Towards the identification of family physician learning needs through a reflective process

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Follow effective action with quiet reflection. From the quiet reflection will come even more effective action.

Peter Drucker (n.d.)

Social ecologist

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Acknowledgements

Abstract

Background

Continuing professional development stakeholders are continually searching for better ways of collecting and using data to determine the educational needs of physicians.

Research questions

1) What, if any, family physician learning needs are revealed through the reflective process prompted by the Information Assessment Method (IAM)?

2) What is the meaning of the Highlight ratings for the identification and prioritization of Canadian family physician learning needs?

Methods

A mixed methods sequential explanatory design was employed. Quantitative IAM data was collected from a family medicine web based e-Therapeutics+ 'Highlights' continuing medical education program over a 22-week period. Six senior Canadian continuing professional development key informants were interviewed about the meaning and potential uses of this IAM data in the context of current needs assessment practices.

Results

3690 family physicians rated at least one highlight (31.4% participation rate). A mean of 675.2 (range 414-1176) ratings per highlight was recorded. On average, 54.5 % of participants learned something new, 45.7 % were motivated to learn more and 59.3% found topics to be relevant to at least one patient in practice. Key informants found that ratings 'motivation to learn more' may suggest participants' learning needs when combined with data from other sources, and that 'learning' and 'relevance' ratings can reveal information about participants' knowledge base.

Conclusions

With data from other sources, IAM data may suggest learning needs, and reveal topics where physician knowledge was confirmed.

Résumé

Contexte

Les personnes impliquées dans le domaine du développement professionnel continu (DPC) cherchent constamment des meilleurs moyens de collecter et d'utiliser des données pour déterminer les besoins des médecins en éducation continue.

Questions de recherche

1) Est-ce que des besoins d'apprentissage des médecins de famille sont révélés à travers le processus de réflexion suscitée par la Méthode d'évaluation des informations (MEI)?

2) Quelle est la signification des évaluations des « Highlights » pour l'identification et le choix des priorités concernant les besoins d'apprentissage des médecins de famille canadiens?

Méthodes

Une recherche utilisant des méthodes mixtes a été conduite (devis séquentiel explicatif). Des données quantitatives ont été collectées avec la MEI sur une période de 22 semaines via un programme d'éducation continue en médecine familiale avec une ressource internet, e-Therapeutics+ 'Highlights'. Six informateurs clés experts en DPC ont été interrogés sur la signification des données obtenues avec la MEI, et les utilisations possibles de ces données pour évaluer les besoins d'apprentissage.

Résultats

3690 médecins de famille ont participé (taux de participation : 31.4%). En moyenne, 675,2 questionnaires MEI ont été complétés par 'Highlight' (414 - 1176). En moyenne, 54,5% des participants ont appris quelque chose de nouveau,

45,7% étaient motivés pour en savoir plus, et 59,3% ont trouvé des informations pertinentes pour au moins un de leurs patients. Les informateurs clés ont trouvé que les réponses 'motivation pour en savoir plus' peuvent suggérer des besoins d'apprentissage des participants lorsqu'elles sont combinés avec des données provenant d'autres sources, et que les réponses 'j'ai appris' et 'information pertinente' peuvent révéler des informations sur les connaissances des participants.

Conclusions

Avec des données d'autres sources, les données obtenues avec la MEI peuvent suggérer des besoins d'apprentissage, et révéler des sujets pour lesquels les médecins ont amélioré ou confirmé leurs connaissances.

1. Introduction

The purpose of this thesis is to explore new potential ways of identifying the learning needs of family physicians. I propose to do so using data generated via a reflective learning tool, i.e., the Information Assessment Method (IAM) (Leung, Pluye, Grad, & Weston, 2010). This research endeavour will bring together the use of educational theory, data from family physicians and expert contextualization in current continuing medical education (CME) practice.

CME is the medical branch of continuing professional development (Fox, 2000). Engaging in CME activities is mandatory for the members of the Royal College of Physicians and Surgeons of Canada and the College or Family Physicians of Canada (CFPC) as a means of maintaining clinical competence (Silver, Campbell, Marlow, & Sargeant, 2008). Many questions remain about the most effective ways to develop, deliver, and evaluate CME programs (Davis, et al., 2006; Fox, 2000; Moore, Green, & Gallis, 2009).

Regarding CME program delivery in particular, email alerts constitute a new educational modality for increasing physicians' awareness and knowledge (Tanna, Sood, Schiff, Schwartz, & Naimark, 2011) of recent research-based information, e.g., InfoPOEMs (Ebell & Shaughnessy, 2003), and updated treatment recommendations, e.g., e-Therapeutics+ Highlights (Pluye, Grad, Repchinsky et al., 2009). IAM is a new tool that "systematically documents reflection on clinical information delivered or retrieved from electronic resources" (ITPCRG, 2009). Reading email alerts and rating them using IAM is considered a brief individual reflective e-learning activity that allows CFPC members to claim CME credits (Pluye, Grad, Leung et al., 2009).

So far, evidence suggests that IAM is a valuable e-learning tool at two different levels (Pluye, Grad, Johnson-Lafleur, et al., 2010). First, at the individual level, IAM assesses the value of email alerts from a physician's perspective, e.g., it can document a learning need fulfilled by an email alert. Second, at the program level, the aggregation of IAM questionnaires completed by all participants for all email alerts facilitates the evaluation of email-based CME programs (Pluye et al., 2010). In this thesis project, I propose to advance from these uses and argue that the aggregated IAM data might reveal learning needs of physicians who participate in the program, and by extension, the needs of other physicians. In theory, a high proportion of program participants reporting a motivation to learn more about a clinical topic raised by an alert may directly suggest learning needs of participants. Conversely, a high proportion of program participants reporting a learning need fulfilled by an email alert may indirectly suggest the importance of this learning need also within the population of family physicians who do not participate in the program. Once documented and shared with CME providers, such learning needs may be addressed by complementary activities or programs. In other words, physicians reading and rating email alerts with new information may point to learning needs that were unrecognized before.

Exploring this claim has the potential to complement usual CME needs assessment where physicians are directly asked to report their learning needs and tend to mention favourite topics for which they are already up-to-date. This thesis explores whether the aggregation of data generated via IAM may help to reveal learning needs of family physicians, and thus whether IAM may have wider implications for CME needs assessment. To this end, this work has been guided by the following research questions:

1) What, if any, family physician learning needs are revealed through the reflective
   process prompted by the Information Assessment Method?

2) What is the meaning of the Highlight ratings for the identification and prioritization
   of Canadian family physician learning needs?

By answering these questions, I will explore in depth the potential role of IAM data in
contributing to the CME learning needs assessment of family physicians.

With respect to the relationship between this thesis and the CIHR-funded
evaluation from which it emerged I first describe the larger evaluation research context
within which this thesis was conducted in the background section. Then, I summarize
relevant literature on the topic under investigation. This literature review contains : (a) a
brief introduction of current trends in Canadian CME in general, and concerning family
physicians in particular; (b) a critical review of the concepts of reflection and reflective
practice; and (c) a focused literature review about the role of reflection in CME needs
assessment in family medicine and general practice. These two sections help to frame the
field of inquiry within which this thesis takes place, as well as suggest where this thesis
might contribute to what is already known.

2. Background

My idea to conduct the present exploratory study emerged during the completion of the e-Therapeutics+ program evaluation research, conducted by a team led by Ms. Repchinsky (Canadian Pharmacists Association, hereinafter CPhA) and Drs. Pluye and Grad (McGill University), and funded by the Canadian Institutes of Health Research in 2009. The purpose of this participatory research was to assess the information delivered via email (Highlights), and to improve the content of information (e-Therapeutics+). Before the implementation of IAM, the CPhA rarely received feedback. As a key member of this research team, I conducted the qualitative data analysis of the constructive feedback and the quantitative analysis of the negative ratings. While conducting these analyses, I questioned whether the data collected using IAM could reveal family physicians' learning needs.

