

Technical Assessment of the Community Chronic Care Network Chronic Disease Registry Project

Presentation to
CCCN Steering Committee

September 6, 2006

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Topics of Assessment

- Technical Architecture
 - Meets requirements of a county-wide registry?
 - Sustainable, expandable, scalable?
- Compatibility of CCCN registry with EMRs
- Suitability of approach to patient-matching
- Suitability of approach to data integration
- Need for additional expertise on project team
- Adequacy of policies and procedures

Sources of Information

- Interviews with 13 project participants
- Demonstration of registry application
- Review of project documents
 - Grant application and CCCN mission statements
 - Requirements and design documents
 - Progress reports
 - Policies and procedures
 - Various legal agreements

Technical Architecture

- Three-tier architecture
 - *Presentation, application, and data* layers
 - Consistent with industry standards
- Overnight batch processing
 - “off-line” pre-processing improves response time during working hours
- Minimum necessary data sent by data sources
 - Only claims, tests, and meds related to diabetes care
 - Reduces complexity of data integration

Technical Architecture (cont'd)

- Some aspects of the implementation will complicate maintenance and extensibility
 - Decision-support logic is duplicated across layers of the application
 - Parts of data model are implemented in low-level code
- Some design features will complicate scaling the application to a larger patient volume and user volume
 - Current model of overnight batch processing will require changes when > ~20,000 patients are managed by the system
 - Current manual review process for patient additions may necessitate extra resources as patient and user volumes grow

Technical Architecture (cont'd)

- Some design features will complicate expansion to other chronic illnesses
 - Addition of one data element requires numerous coordinated programming changes
 - Acquisition of lab, Rx, and claims data for other illnesses creates new projects for existing data sources

- Technical architecture take-homes
 - Current architecture is sufficient for the scope and scale of the AHRQ diabetes-care project
 - Long-term maintenance and expansion to other chronic illnesses would benefit greatly from increased modularity in the software architecture (otherwise, >> programming effort in long run)

Co-existence with EMRs

- Tight integration between registry and EMRs is needed
 - Clinical workflow pressures preclude duplicate data entry and interaction with multiple information systems
- Tight integration between registry and EMRs is difficult
 - Variety of internal data representations among EMRs
 - Variety of data-entry conventions among EMRs (including free text)
 - Significant ongoing maintenance required as the various systems evolve
- Implication: Sufficient time and resources must be available to build and maintain such interfaces

Co-existence with EMRs (cont'd)

- SCMF Epic EMR
 - SCMF will not be able to participate in integration activity until (at least) summer 2007
 - A significant number of community physicians will be using the SCMF Epic EMR (~20%)
 - Implication: Integration with SCMF is an important long-term goal, subsequent to AHRQ grant

- PAMF's "Solution" as means of interfacing with Epic
 - "Solution" = an integrated data warehouse, without web-based interface
 - Idea of combining Solution database with CCCN web-based interface
 - Integration of the systems will require significant work, given the amount of program logic in the database layer (stored procedures)
 - Requires further investigation

Co-existence with EMRs (cont'd)

- PMG Practice Partners EMR
 - Integration underway with one PP site
 - Early work is promising; work remains to implement bi-directional data exchange
 - Important lessons will be learned, but most of the software developed will be specific to PP or even the specific PP site

Patient Matching

- Relatively basic matching strategy used
 - No allowance for nicknames, spelling variations, transposition errors, or missing data in matching process
 - No representation of nicknames, maiden names, etc. in patient database
- Works well for batch integration of external data feeds
 - Data sources seem to do good job in matching to the diabetes patient roster provided by CCCN

Patient Matching (cont'd)

- Works less well for real-time patient lookups
 - Requirement for exact match and absence of aliases in patient database result in false negative matches
 - False negative matches result in data quality issues and/or duplicate patient records, especially for non-capitated patients
- May wish to explore whether exact match is required for HIPAA compliance
- May wish to explore more flexible matching algorithms (e.g., probabilistic)

Need for Additional Expertise

- **Software Product Manager**
 - Thorough software-requirements analysis (features for success)
 - Coherent requirements documentation (suitable for developers)
 - Effect communication between stakeholders and developers
 - High-level change management

- **Software Development Manager**
 - Detailed development plan and development schedule
 - Ongoing project management to the schedule
 - Close supervision of programming resources
 - Effect communication between programmers and product mgr.

Need for Additional Expertise (cont'd)

- Quality Assurance Engineer
 - More formal process
 - Test plans
 - Regression testing
- Technical Documentation Writer
 - Documentation of architecture, data model, access model, etc.
 - Reduces risks of reliance on a key individual
 - Enables a team to maintain and enhance the application
- Web Software Engineer(s)
 - Experience with all layers of the application architecture
 - Availability for frequent communications with project team

Policies and Procedures

- Generally excellent
- Some variances between P&Ps and Quest agreement
 - Need for patient notification and consent
 - Allowed uses beyond treatment of patient
- Some variances between P&Ps and actual implementation
 - Prevention of brute-force attack on passwords [since corrected]
 - Enforcement of password-selection rules [since corrected]
- May wish to consider a formal assessment of risk and vulnerability