Post-Implementation EMR Evaluation for the Beta Ambulatory Care Clinic

Proposed Plan – Jul 6/2012, Version 2.0

1. Purpose and Scope

This document describes our proposed plan to conduct a formative evaluation study of the Electronic Medical Record (EMR) system that has been recently implemented at the Ambulatory Care Clinic of Beta Healthcare Organization. The objectives of this study are to:

(1) Evaluate the impact of EMR adoption at Beta Health Clinic
(2) Identify the clinical values being delivered and barriers to adoption to date
(3) Identify strategies that should be considered to optimize EMR use
(4) Document lessons learned for future EMR implementation in Beta Healthcare Organization

2. Work Plan

(1) Finalize evaluation plan – confirm evaluation study details with stakeholders
(2) Conduct field evaluation – conduct evaluation through site visits including initial feedback for clinic staff
(3) Synthesize findings – analyze results, identify values, barriers and strategies, and summarize lessons
(4) Share findings – discuss findings with stakeholders and revise as needed
(5) Finalize evaluation report – write evaluation objectives, methods, findings and next steps

3. Timeline and Deliverable

This is a 3-month study with the final deliverable being the **post-implementation evaluation report**. A draft will be submitted to Beta management team by date1 with the final version by date6. The study timeline is shown below.

- Evaluation team kickoff meeting with stakeholders (clinic leads and project sponsors) – date1
- Clinic visits for data collection, up to 4 visits/clinic (clinicians, support and management staff) –date2 to date3
- Data analysis and follow-up, done in parallel during/after clinic visits (evaluation team) –date4 to date5
- Review findings with stakeholders, provide feedback to clinics and finalize report – by date6

4. Resources

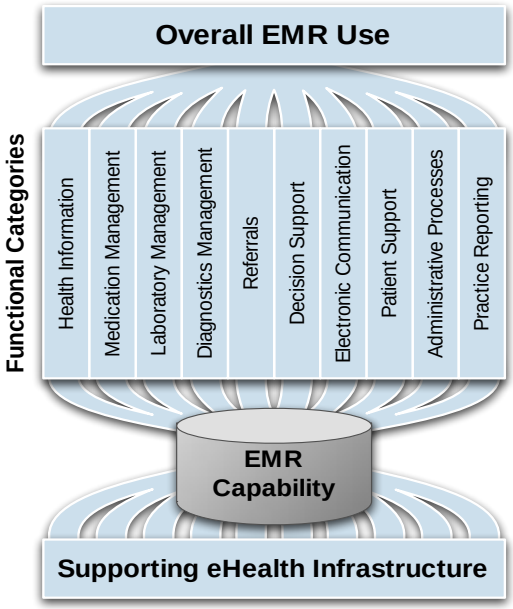
The evaluation team members are researcher1 as the lead, researcher2 as the clinician researcher, researcher3 and researcher4 as the informatics analysts, and researcher5 as the advisor. Their information is listed below:

- **Researcher1** – Team leader, specialist in health information systems (HIS) and EMR evaluation
- **Researcher2** – Practising family physician and researcher in EMR evaluation/improvement
- **Researcher3** – Informatics analyst specialized in EMR evaluation
- **Researcher4** – Backup/support informatics analyst specialized in EMR evaluation
- **Researcher5** – Advisor, specialist in HIS evaluation including EMR in primary health care setting

5. Evaluation Methodology

The methodology covers the evaluation model, methods and metrics to be applied to examine the adoption and impact of the EMR on Beta clinic staff. See Appendix A for mapping of evaluation methods and metrics in this study.

5.1 Evaluation Model – The EMR adoption framework by Price et al. [1] is the evaluation model used in this study. The framework is based on the Health Information Management Systems Society (HIMSS) Analytics 5-level of EMR adoption for ambulatory care and the essential EHR features identified by the Institute of Medicine (Exhibit 1).



Stage	Description
5	Full EMR that is interconnected with regional / community hospitals, other practices, labs, pharmacists for collaborative care. Proactive and automated outreach to patients (e.g. Chronic disease management). EMR supports clinical research.
4	Advanced clinical decision support in use, including practice level reporting. Structured messaging between providers occurring within the office / clinic.
3	Computer has replaced paper chart. Laboratory data imported in structured form. Some level of basic decision support, but the EMR primarily used as an electronic paper record.
2	Partial use of computers at point of care for recording patient information. May leverage scheduling / billing system to document reasons for visit and be able to pull up simple reports.
1	Electronic reference material, but still paper charting. If transcription used, notes may be saved in free text / word processing files.
0	Traditional paper-based practice. Charts on paper, results received on paper. May have localized computerized billing and / or scheduling, but this is not used for clinical purposes.