2.1 The e-Therapeutics+ Continuing Medical Education Program

Using a participatory research approach among the CPhA, the CFPC, and McGill researchers, longitudinal prospective evaluation research was conducted where 51 e-Therapeutics+ Highlights were emailed to CFPC members over one year. Eligible participants were members of the CFPC who had valid email addresses. Highlights are content from e-Therapeutics+, an electronic knowledge resource with treatment recommendations, and were selected and approved by the CFPC Director for Continuing Professional Development. Each email contained one Highlight (Appendix A) linked to its related chapter in e-Therapeutics+. Participants were asked to rate each Highlight using IAM, a validated tool for assessing the relevance, cognitive impact, use, and

expected health benefits of clinical information. Respondents received 0.1 M1 Mainpro credit for each rated Highlight.

2.2 The CIHR-funded e-Therapeutics+ Program Evaluation

2.2.1 Assessing information: Participants' ratings

To assess the value of e-Therapeutics+ content from the readers' perspective, a web-based longitudinal evaluation of the IAM ratings was conducted. Frequency counts of IAM ratings per Highlight and per participant were analyzed. From January 20, 2010 to January 19, 2011, 31,419 questionnaires were submitted by 5,346 CFPC members. About a third of CFPC members read and rated at least one Highlight, and on average each CFPC member rated 6.1 Highlights. According to CFPC members, Highlights contained relevant clinical information, and when applied to practice, had the potential to benefit specific patients (Appendix B). Participants reported that 89.8% of rated Highlights were totally or partially relevant for at least one patient, and that they planned to use the information contained in 59.2% of rated Highlights for a patient, for example 'To modify the management of this patient'. When information was rated to be used for a patient, participants expected health benefits for 40.9% of rated Highlights, such as 'Avoiding an unnecessary or inappropriate treatment, a diagnostic procedure or a preventive intervention'.

2.2.2 Improving information: Participants' feed-back

To explore whether textual feedback obtained from FPs using IAM could be integrated into the CPhA information management cycle, I reviewed these comments and identified constructive feedback requiring further investigation. Reports with constructive

feedback comments[1] were sent to the CPhA Editor-in-Chief every six months. Between

January 20, 2010 and January 19, 2011: (a) 4,166 (13.3%) included written comments,

(b) 682 (2.2%) incorporate constructive feedback comments, and (c) 121 (0.4%) were

associated with a change in the content or wording of the e-Therapeutics+ Highlight. An

analysis of these preliminary results suggest the most frequent types of feedback

associated with changes in e-Therapeutics+ were suggestions for additional information

such as a contextual detail (n=70), and suggestions to consider contradictory evidence

(n=24).

2.3 Relationship of the thesis study to this CIHR-funded e-Therapeutics+ Program

Evaluation

A new research question emerged from this e-Therapeutics+ program evaluation,

which forms the basis for the present thesis project: What is, if any, the relationship

between the data generated by physician who used IAM and family physicians' learning

needs? In order to answer this new question, a subset of the quantitative data that include

physicians' responses to IAM-items related to learning (learning something new,

motivation to learn more) and relevance was first considered. With the aim to also obtain

CME expert advice about the potential of those IAM subset of items for identifying

family physicians learning needs, the results of the statistical analysis of this data subset

was then presented to CME researcher and administrator participants, as they are the

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[1] Constructive feedback was defined as:
- a comment that corresponds in meaning to a rating of "Disagreement", "Potential harm", "Dissatisfaction" or "Problem with this information"; or
- a comment about missing information or that more information would be better; or
- a comment that includes a nuance or reserve (e.g., "I agree, but…"); or
- a comment revealing the reader was not 'convinced' by the information; or
- a comment saying the information was not found; or
- a comment stating that the Highlight is 'old knowledge' or the equivalent; or
- a negative comment on the questionnaire or on the rating process.

potential end-users of these results for needs assessment and program planning. The

CME developers, in this case CPhA , already had access to the IAM data and have

applied it to edit the content of the knowledge product.

3. Review of Literature

This thesis is at the crossroad of several important concepts related to CME and learning processes. Accordingly, CME priorities, specifically in a Canadian context, are discussed and then the concepts of reflection and reflective practice are defined and critically discussed. Finally, as the objectives of this thesis are to reveal whether a relationship exists between a reflective tool (IAM) and needs assessment in CME, the ways in which reflection and reflective practice have been historically employed in CME needs assessment are presented.

3.1 Current Issues in Continuing Medical Education

In order to provide high quality medical care, physicians must keep themselves up-to-date regarding advances in medicine and therapeutics (Fox, 2000; K. V. Mann & Chaytor, 1992; Silver, et al., 2008). CME has therefore emerged as a field in which the function, structure, theory and administration of continued professional development (CPD) of physicians is considered (MacIntosh-Murray, Perrier, & Davis, 2006). With this development of a dedicated field of study, a persistent and growing disconnect between the practice and research of CPD (of which CME is a branch), has been highlighted. For instance, Fox (2000) asserts that "[o]ver the last decade, researchers in continuing medical education (CME), the branch of CPD that applies to medicine, have been more effective at generating knowledge but less effective at generating knowledge that is widely used" (p.238). This implies that opportunities are consistently missed to base the conception, development and delivery of relevant continuing medical education activities on research findings and educational theories. An area that has been offered as a potential

space for integrating research findings with practice is CME needs assessment (Eva &

Regehr, 2005). The increasing study of the needs assessments in CME is chronicled in a

thematic analysis of the content the Journal of Continuing Education in the Health

Professions (MacIntosh-Murray, et al., 2006).

More recently, Eva and Regehr (2008) have called for a reformulation of the

continuing medical education needs assessment research agenda to include the potential

uses of reflection and externally generated data in lieu of traditional and sometimes

problematic self-assessment methods historically used in CME needs assessment. The

human limitations, and resulting less than accurate outcomes of directly self-identifying

learning needs, have been well documented in the literature (Davis, et al., 2006; Eva &

Regehr, 2005; Gordon, 1991; Tracey, Arroll, Richmond, & Barham, 1997). In light of

this growing evidence, the Canadian academic and regulatory continuing education and

continuing professional development community has recognized the need for "learning

programs that encourage [physicians] to reflect on their clinical practice" (Silver, et al.,

2008). The concept and use of reflection appears to be an emerging, yet underexplored,

priority in CME research.

3.2. Reflection and Reflective Practice in Needs Assessment in the Health

Professions

Many descriptions of the general concept of reflection exist in the literature. An

enduring view, first put forth in 1933 by Dewey, describes reflective thought as "active,

persistent and careful consideration of any belief or supposed form of knowledge in the

light of the grounds that support it and the further conclusion to which it tends" (Dewey,

1933). In 1985 Boud, Keogh, & Waller described reflection as an inherently human

activity following experience "in which people recapture their experience, think about it, mull it over and evaluate it" (K. Mann, Gordon, & MacLeod, 2009). They suggest that this ability to reflect may be an essential component for effective learning. Moon (2004) takes a common sense approach to defining reflection as a form of mental processing (like a form of thinking) that we may use to fulfill a purpose or to achieve some anticipated outcome, or we may simply be reflective and then an outcome can be expected. Reflection is applied to relatively complicated, ill-structured ideas for which there is not an obvious solution and is largely based on the further processing of knowledge and understanding that we already possess. For Eva and Regehr (2008), "reflection is intended to indicate a conscious and deliberate reinvestment of mental energy aimed at exploring and elaborating one's understanding of the problem one has faced (or is facing) rather than aimed simply at trying to solve it" (p.15). None of these definitions provide a map for how reflection is operationalized[2]. They do, however, suggest that it is an activity where context (in the case of this study clinical experiential context) is a necessary component of any reflective process.

3.3 The historical use of reflection in family physician learning needs assessment

As this study aims to fully explore the potential meanings and uses for the data generated through IAM in the context of family physician educational needs assessment, an in-depth examination of how reflection historically has been applied in the field of needs assessment appears necessary. I found it appropriate to explore in detail the use of educational theoretical frameworks within these studies. The works that I have included in my review are those that: (a) examine family physician learning needs assessment, (b)

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[2] The operationalization of the reflective process of IAM is described in section 4.1.3 on page 30.

employ some type of data, (c) utilize the concept of reflection in the process. Initially a librarian assisted search of MEDLINE database via OvidSP and ERIC database using the PICO (Population, Intervention, Comparison, Outcome, study Design) framework was employed and yielded the identification of the sentinel study by Myers (1999). To identify more of this highly specific type of published study, an identification strategy endorsed by Greenhalgh and Peacock (2005) was used. In their analysis of the literature contained in their systematic review, they found that of 495 primary sources, only 30% were identified through a protocol. Citation tracking (51%) and personal knowledge and colleagues (24%) yielded the identification of the bulk of included studies. They concluded that focused alternative strategies to protocols might have a higher return, particularly with respect to specialized or obscure studies.

