The connecting South West Ontario (cSWO) Benefits Model: An approach for the collaborative capture of value of electronic health records and enabling technology

Ted ALEXANDER[a,b,1], Lori-Anne HUEBNER[b,c],
Mohamed ALARAKHIA, M.D. CCFP[b,c,d], and Kirk HOLLOHAN, M.D. CCFP[a,e]

[a] *Connecting South West Ontario Program, London Health Sciences Centre, London, Ontario*
[b] *Department of Family Medicine, McMaster University*
[c] *eHealth Centre of Excellence, Centre for Family Medicine Family Health Team, Kitchener, Ontario*
[d] *Enabling Technologies Physician Lead, Waterloo Wellington Local Health Integration Network*
[e] *London Family Health Team, London, Ontario*

Abstract. This paper explains the benefits model developed and deployed by the connecting South West Ontario (cSWO) program. The cSWO approach is founded on the principles of enabling clinical and organizational value and the recognition that enabling requires a collaborative approach that can include several perspectives. We describe our approach which is aimed at creating a four-part harmony between change management and adoption, best practice research and quality indicators, data analytics and clinical value production.

Keywords. Electronic health record (EHR), enabling technology, data sharing, change management and adoption, clinical value, collaborative inquiry, quality assurance (QA), benefits realization

1. Understanding benefits of health information systems in Canada

Health systems in Canada have benefited from a decade of thought devoted to answering questions about how best to evaluate health information system success. Canada Health Infoway [1] published a framework adapted from the foundational Information System (IS) success model [2, 3]. Subsequent iterations of that model have accounted for elements initially determined to be out of scope [4], and suggested appropriate

[1] Corresponding Author. Connecting South West Ontario Program, 408-746 Baseline Rd East, London, ON, N6C 5Z2. ted.alexander@lhsc.on.ca

approaches to evaluating and learning about dimensions and measures that help define and determine successful adoption [5].

In the Ontario context, recognizing influences from the macro and meso dimensions is critical to properly inform the process of translating the potential value of information systems into realized benefits such as safer and higher quality care and/or a more cost efficient system of care. This process of translation is the focus of change management efforts embedded in many technology investments, including those within this paper [6].

There are difficult realities in negotiating how to best enable a health system, and to systematically understand the value that can be produced by sharing interoperable information. At the same time that data sharing and privacy and security legislation and agreements confound health service provider (HSP) decision makers who may see the potential in investing in technology to enable better care, Ontario's government continues to transform healthcare delivery through changes that seem to rely on information being shared effectively between organizations [7,8].

This paper outlines and explains the model developed and deployed by the connecting South West Ontario (cSWO) program. Our model does not replace the foundational work in the Canadian context, rather it is nested within certain elements of existing frameworks. The cSWO approach is founded on the principles of enabling clinical and organizational value and the recognition that enabling requires a collaborative approach. We will describe our approach which is aimed at creating a four-part harmony between change management and adoption (CM&A), best practice research and quality indicators, data analytics and clinical value production.

2. The theoretical and practical antecedents of the cSWO Benefits Model

cSWO's goal is to enable the transformation of the health system through implementing a regional ehealth program that will make an individual's health information from across the continuum of care available in a timely and secure fashion. The program deploys an integrated electronic health record (EHR) across four Local Health Integration Networks (LHINs), providing information to 42,000 health care professionals who provide clinical care to 3.6 million residents [9]. cSWO delivers services including project management, privacy and policy management/development, and an integrated approach to CM&A and benefits realization (BR).

. cSWO recognizes an organization's performance will only be improved by information systems when the targeted use of those resources is aligned with its' core business objectives [10]. In light of this, cSWO focused its BR model on the realization that workflows and processes in HSPs are dedicated to producing organizational and clinical value. Workflows producing those two types of value were an appropriate level of analysis to allow for study to occur using the same model across the continuum of care and across several projects.

Relating the concepts back to the conceptual work of Lau et al.'s clinical adoption framework [5], cSWO BR draws a line between expectations of organizations to produce organizational and clinical value (healthcare standards) and the micro-level implementation of the information into decision-making moments that change value production. The team felt supported in pursuing what seemed like a selective analysis when reviewing some of the lessons that have been shared from IS investment in the United Kingdom. Greenhalgh et al. [11] completed a comprehensive literature review involving multiple approaches to work that had focused on research designed to

understand innovative efforts within HSPs. The authors distinguished between four different descriptors of innovation methods: diffusion (passive spread), dissemination (active and planned), implementation (mainstreaming an innovation), and sustainability (routinization). These useful clarifications helped us to place the relative position of cSWO's investigation in the larger innovation context. At the outset our evaluation context was broad (the healthcare continuum) and our initial cases were conducted in a diffusion context because the innovation program had pre-dated its investment in benefits research. We sought to learn about the connections that clinicians had made between more macro-level clinical motivators (i.e. practice standards) and micro-level benefits resulting from adoption.