Exhibit 1 – EMR adoption framework by Price et al. [1]

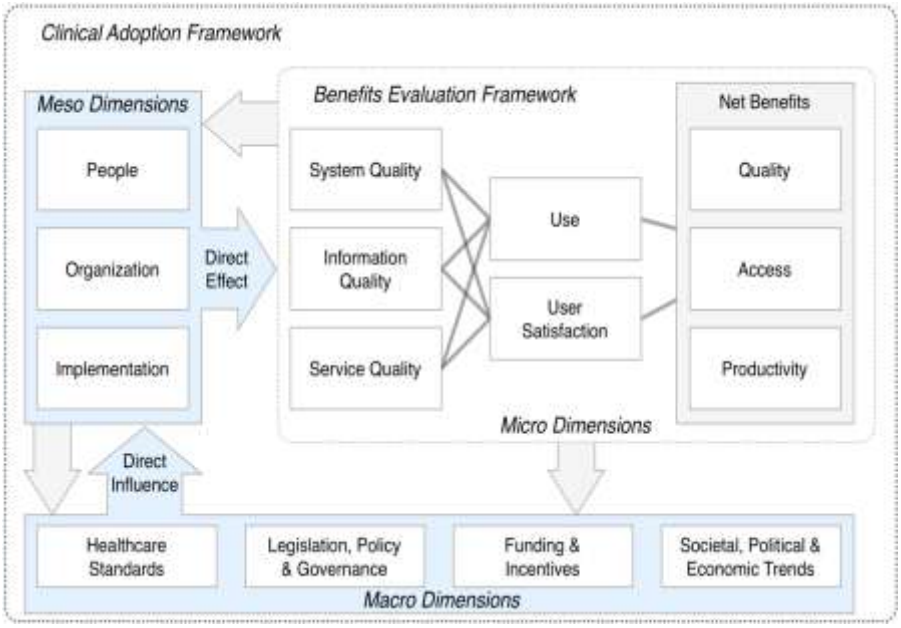
5.2 Evaluation Methods - The evaluation methods to be applied in this study are: EMR adoption assessment, usability testing, workflow analysis, data quality assessment, project risk assessment and practice reflection. These are methods published by the UVic eHealth Observatory (see Appendix B for a list of the tools).

(a) **EMR adoption assessment:** The 5-level EMR adoption assessment model will be used to determine the level of EMR adoption and usage associated with a given practice post EMR implementation.
(b) **Usability testing:** A set of standardized patient personas will be used as test case scenarios to determine the usefulness/ease-of-use of the EMR in documenting typical patient cases seen in primary care settings.
(c) **Workflow analysis:** Selected practice workflows such as prescribing practice/process can be reviewed through workflow analysis and observations in the practice.
(d) **Data quality assessment:** A set of patient case queries will be used to determine the quality of the patient data recorded in the EMR either thru standard reports from or customized queries against the EMR.
(e) **Project risk assessment:** A set of standardized questions will be used to determine the change management strategies used to implement the EMR and identify potential areas of project risks. Also included is a review of all project and related documentations made available to the study team.
(f) **Practice reflections:** Interviews and focus groups with stakeholders will be conducted to share experience, discuss findings, provide feedback and identify practice improvement opportunities post-implementation.

5.3 Evaluation Metrics - The evaluation metrics that are considered in this study are based on the Clinical Adoption Framework by Lau et al. [2] (see Exhibit 2), which is an extension of the Infoway benefits evaluation (BE) framework of HIS quality, use/satisfaction, and net benefits [3]. These metrics are outlined below.

(a) **System features and data quality:** For EMR quality, the metrics may include technical performance of the EMR and quality of its patient data in terms of accuracy, consistency and completeness.
(b) **System usage and satisfaction:** For EMR use/satisfaction, the metrics may include actual usage pattern, self-reported use of EMR interfaces/reports, and perceived usefulness and value of the EMR.
(c) **Effectiveness:** For net benefits care quality, the effectiveness metrics may include guideline adherence rates for preventive care, disease management and follow-up visits, depending on data availability.
(d) **Efficiency:** For net benefits as productivity, the efficiency metrics may include time to complete clinical and administrative tasks such as prescribing, clinical documentation and referral.
(e) **Meso dimensions:** People, organization and implementation related factors will be examined. People include roles, expectations and experiences. Organization includes strategy, culture, process and infrastructures. Implementation includes deployment stage, EMR-practice fit, and project process.

(f) **Macro dimensions:** Healthcare standards, policy and funding/incentives will be examined. Standards cover interoperability such as HL7 messaging. Policy covers current data exchange practices, and funding/incentives cover provider payment schemes at the clinics.



The Benefits Evaluation Framework covers the micro dimensions of:

- **System quality** – EMR technical performance, usability, usefulness
- **Information quality** –completeness, accuracy, consistency of EMR data
- **Net Benefits** to be examined:
    - **Quality** – care effectiveness
    - **Productivity** – care efficiency

The Meso/Macro Dimensions in the Clinical Adoption Framework to be examined are:

- People – roles, expectations, experiences
- Organization – strategy, culture, process, infrastructure
- Implementation – stage, project, fit
- Standards – interoperability, e.g. HL7
- Policy – data exchange, privacy
- Funding/incentives – payment schemes

Exhibit 2 – Clinical adoption framework by Lau et al. [2]

5.4 Study Site and Participants

The study site is the Beta Ambulatory Care Clinic which is managed by the Beta Healthcare Organization. The participants are clinicians and support staff at the clinic, EMR project support team, and management responsible for planning and operation of the clinic at Beta Healthcare Organization. Up to four half hour face-to-face interview sessions are planned for each clinician and support staff at the clinic. For management, a one hour interview is requested. These are followed by a one hour focus group for clinic staff to provide feedback, one feedback session for the EMR project team, and one presentation session for management, including the project sponsor. The clinic visit schedule template is shown in Appendix C.