Study identification began with the systematic review of the paper 'The objective assessment of general practitioners' educational needs: An under-researched area' by Myers (1999). From this primary source, two studies meeting the above criteria were identified (Jacques, Sindon, Bourque, Bordage, & Ferland, 1995; Perol, et al., 2002). Citation tracking and networking (using SCOPUS and ISI Web of Science) yielded the remaining five studies (Allan & Schaefer, 2005; Jacques, et al., 1995; Kerwick, Jones, Mann, & Goldberg, 1997; Lockyer, Simpson, Toews, & Becker, 1996; Toews, et al., 1996). Study characteristics are presented in Table 1. The textual description of the included studies, their narrative synthesis, and a summary of lessons learned from this review follow.

Table 1 Characteristics of Retained Family Physician Learning Needs Empirical Studies

Study	Region	Study Design	Participants	N
Allan, 2005	Australia	Observational	General Practitioners	1762
Jacques, 1995	Canada	Observational	Physicians (unspecified)*	6
Kerwick, 1997	UK	Observational	General Practitioners	380
Lockyer, 1996	Canada	Observational	CFPC** Family Physicians	16
Mann, 1992	Canada	Observational	Family Physicians Specialists	390 (approximation)
Pérol, 2002	France	Randomized Control Trial	General Practitioners	1038
Towes, 1996	Canada	Observational	Family Physicians	539

3.4. Textual descriptions

Mann and Chaytor (1992) conducted a study to determine the learning needs of a population of family physicians in a defined geographic location (funding was provided by the Medical Society of Nova Scotia). A secondary aim of their study was to examine the validity of theoretical perspectives on physician learning (including Schön's reflective practice). Three-hundred-ninety (390) family physicians completed and returned the mailed-out questionnaire. Data collected via questionnaires included perceived learning

needs, patterns, and preferences and physician demographic and geographic data. Response frequencies and proportions were calculated and the effects of the various outcomes were calculated using parametric and non-parametric statistical techniques. A response rate of 50% was observed. Family physicians demonstrated an appetite for learning needs associated with socioeconomic and psychosocial topics. They preferred CME learning in lectures and workshops to other methods and identified universities and the College of Family Physicians of Canada (CFPC) as the most appropriate providers of CME. Though the authors used a framework that included adult learning, change and educational evaluation, without seeing the questionnaire, it is difficult to assess how these principles were applied in the data collection.

Each year the Collège des Médecins du Québec (CMQ), a provincial medical licensing agency, evaluates or retrains between 5 and 10 physicians (Jacques et al., 1995). This study aimed to develop a needs assessment tool for family physicians in Québec who have had difficulties in maintaining their competencies via CME activities. It was hypothesized that older physicians in non-academic settings would likely have the least access to CME and would form the bulk of physicians requiring evaluation or retraining. Six family physicians, aged 50 or older and without hospital privileges from Montreal were selected at random. Oral interviews were conducted with these family physicians with the aim of informing individual learning plans. Structured case-based interview guides were used: each family physician was briefed with 40 frequently encountered and important family practice clinical problems and then interviewed about their management approach by two interviewers who were recommended by the CMQ. Physicians were scored based on 10 performance indicators. Simple descriptive statistics were performed.

Ultimately, it was found that physicians were not able to accurately judge their

performance and by extension, their educational needs. The results of this study suggest

that objective measures of needs assessment would best serve individual CME planning.

This was a pilot study for the development of a needs assessment tool. A wider

application across a broad range of practicing family physicians would yield more

reliable results.

In another study, multidisciplinary focus groups were conducted where separate

groups of health professionals and patients reflected on the difficulties with diagnosis,

treatment of headaches and the role of continuing medical education (Lockyer, et al.,

1996). Focus groups have been used extensively in the assessment of health professional

learning needs, however they have not generally been conducted across different health

professionals or patients for a given group's learning needs. The intention of this study

was to determine the feasibility of using these types of focus groups as a needs

assessment technique for the treatment of chronic headache by family physicians. Sixteen

(16) physicians, 12 pharmacists, 12 allied health professionals and four patients

participated in discipline specific focus groups that addressed the following questions:

"What are the most difficult aspects of treatment? What resources have you found

helpful? What resources would you find helpful?" (p. 224). Groups were recorded and a

thematic analysis was carried out on the qualitative data by two researchers

independently of each other. The qualitative data provided rich details about health care

provider and patient experiences when treating chronic headache, such as willingness to

allow time to try different therapies and the bureaucratic impediments to a satisfactory

consultation. Allied health professionals were able to point to areas of weakness in

physician management and coordination of care. Knowledge gaps in diagnostics and treatment options were also noted. Traditionally, the data from physician focus groups may be combined with other physician-derived data to inform CME program planning. In this study the focus group data from other disciplines and patients was seen as complimentary to physician data and a possible future technique for conducting CME needs assessment. The difficulty in recruiting participants resulted in small participant numbers. Additionally, focus groups are time and labour intensive and data are often difficult to generalize to larger populations.

Psychiatric complaints form a large part of primary care medical practice (Toews, et al., 1996). However, it is an area where family physicians often feel inadequately prepared. The aim of this cross-sectional study was to assess a geographically defined group of family physicians' learning needs for encountering schizophrenia in practice. These needs were elicited through structured mailed questionnaires that prompted reflection on clinical practice. Five-hundred-thirty-nine (539) family physicians registered with the College of Physicians of Alberta in southern Alberta participated in the study, representing 43.8% of those solicited. Seventy-nine percent (79%) of these respondents practiced in urban areas. Simple descriptive statistics were used to analyze the quantitative data generated by the questionnaire. About fifty-three percent (53.5%) of physicians reported seeing at least one patient per month with schizophrenia in their practice. Physicians reported more knowledge, psychiatric consultation backup, and a greater awareness of community resources as the three factors most likely to positively impact their care of patients with schizophrenia. They were concerned with the amount of time required to learn the information necessary to diagnose and manage these patients

without referral to psychiatric services. The results of this survey suggest areas for CME attention with respect to schizophrenia and also point to some system-level barriers present in the management of schizophrenia in family practice. Several limitations are present. The study was limited to one area of one province and results may not be applicable to other areas of the same province. Though the authors explicitly state the design of the questionnaire as deliberately reflective in nature, no theory or framework was cited as its basis for development.

The diagnosis and management of mental health problems is a staple in general practice (family medicine) in the United Kingdom (Kerwick, et al., 1997). General practitioners have historically struggled with this aspect of practice in the absence of adequate postgraduate training in mental health issues. General practitioner learning needs with respect to mental health topics were assessed using a traditional mailed survey in this cross-sectional observational study. Two-hundred-thirty-seven (237) general practitioners in a family health services authority in southeast Thames returned the questionnaire (62% of those solicited). They provided data about the mental health topics about which they would be interested in obtaining CME training, their preferred formats of this CME content and willingness to participate in CME activities. Simple descriptive statistics were used to analyze the data. Though the authors reference the pitfalls of this method they did not integrate any theoretical framework into the design of this needs assessment. The major limitation of this study was the use of a self-reported self-assessment of interests that has been shown in the literature to be inconsistent and inaccurate in determining real learning needs.

