling functionalities. Figure B illustrates our actual vs. expected velocities; B(2) illustrates the potential for negative velocities and ‘resetting’ that occurs when new stories are added.

Figure B: Burndown charts for iterations 1 and 2.

Conclusion
The Agile method allowed developers to rapidly accelerate and monitor their progress while allowing requirements to be flexible and priorities to change. Our experience has demonstrated that Agile is especially applicable for medical informatics projects in which changing requirements are anticipated.

References
Cohn M, User Stories Applied, Addison-Wesley 2004