6. References

[1] Lau F, Hagens S, Muttitt S. A proposed benefits evaluation framework for health information systems in Canada. *Healthcare Quarterly* 2007; 10(1):112-8.

[2] Lau F, Price M, Keshavjee K. From benefits evaluation to clinical adoption: Making sense of health information system success in Canada. *Healthcare Quarterly* 2011; 14(1):39-45.

[3] Price M, Lau F, Lai J. Measuring EMR adoption: A framework and case study. *ElectronicHealthcare* 2011; 10(1): e25-e30.

Appendix A – Evaluation Methodology Mapping

Mapping of evaluation methods and metrics to data collection techniques used in this study

By Evaluation Methods	**Interviews**	**Observations**	**Usability/Workflow Study**	**Document Review**	**Data Extraction**	**Focus Groups**
EMR adoption assessment						
5 stage EMR adoption model assessment	√					
Usability testing						
Patient persona scenarios on front-end and backend issues		√	√			
Workflow analysis						
Analysis of selected clinic processes, e.g. referral, prescribing		√	√			
Data Quality assessment						
Queries on codes, free-text, templates/forms available and used					√	
Queries on frequencies of selected patient cases/conditions					√	
Project risk assessment						
Assessment on performance, outcomes, satisfaction	√			√		√
Deployment process thru change/risk management assessment	√			√		√
Practice reflections						
User assessment on performance, outcomes, satisfaction	√					
Group reflections for info sharing, feedback and improvements						√
By Evaluation Metrics						
System features and data quality						
Code and data consistency, accuracy and completeness	√	√	√		√	√
Completeness/consistency of specific templates and flow sheets	√	√	√		√	√
System usage and satisfaction						
Actual EMR usage					√	
Perceived EMR usefulness, ease of use and value	√	√	√			√
Effectiveness						
Adherence to CDM guidelines e.g., preventive care and follow-up				√	√	
Efficiency						
Impact on clinician/support staff productivity	√	√	√			
Meso dimensions						
People, organization and implementation factors	√	√		√		√
Macro dimensions						
Standards, policy and funding/incentive factors	√	√	√	√	√	√

Appendix B – List of Evaluation Tools

The evaluation tools to be used in the study are listed below. They are available on the UVic eHealth Observatory website, URL – http://eHealth.uvic/ca under resources

- **EMR adoption assessment tool –** A list of interview questions used to determine the level of EMR adoption and usage at the clinic.

- **Usability testing:** A set of standardized patient personas used as test case scenarios to determine the usefulness/ease-of-use of the EMR itself.

- **Workflow analysis:** A set of routine tasks to be observed along with usability inspection to determine the workflow patterns at the clinic.

- **Data quality assessment:** A set of patient case queries used to determine the quality of the patient data recorded in the EMR.

- **Project risk assessment:** A set of 23 interview questions used to determine the change management strategies used to implement the EMR and identify potential areas of project risks.

- **Practice reflections, user assessment:** A set of 9 interview questions used with project staff and management to share experience and lessons learned about the EMR implementation project.

- **Practice reflections, focus group:** A set of 9 interview questions used with project staff and management to share experience and lessons learned about the EMR implementation project.

Appendix C - Clinic Visit Schedule Template

This section contains information on the clinic visits. It covers the participants and the visit schedule for the Beta Ambulatory Care Clinic staff. Note that the visit schedule is still being confirmed and updated at this time

1. Participants - Please put in actual name and role; add more rows as needed

Beta Clinic	Name	Role

2. Type of assessments by evaluation team

(a) Interviews – conduct face-to-face interviews and focus groups from half to one hour with clinicians, clinic staff, project support staff and management
(b) Data quality assessment – request aggregate outputs from EMR support team based on specific database query algorithms and parameters
(c) Usability/workflow assessment – observe clinic staff complete specific tasks using their EMR and workflow through different scenarios provided
(d) Vendor interview – conduct phone interview on EMR features, issues and directions
(e) Document review – review documents provided by EMR support team

3. Interview Schedule – Up to 4 half-hour interviews per clinic staff as time permits; with a 1-hr focus group at end

	Date1	Date2	Date3	Date4
8:00				
8:30				
9:00				
9:30				
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Notes: Interview1=EMR adoption assessment; Interview2=Practice reflections user assessment; Interview3=usability/workflow; Interview4=usability/workflow; Focus group=practice reflections feedback