Perol et al. (2002) assert that traditional methods of needs assessment do not capture the real needs felt by physicians in the moment of patient consultation. Their study aimed to create an assessment tool to provide a situated expression of needs for general practitioners in France. The hypothesis of this study is that family physician learning needs will be more accurately captured when they are expressed in the professional situation. In this randomized control trial, the intervention group reflected on challenging patient encounters in personal office-visit diaries for two weeks. After this time period the intervention group (n=519) used their notes from the diaries to express four learning needs that presented themselves through these patient encounters during a telephone interview. The control group (n=519) was asked to report four clinical situations for which they perceived a need for training in a telephone interview. The specificity "i.e., level of not being general or vague" (p.407) of these needs was coded. A variety of statistical tests were used to analyze the differences in specificity between groups: student t-test, chi-squared, odds ratios and multivariate regression. The intervention group was found to have expressed learning needs with greater specificity than the control group. This suggests that simple unguided reflection in a situated context provides greater detail about learning needs. There may be a role for this type of activity in individual learning plans. Limitations include intervention bias — the results may not hold true in a non-experimental setting.

The goal of Allan and Schaefer's study (2005) was to identify differences in general practitioners' learning needs between accessible and remote areas in Australia. This type of GP population needs assessment has rarely been conducted in Australia. In 13 geographic divisions, falling into one of five Accessibility/Remoteness Index of

Australia (ARIA) areas, 1762 general practitioners (58% male) were administered self-reported questionnaires that probed topics for CME. The overall response rate was 33% and ranged from 18-97% for the 13 divisions. Chi-squared analysis was used to compare the learning needs between groups of GPs among five ARIA measures. Though this study was hampered by low response rates, a significant difference was found for 19 of the 104 CME topics between accessible and remote GPs. The authors conclude that these differences provide support for the previous assertion that rural medicine is a distinct discipline and that the development regional CME curricula might be appropriate. Despite these differences, GPs showed no differences in learning needs for 85 of the 104 remaining topics. The results of this study were limited by the traditional form of self-reported data collected, which historically has proven to be an inaccurate method of revealing real needs.

3.5 Narrative synthesis

Each retained study had among its objectives to elicit educational needs of family physicians either with respect to a specific subject or more generally, the practice of family medicine. A deductive thematic analysis of the retained studies was conducted and is presented in Table 2.

Table 2 Thematic Analyses of Family Physician Learning Needs Empirical Studies: Reflective Elements

Study	Reflective Theoretical Framework	Reflective Tool	Reflective Learning	Other Reflective Reference

Study	Reflective Theoretical Framework	Reflective Tool	Reflective Learning	Other Reflective Reference
Allan, 2005	-	-	-	-
Mann, 1992	Schön: learning through reflection on practice	-	Schön: learning through reflection on practice	-
Jacques, 1995	-	-	-	-
Lockyer, 1996	Ramsey: peer evaluation including that provided by nurses can be a very helpful method of assessing cognitive and clinical management skills as well humanistic qualities and	-	-	'…may underscore the need to help physicians reflect on their practices and have objective data available to assist them to critically evaluate their practices'

Study	Reflective Theoretical Framework	Reflective Tool	Reflective Learning	Other Reflective Reference
	management of psychosocial aspects of illness			
Towes, 1996	-	-	-	'The study was designed to have physicians reflect on their clinical practices related to the management of patients with schizophrenia and to determine their interest in educational opportunities designed to

Study	Reflective Theoretical Framework	Reflective Tool	Reflective Learning	Other Reflective Reference
				improve the care they provided'
Kerwick, 1997	-	-	-	-
Perol, 2002	Al-Shehri: locating general practitioners in their professional situation when expressing their learning needs	Personal office visit diary: '[GPs] were asked to note every day in their dairies any difficult situations encountered during their office of home visits… asked to read over their notes and then to summarize the	-	'However, it has also been suggested that the questions used to assess "actual" knowledge should be directly relevant to the daily practices of the practitioners tested'

Study	Reflective Theoretical Framework	Reflective Tool	Reflective Learning	Other Reflective Reference
		difficulties under four training needs expressed in terms of needs in general practice situations'		

Three of the a priori deductive thematic analysis themes were quite specific: reflective theoretical framework, reflective tool, and reflective learning. The fourth and final theme was a catchall category for all other reflective references in the manuscript of the study. The only consistent emergent theme from this preliminary analysis is described under the other reflective references theme.

Canada has been a leader in the published discourse around the assessment of family physician learning needs being the setting of four of the seven retained studies (Table 1). These studies span between 1992 and 2005 and are observational with the exception of one randomized control trial. This trend suggests that observational designs might also be typical of those employed in unpublished needs assessments.

The methods and tools used among the studies included both qualitative and quantitative instruments and ranged from the traditional survey of physician interests, to focus groups and diaries. All instruments relied on self-reported data and involved various levels of reflection. The least reflective instrument merely asked physicians to identify topics they would like to learn about from a predetermined list (Allan & Schaefer, 2005) while the most developed reflective instrument incorporated constructivist situated learning principles, which allowed the practitioner to evaluate their knowledge within a clinical context using data from the experiences recorded in personal office visit diaries (Jacques, et al., 1995). Two other studies (Lockyer, et al., 1996; Toews, et al., 1996) made explicit reference to this ideal that self-assessment questions be relevant to physicians' clinical experiences. However, even though these three needs assessments (Jacques, et al., 1995; Lockyer, et al., 1996; Toews, et al., 1996) recognized a role for reflection (as the linking activity between identifying learning needs and clinical practice experiences), only one (Lockyer, et al., 1996), in addition to Mann (1992) and Perol (2002) referred to theoretical frameworks with reflective undertones. Of these three, only one, Mann (1992), referred to an explicitly reflective framework. From the seven published studies featured in this review, there appears to be no trend in the methods, instrumentation, or theoretical frameworks employed in the learning needs assessment of family physicians. From this follows that the concept of reflection is not always clearly defined and its use in the studies is not standardized. This appears to be the case both within Canada and internationally.

3.6 Summary of reviewed literature

Reflection is an ill defined but often referenced concept that may be able to occupy the space between experience (clinical practice) and evidence-based needs assessment (research), and CME planning, development, and execution (practice). Of the papers retained, it was difficult to assess the standardization of reflection of each needs assessment tool without access to the tools. Only two studies were explicit about employing reflective theoretical frameworks in their design and data collection. This suggests that even if the other studies had utilized reflective assessment tools this was not by design. In general, the lack of theoretical frameworks underpinning the research is typical of most continuing medical education needs assessment strategies (K. V. Mann & Chaytor, 1992).

Family physician continuing medical education needs assessments have to date been largely ad hoc, not based on evidence, and without grounding in theoretical frameworks. External data was sometimes collected in the retained studies in this review. This is not surprising as the call for using external data to reveal learning needs is recent. Few studies have integrated elements of reflective learning into their tools and design though several studies acknowledge the importance of relating assessments to real-life clinical experiences for revealing true learning needs. This suggests that the application of IAM will be a novel approach, particular as it is applied at a population level. IAM's theoretical underpinnings will likely raise the perceived scientific merit of assessment as well as ground the assessment in a context that makes sense to the larger education community. Finally the suggestion by several studies that the need assessment must be linked to the clinician's practice for maximum benefit/specificity of revealed needs

confirms that reflection, as an element of learning needs assessment, is worthwhile of

formal exploration.

4. Methodology

This research was conducted in the context of an ongoing national CME program, based on content from the CPhA's electronic version of 'Therapeutic Choices' (e-Therapeutics+ Highlights), for members of the College of Family Physicians of Canada, which started January 20, 2010. Program participants include family physicians that earned credits for their participation. Due its national scope, this program provided an excellent opportunity to collect data for the purpose of assessing potential learning needs of a large sample of the Canadian family physician population. What is more, in contrast to the common practice of unstructured reflection, i.e., self-assessment, used in traditional CME needs assessments, as discussed in the literature review, the present investigation required individuals to reflect in a systematic fashion on their knowledge gaps while in the midst of encountering information. The endeavour of capturing accurate, timely, population-level data is benefitted by this approach. This 'in situ' design is intended to address the well-documented gap between the research (needs assessment included) and practice of CME (Fox, 2000; MacIntosh-Murray, et al., 2006). In fact, it is this very novel and unconventional feature of the methodology that may contribute to the development of evidence based CME planning and development. In this context, and in order to better address the well-documented, and previously discussed, gap between research (needs assessment included) and practice of CME, I decided to conduct a mixed-method study. Before detailing the elements of the methodological approach I adopted, I will first describe the IAM tool.