Beyond the initial categorization of innovations, Greenhalgh et al's discussion offered three profound points of guidance for cSWO's model development. Research on health service innovations, among other recommendations, should be process rather than package oriented meaning research questions should allow for the illumination of a process rather than does X impact Y. Research should be collaborative and coordinated to learn about multiple contexts and workflows. Finally, research should be multidisciplinary and multimethod to adequately uncover complexity. Emboldened by these words we set out to define a model that offers important signposts to guide our case study development and also encourage inclusion of stakeholders in reshaping our thinking by encouraging multiple interpretations and influences [11].

3. The cSWO Benefits Model

The cSWO Benefit Model (Figure 1) is centred on the production of case studies that aim to learn how clinicians improve their ability to produce clinical value for patients when introducing new information into the workflow, and how clinical and/or other staff members improve their ability to produce organizational value when introducing new information in their workflow?

An interdisciplinary team consisting of CM&A, BR, data analysis (DA), and of course, clinical and organizational users of the tools, work together to produce the cases. The cSWO team resources (CM&A, BR, DA) need to remain mindful of their mandate as *enablers* and not as *producers* of value. Therefore the model relies on the concept of collaborative inquiry to guide the development of cases, which recognized the need to respect and include the end-user's voice in producing the case study. Collaborative inquiry is defined as "a process consisting of repeated episodes of reflection and action through which a group of peers strives to answer a question of importance to them" [12]. The collaborative BR case process begins with cSWO resources discussing how the deployment of tools has progressed in an organization and what clinical workflows have been discussed during those deployments.

The goal of these early discussions is to better understand opportunities to develop case studies starting with an identification of the perspectives (CM&A, BR, DA) that could match with the HSP use of a tool. An initial meeting to clarify value production is depicted in the model in the Adoption, Meaningful Use, Benefits Realization box. These terms reflect the different categorizations that health service providers may use to identify champions in their organization related to using the EHR or other IS tools.

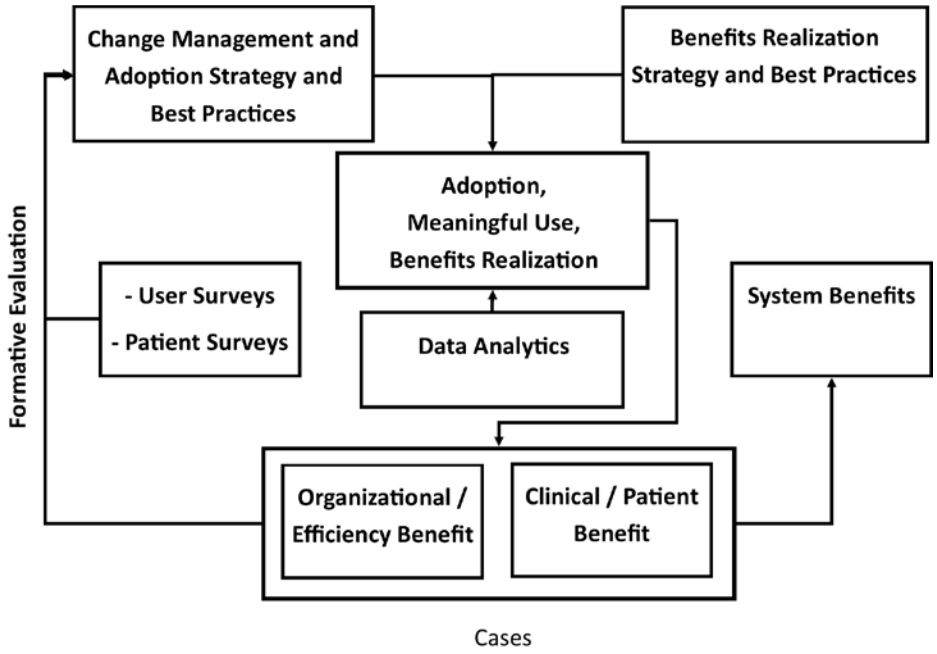

Figure 1. cSWO Benefit Model.

The iterative process of reflection and meaning making begins by learning about how the people within the HSP are producing value; a description of their use within their daily work. Discussion between the CM&A and HSP resources proceed with the BR resource asking clarifying questions that help translate descriptions of daily work into meaning in terms of quality improvement (QI) and patient outcomes.

The cSWO approach relies on the collaborative process of refining value propositions in advance of meeting with HSPs to test the potential of ideas across clinical, technical and research domains. The cSWO model asks CM&A resources who have met at HSPs and discussed applications of tools with different clinical teams within the HSP to match those stories with the literature. The BR team conducts a review of literature and published best practices to imagine the potential for new information to improve decision making within an HSP. In some cases there are opportunities to refine data within a project using DA resources. Interim value propositions are often clarified with cSWO clinical leaders before meetings with HSPs.

In the following section, we will explain case studies of this process to help elucidate the model as it has informed the development of cases across South West Ontario.

4. Three case examples of the cSWO Benefits Model

During the past two-year period the cSWO BR program has used the model to develop cases that capture the value enabled through several health IS projects. The following sections discuss how the BR Model has allowed for the flexibility needed to achieve consensus on the value achieved in different settings.