4.1 Instrument – The Information Assessment Method

IAM (Figure 1 and Appendix C) is a four-construct, 23-item reflective tool with one free text comment box co-developed by Drs. Pluye and Grad (Information Technology Primary Care Research Group, Department of Family Medicine, McGill University: www.iam2009.pbworks.com). The Information Assessment Method (IAM) systematically documents reflection on relevance, cognitive impact, use, and health outcomes of objects of information delivered or retrieved in electronic knowledge resources. IAM can enhance continuing education (reflective learning), evaluation of resources, and two-way knowledge exchange between information users and providers. Using literature reviews, qualitative, quantitative and mixed methods studies, the substantive validity (theoretical rationale), construct validity, and content validity of the IAM questionnaire have been documented (Pluye, Grad, Granikov, Jagosh, & Leung, 2010; Pluye, Grad, Johnson-Lafleur, et al., 2010). When combined with a technique called Computerized Ecological Momentary Assessment, IAM can efficiently evaluate the 'relevance-impact-use-outcomes' of information objects retrieved from (pull) or delivered by (push) electronic knowledge resources (ITPCRG, 2009).

4.1.1 Substantive validity

IAM is based on a theoretical model from information science called the 'Acquisition-Cognition-Application' (ACA) model. To illustrate the ACA model in the context of receiving email alerts, health professionals (a) filter emailed information according to relevance and choose to read a specific email alert (Acquisition), (b) absorb, understand and integrate the information in the alert

(Cognition), and then (c) may use this newly understood and cognitively processed information (Application). IAM items operationalize these ACA constructs and follow these phases.

A recent literature review in health sciences and four other disciplines (communication, information studies, education, and knowledge translation) suggested a final phase to the ACA model, namely 'Outcomes' (Pluye, Grad, Granikov et al., 2010). In the context of receiving email alerts, these outcomes were operationalized as 'expected patient health benefits' resulting from the use of information contained in one alert. As such, the version of IAM used (2008) in this research operationalizes this evolved Acquisition-Cognition-Application-Outcomes (ACAO) model, and documents the value of delivered clinical information using the corresponding four constructs: (a) clinical relevance for a specific patient, (b) its cognitive impact (10 item response categories), (c) any use of this information for a patient (four item response categories), and (d) if used, any expected health benefits (five item response categories).

4.1.2 Content and construct validity

The IAM questionnaire was validated in the pushed information context using a longitudinal mixed methods design where 46 physicians read and rated information objects (InfoPOEMs) (Pluye, Grad, Johnson-Lafleur, et al., 2010). Raters were then interviewed to provide explanations of their cognitive impact ratings. The quantitative ratings and the qualitative explanations were then analyzed for concordance. Three IAM items were modified based on the results.

With regard to IAM linked to email alerts of research-based clinical information (pushed), over a 150-day study period, 1,007 participants submitted 61,493 reports of 'cognitive impact' by rating on average 61 InfoPOEMs (range 5-111). Factor analysis indicated that IAM items corresponded to independent factors (Grad, et al., 2008; Pluye, Grad, Granikov, et al., 2010). This construct and content validity suggested IAM items and corresponding results can be considered and analyzed separately to address our research question..

Figure 1 Screenshot of Instrument – The Information Assessment Method (IAM) linked to an information object.

4.1.3 IAM and the continuing medical education reflective learning framework

A framework for the operationalization of reflective learning was both developed and validated in a CME context through the development and application of IAM (Leung, et al., 2010). This framework is based on Dewey's explanation of reflection, Schön's reflective learning theory, Resnick's work on higher-order thinking, and Donald's model of higher-order learning (Leung, et al., 2010). Four cognitive processes, i.e. interpretation, verification, generalization and change, were described as properties of reflective learning. The cognitive tasks within these four processes were supported by data collected in a similar e-learning CME environment as the present work, and are presented in Appendix D. This reflective learning framework served to ground IAM in educational theory. Completing the IAM questionnaire, in the context of a CME program, was thus conceived as a brief individual e-learning activity (a reflective exercise). This pertains to this thesis because reflection is explored as a potential cognitive process for eliciting learning needs data. The end goal of the present study is to explore whether relevant IAM data may reveal learning needs by way of such reflective process.

4.2 Data collection and analysis

Considering the research questions aimed at potentially identifying learning needs using reflective data generated using IAM and the potential meanings of this needs assessment data for CME program planning, as well as the need to have a manageable material for explanatory interviews, I focused on the three IAM items that directly addressed these questions, and referred specifically

to learning (1.2 I learned something new, 1.3 I am motivated to learn more), and

clinical relevance (2.1 Totally Relevant). These three items were selected for the

following reasons:

1) 'learning' and 'motivation to learn' are the only positive cognitive impact

    items associated with encountering new information, and

2) 'relevance' provides an indication of the relationship between CME content

    and actual problems encountered in clinical practice.

Other IAM 'cognitive impact' items, such as "this information confirmed I did

(am doing) the right thing", and IAM items on the use of information and

subsequent patient health outcomes, were not retained as they did not *directly*

address the research questions which are concerned with possibly associating

selected IAM data to learning needs and the potential application of this specific

data for the purposes of CME program planning.

4.3 Mixed Methods Research Strategy

A sequential explanatory mixed methods design, as described by Creswell

and Plano Clark (2007), was selected to meaningfully collect, describe and

contextualize the IAM-generated data. Among the different mixed-methods

research designs, this was considered the more appropriate to answer my research

questions around learning needs and CME prioritization. Accordingly, neither the

quantitative nor the qualitative phases of the design were intended to stand alone

as distinct research pieces. Together, they produced complimentary and

interwoven data that was considered in a current and practical context (Figure 2).

This study obtained ethical approval from the McGill University Institutional

Review Board (Appendix E).

Phase	Setting/Participants	Data Collection	Data Analysis	Outcomes
QUANTITATIVE	CFPC*-member family physicians Approximately 4300	IAM question-naire linked to e-Therapeutics+® highlights	Descriptive statistics	Population level learning needs trends and rankings
			— INTEGRATION —	
QUALITATIVE	10 continuing profes-sional development key informants	Structured telephone interviews	Inductive thematic analysis	Meaning of Rankings Implications for CME

*CFPC = College of Family Physicians of Canada

Figure 2 The mixed methods a priori design.

4.3.1 Quantitative phase

In this phase, I collected, and then described data generated by a sample of

Canadian family physicians using IAM. The participation of family physicians in

this continuing education program happened as follows: each week over a 22-

week period (i.e. the 22 Highlights), approximately 17,000 family physician-

members of the CFPC received an email from the CFPC with a link to the

continuing education activity (see Appendix A for an example email). The CME

activity consisted of an information object (knowledge product[3]), an e-

Therapeutics+ Highlight, coupled with the IAM. The e-Therapeutics+ Highlights

were green-text short synopses of evidence in support of a clinical

recommendation based on the CPhA's publication entitled 'Therapeutic Choices'.

They were embedded within larger chapters (black text) that contain additional

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[3] The term 'knowledge product' was consistently used by the CME participants to describe CME educational material.

text and tables (see Figure 3 for a screen shot of an e-Therapeutics+ Highlight,

and Appendix E for the 22 Highlights emailed to CFPC members). Physicians

were asked to read the Highlights (green text only) and rate the information they

contained using IAM. For completion of this activity, they earned 0.1 Mainpro

M1 credits (equivalent to six minutes of continuing education activity). The

Highlights were proposed by the CPhA Editor-in-Chief, and selected by the CFPC

Director for Continuing Professional Development.

regular stretching may be of benefit in preventing cramps.

Pharmacologic Choices Back to Top

Quinine sulfate has been used for decades to manage nocturnal leg cramps; its proposed mechanism of action involves decreasing the responsiveness of the motor endpoint to nerve stimulation by increasing the muscle refractory period. Clinical trials have not conclusively demonstrated its effectiveness. A meta-analysis did show a reduction in frequency of cramps but not in severity or duration.[1] It is reasonable to give a patient a four- to six-week trial of quinine at a dose of 200 to 300 mg at bedtime. Higher doses of quinine are associated with dizziness, visual impairment, tinnitus, gait disturbance, headache and hypersensitivity reactions. Fatal thrombocytopenia has also been reported. At the lower doses used for nocturnal cramps, usually only tinnitus is commonly reported. However, patients need to be counselled about the more serious side effects. Treatment should be interrupted every three months to assess further need.[2] [Earn MainPro Credits]

There is minimal evidence for other therapies for leg cramps. A crossover trial of vitamin E failed to show any benefit.[3] Results for magnesium supplementation (300 to 900 mg per day) have been mixed.[4],[5] Small, randomized, double-blind or cross-over studies have shown potential benefit of diltiazem 30 mg daily,[6] vitamin B complex[7] and orphenadrine citrate.[8] Open-labelled trials of gabapentin[9] and verapamil[10] showed some potential benefit. These studies are of insufficient sample size to allow for recommendation of the respective therapies; therefore, risk-benefit analysis must guide therapy for individual patients.

Therapeutic Tips Back to Top

- Check patient's medication history carefully before treating cramps.
- Use quinine cautiously, only if cramps are frequent and severe and nonpharmacologic measures have failed.
- Regularly reassess use of quinine, as cramps can resolve spontaneously or after a short duration of therapy.
- Cramps rarely need referral unless associated with other neurologic complaints or signs.

Table 1: Management of Nocturnal Leg Cramps (Printable Table)

Class	Drug	Dose	Adverse Effects	Drug Interactions	Comments	Cost[a]
Cinchona Alkaloids	quinine sulfate generics	200–300 mg QHS	Tinnitus; higher doses have been associated with dizziness, gait disturbances, visual impairment, headache, potentially fatal thrombocytopenia.	May potentiate the effect of warfarin — monitor INR; may ↓ digoxin clearance — monitor serum concentration; ketoconazole may reduce quinine clearance and ↑ toxicity; rifampin may ↑ quinine clearance and reduce effectiveness.	Withdraw therapy every 3 months to reassess need.	$

[a.] Cost of 30-day supply; includes drug cost only.

Legend: $ $5–15

Suggested Readings Back to Top

Figure 3 Example of an e-Therapeutics+ Highlight.

The data analyzed in this thesis was collected in a participatory CIHR-funded McGill IRB approved knowledge translation project. The partners were researchers at McGill Department of Family Medicine, the Canadian Pharmacists Association (CPhA) and the CFPC. In connection with an independent private information technology company, the partners of this project designed and implemented the weekly data collection process (following internal testing and an introductory email). The collected data was rendered anonymous and aggregated by the independent information technology contractors before being released to the project partners (including researchers) (Figure 4).
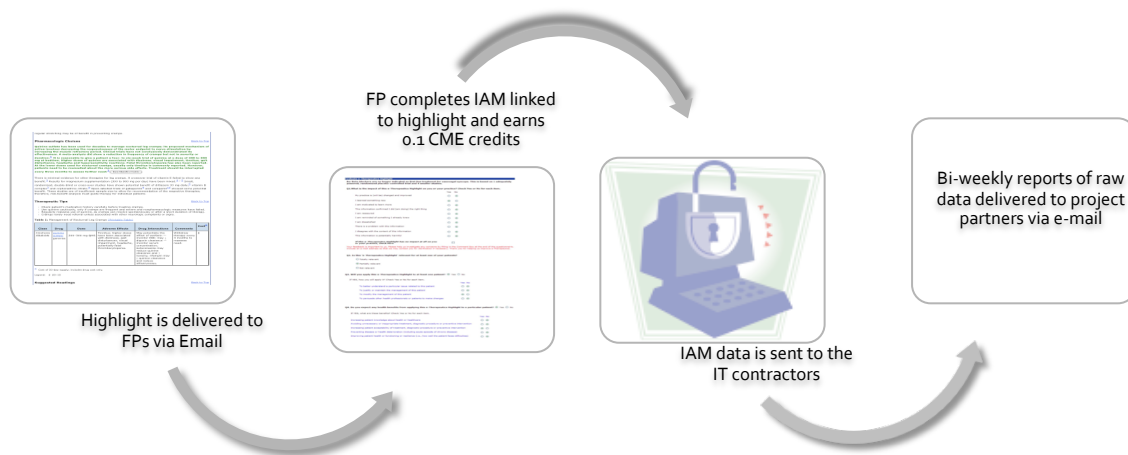
Figure 4 Schematic of quantitative data collection process.

Data for the 22 Highlights were presented to the participants. For each Highlight, sample descriptive statistics were computed using MS Excel 2008 version 12.2.8 for the following variables: response rates, learning, motivation and relevance. The results were presented in graphical formats for interpretation and discussion by the participants in the qualitative phase. Simple descriptive analysis of this data allowed for greater accessibility to the outcome measures for the participants, a

group comprised of both continuing medical education administrators and researchers with varying levels of formal research and statistics training.

4.3.3 Qualitative Phase

The qualitative component of this work followed the quantitative phase both temporally and in its approach. A descriptive approach, specifically qualitative description as described by Sandelowski (2000) was selected as the most appropriate, particularly in a mixed methods design, for the following reasons: a) qualitative description is an often used but seldom named methodological approach in which the reporting of results stays close to the data and may even be organized and analyzed using the descriptive techniques most familiar to novice researchers and clinical audiences (Sandelowski, 2010); and b) it is suitable for limited time and resources, is applicable by those without formal research training (for example, clinicians), often identifies directions for further research and can take on the flavours of other methodologies (for example ethnography) (Sandelowski, 2000). For these reasons, qualitative description was determined to be accessible to both myself, as a researcher-in-training and the policy and practitioner audience that is most likely to consider and possibly implement the findings.

4.3.3.1 Interviewees

As one goal of this research is to explain what this data means in the context of a needs assessment, while the end goal is to explore how it might be used specifically to facilitate learning needs assessment, I considered decision-

makers and researchers in CME as participants in this phase of the investigation. I

am conscious that the IAM data may prove to be useful in other ways for CME

developers; however this was not the focus of this research[4].

I therefore interviewed a purposeful sample of administrative and research

participants in Canadian continuing medical education/continuing professional

development. They were first identified by a member of this thesis committee

who resides in the McGill Centre for Continuing Health Professional Education

(CCHPE), from Canadian literature, as well as through key informant networking

(snowball sampling). Having said this, maximum variability both in terms of role

(researcher versus administrator) and geography (pan-Canadian) was a priority in

key informant selection. Once selected, they were formally recruited through an

email invitation although in some cases, informal recruitment occurred prior to

the email invitation in person, by phone or through my thesis committee members

and their colleagues (see Appendix F for the email invitation). Participants

received a copy of the interview guide, which also included the questions and the

quantitative results, via email one week prior to the scheduled interview date.

4.3.3.2 Method for Gathering Qualitative Data

I adopted semi-structured telephone, one-to-one, hour-long interviews as a

privileged method for gathering qualitative data. In line with the features of data

collection in qualitative description, I constructed a structured interview guide

based on the quantitative data that allowed for prompts and the opportunity for

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[4] The role of the IAM for product development was addressed in the CIHR-
funded evaluation of the larger participatory project with knowledge product
developers outlined in the background section.

key informants to expand or clarify their responses (see Appendix G for the

English guide and Appendix I for the French guide and their respective consent

forms). The questions were modeled to elicit the Who, What, Where, When, Why

and How of the quantitative data from the first phase of the mixed methods

design. Interviews were digitally recorded and transcribed verbatim using Nuance

Dragon Dictate version 2.0.

4.3.3.3 Method for analyzing qualitative data

In keeping with the characteristics of qualitative description, an inductive

approach to generating initial codes from the transcribed interviews was taken

(Sandelowski, 2000) (see Appendix I). A semantic thematic analysis (Braun and

Clarke, 2006) was employed as all subthemes would be reported regardless of

frequency in order to paint the most comprehensive descriptive portrait of this

data as possible (Table 3).

Table 3 Approach to thematic analysis as per Braun and Clarke (2006)

Phases	Description
Familiarizing yourself with your data	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.