4.1. Benefits originating from Change Management and Adoption

The first BR case study was completed with the Canadian Mental Health Association, Waterloo Wellington Dufferin (CMHA-WWD). After user-report analysis revealed that users were accessing the EHR on a regular basis, an inquiry was made to understand what clinical programs were responsible for that use. We were directed to the Early Psychosis program as a champion user at the HSP and the cSWO team met with the nursing lead and intake clinician at the organization.

During the discussion the CM&A lead spoke with the clinicians about their interest during training sessions. The CM&A resource, a nurse, discussed the value of: i) being able to see the clinical details from a previous episode in the client's care and ii) being able to complete the program intake in a way that now enables the client to enter into treatment more efficiently. The BR lead had researched best practices in early psychosis care and asked questions during the meeting which helped refine the focus of the value discussion. What was initially an account focused on improved value to the organization by removing a labour intensive process of asking hospitals for patient information became an account of what that meant for patients. In the case study, the HSP showed intake data that explained an average of 3 days had been eliminated from the intake process. The cSWO process positioned those days as relevant as labour time saving *and* as clinically important because decreases in the duration of untreated psychosis are important determinants of patient outcome.

4.2. Benefits originating from best practice research

In another scenario, a regional Secondary Stroke Prevention Clinic (SSPC), the cSWO team expected to see value in the "organization agnostic health record". For regional programs that have broader catchment areas than in just one community access to timely information has proven challenging. The SSPC at Grand River Hospital in Kitchener previously had logins to seven different hospital information systems to find diagnostic images ordered after an initial possible stroke. The results of the case study were that the SSPC was able to serve a greater number of residents each month with the same number of staff because they could access all of the images through the EHR. More importantly, the stroke clinician was referring urgent cases for preventative procedures such as carotid endarterectomies more effectively as a result of their improved information consumption which facilitated clinical decision-making.

4.3. Benefits originating from data analysis and best practice research

In the final example of how the case study approach has developed, data analysis tools were central in the collaborative development process. During the EMR Content Standard project (in partnership with the Canadian Institute of Health Information), the project was interested in pursuing data standardization. The BR focus in that project was to learn about the completeness of the data in different fields and understand the potential value in combining information in clinical tools.

The BR data analysis project team worked to understand how information was being stored in the EMR and how it could be extracted and related to a new best practice for suggesting appropriate prescription of oral anticoagulants (OACs) for patients diagnosed with Atrial Fibrillation (AFib). The report process resulted initially in patients being grouped into risk categories based on age and comorbid diagnoses and then were

eliminated from those categories when they were already prescribed OACs. The remaining patients were put forward for a chart review by the local team's clinical pharmacist. At the end of the process we found that all patients had been offered a discussion on taking OACs initially but 5% of patients were recommended for additional discussion based on factors that had subsequently changed their level of stroke risk. Further, several patients began taking OACs as a result of the follow-up conversation once they understood their updated level of stroke risk.

5. Discussion and Conclusion

The results of these case studies are in and of themselves worthy of discussion and debate about how informatics projects can and should contribute to clinical improvements. For the purposes of this paper, however, we are focused on the application of the cSWO BR model.

At the centre of our approach is the need to develop a model or process that maintains the clinicians' position as the producer of clinical value. Our model is about pursuing and clarifying the salient points that a user perceives as important in improving care delivery. The initial point could exist in the CM&A history that focused on a specific moment in the workflow when a previous process could be improved (Early Psychosis example). The origin could come from a hypothesis about what a record containing information from multiple organizations might mean for the success of a regional clinical program requiring previously dispersed information (Secondary Stroke Prevention). It could emerge from an analysis of available information that when combined creates a novel expression of a patient population (Primary Care, AFib). In all instances, the initial case was developed and refined by resources within the cSWO initiative and then presented to the clinician responsible for producing the value itself. The cSWO model collaboratively investigates assumptions to learn how HSPs access information, how information is changing their decisions, and how new decisions might be related to patient outcomes.

There are limitations to this model, as it offers clarity to a part of what more comprehensive models have pursued to better understand value in the space between IS projects and clinical practice. The model does not lend itself to producing causal claims, or help understand the myriad of factors influencing optimal adoption.

We have, however, found considerable value in the process and outcomes of using the cSWO model to pursue case studies and to improve change management efforts. Clinicians who are busy producing value for patients have commented that the opportunity to participate in the BR effort caused them to pause and reflect upon the value their use produced in a way that led them to use the tools in a more meaningful way. In terms of the overall cSWO program's development, the BR Model has led to a stronger change management message because the cases help to frame subsequent adoption in the clinical reality of the prospective user. As an enabler, it is not as important what cSWO thinks that value of the tools are, as it is important to communicate the value that another clinician doing the same job has realized. It is this value that can lead to a replicated or a modified adoption approach and the spreading of value across the continuum of care, and potentially across a wider jurisdiction.

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