Reviewing themes	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Initial codes were mapped with like codes to produce groups of related codes (see Appendix J). These groups of related codes formed the initial emergent themes from the data. Even at this early mapping stage, several initial codes were found to be equally relevant to multiple emergent themes. Subsequent reviews of the map resulted in the splitting and merging of several initial themes. The initial codes belonging to the final themes were expanded into subthemes (Appendix K). The final stage of thematic analysis was the organization of themes and subthemes to facilitate answering my research questions (Appendix L). Following

data analysis, I translated all quotes extracted from French interviews into

English.

5. Results

5.1 Quantitative Results

The results presented in this subsection stem from quantitative data collected between January 19, 2010 and June 15, 2011.

5.1.1 Description of demographic and professional characteristics of raters

Family physicians who rated at least one of the 22 Highlights are referred to as raters. Distinct raters totalled 3690. The average participation rate was 31.4 %. Raters that identified as male comprised 48.0%. The remaining 52.0% identified as female. Regarding language of practice, 98.5 % of raters reported speaking English with their patients, 12.3% reported speaking French with their patients, and 12.8% of all raters reported speaking other languages with their patients. As shown in Figure 5, 57.0% of raters reported being 41 years or older.
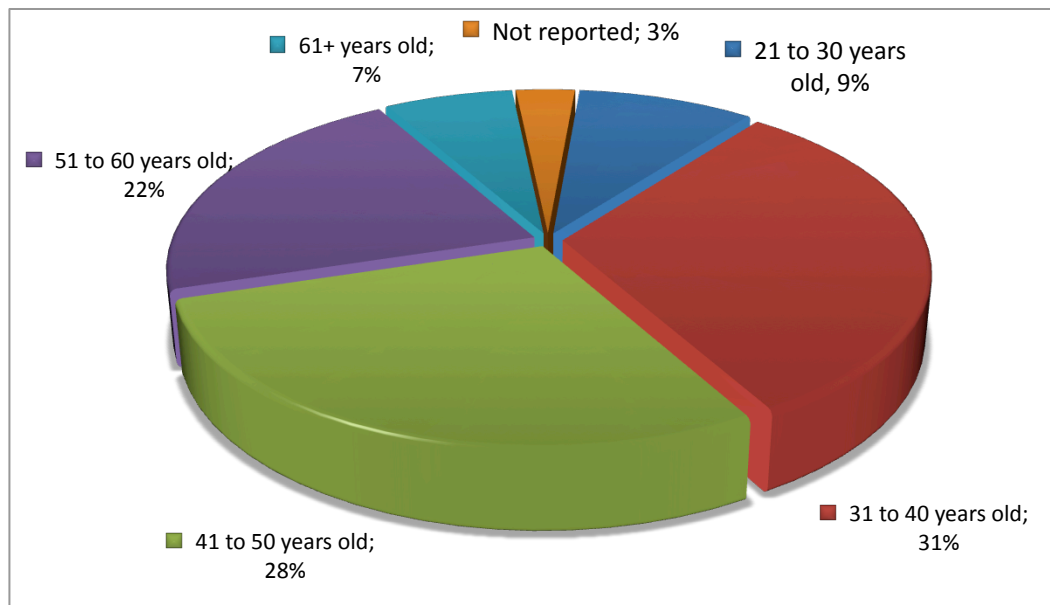
Figure 5 Distribution of family physician raters by age group.

Raters were asked to indicate all settings that best described where they work (Figure 6). Two-third of raters (66.5%) worked in private offices or clinics, excluding freestanding walk-in clinics. Community hospitals, emergency departments, and community health centres were the next most common work settings.
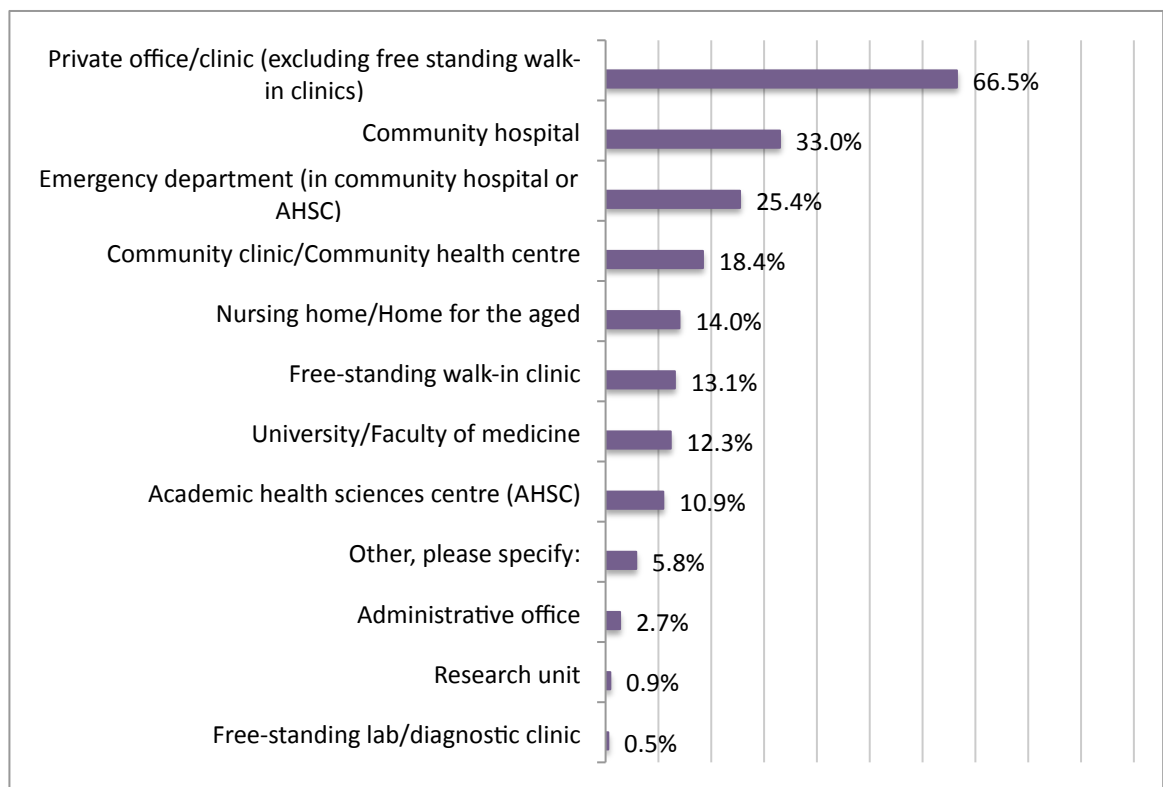
Figure 6 Description of work settings of raters

More than nine out of 10 raters (93.1%) included clinical family medicine among their practice areas (Figure 7). The next most common practice areas of raters were chronic disease management, geriatric medicine, paediatrics, hospital inpatient care, and emergency medicine.

Family practice / general practice	93.07%
Chronic disease management	44.63%
Geriatric medicine	40.13%
Paediatrics	37.42%
Hospital inpatient care	33.87%
Teaching	33.71%
Emergency medicine	32.50%
Administration	14.00%
Intrapartum care	13.83%
Other	8.72%
Research	6.29%
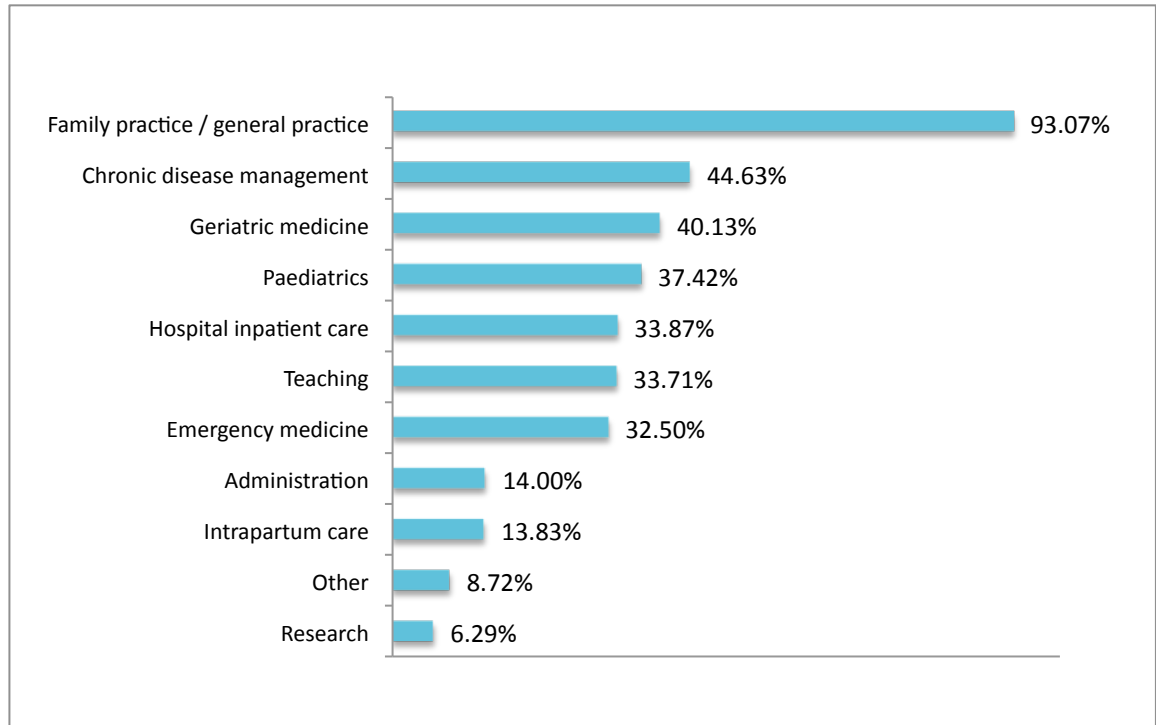
Figure 7 Description of practice areas of raters

5.1.2 Distribution of ratings for the 22 Highlights

On average 675.2 ratings per Highlight were collected (range from 414 to

1176) (Figure 8). Following the first Highlight, a downward trend was

observed with the lowest number of ratings occurring at Highlight three. From

Highlight four, the ratings appeared to stabilize around the mean. The most

frequently rated Highlight 'ADHD' was the first Highlight in the data

collection period, which may be associated with a 'novelty effect' (week 1).

'Cannabis and Psychosis' was the least frequently rated (Highlight three).

Ratings in order of Highlight delivery
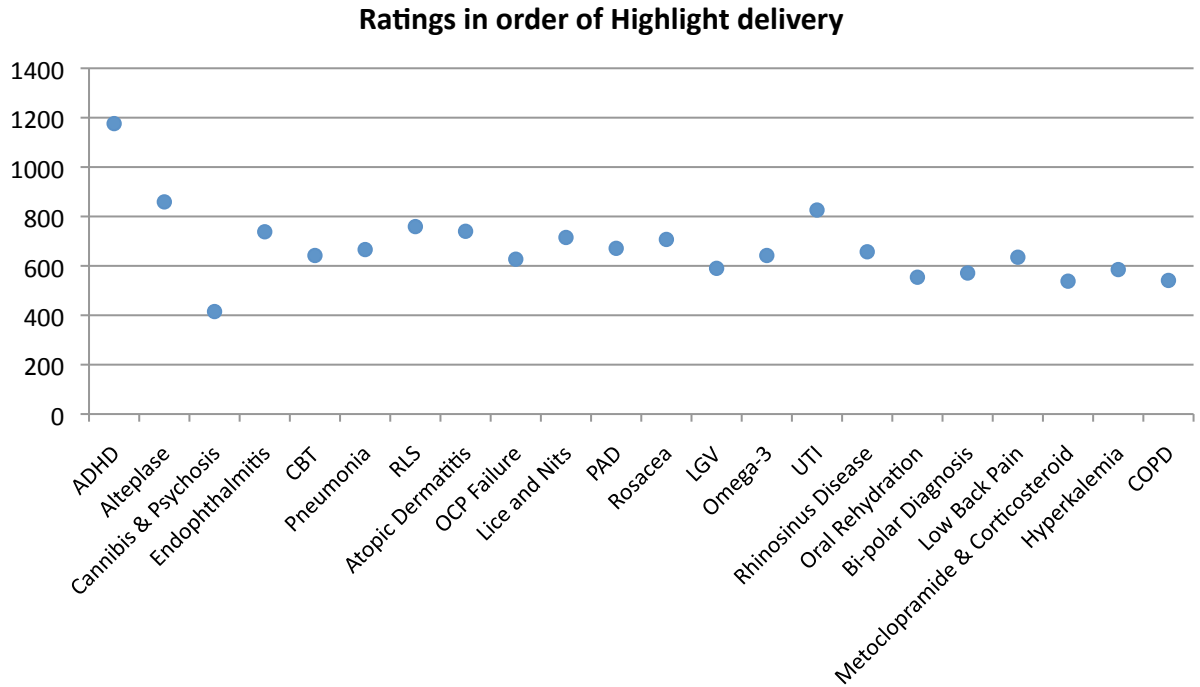
Figure 8 Number of ratings per Highlight in chronological order of email delivery

Overall, 14854 total ratings of 22 Highlights were collected. This denominator is the basis for the data presented in Table 4. In general, 89.7 % of the time the information contained in the Highlights was rated as being at least partially clinically relevant to a specific patient within participating physicians' patient populations.

Table 4 Global ratings of all IAM items for the 22-Highlight data set.

I. COGNITIVE IMPACT*

What is the impact of this e-Therapeutics+ Highlight on you or your practice?

	yes (%)	no (%)	possibly (%)	disabled (%)

My practice is (will be) changed and improved	35.7	44.3	20.1	0.00
I learned something new	54.6	38.6	6.8	0.00
I am motivated to learn more	46.0	44.9	9.1	0.00
This information confirmed I did (am doing) the right thing	50.2	39.3	10.6	0.00
I am reassured	53.0	40.7	6.4	0.00
I am reminded of something I already knew	44.7	49.2	6.1	0.00
I am dissatisfied	1.0	98.2	0.9	0.00
There is a problem with this information	0.7	98.3	1.0	0.00
I disagree with the content of this information	0.7	98.4	0.9	0.00
This information is potentially harmful	0.3	99.0	0.7	0.00

II. CLINICAL RELEVANCE

Is this e-Therapeutics+ Highlight relevant for at least one of your patients?

Totally Relevant (%)	Partially Relevant (%)	Not Relevant (%)
59.8	29.9	10.3

III. INFORMATION USE*

Will you apply this e-Therapeutics+ Highlight to at least one patient?

	yes (%)	no (%)	possibly (%)	disabled (%)
	60.0	7.6	22.2	10.3

If yes, how will you apply it?

	yes (%)	no (%)	possibly (%)	disabled (%)
To better understand a particular issue related to this patient	28.2	29.8	3.1	39.0
To justify or maintain the management of this patient	42.1	16.5	2.4	39.0
To modify the management of this patient	30.9	24.8	5.3	39.0
To persuade this patient or other health professionals to make changes	14.5	40..0	6.6	39.0
Other	8.3	47.4	4.1	40.1

IV. EXPECTED PATIENT HEALTH BENEFITS*

Do you expect any health benefits from applying this e-Therapeutics+ Highlight to a particular patient?

	yes (%)	no (%)	possibly (%)	disabled (%)
Increasing patient knowledge about health or healthcare	21.9	18.6	1.9	57.6
Avoiding unnecessary or inappropriate treatment, diagnostic procedure or preventive intervention	23.2	17.5	1.7	57.6
Increasing patient acceptability of treatment, diagnostic procedure or preventive intervention	26.0	14.6	1.8	57.6
Preventing disease or health deterioration (including acute episode of chronic disease)	23.3	17.1	2.0	57.6
Improving patient health or functioning or resilience (the way patients face difficulties)	19.8	20.5	2.1	57.6
Other	1.4	39.5	1.5	57.6

5.1.3 Selected learning and relevance item ratings

The three IAM items of interest for this exploratory study include (1) learning, (2) motivation to learn more, and (3) clinical relevance. On average, raters reported learning something new in 54.5% of their ratings. The highest proportion of ratings 'I learned something new' was reported for the Highlight 'Lymphogranuloma Venerum' (74.2%), and the lowest for the Highlight 'Low back pain' (26.9%), which refers to one of most frequent symptoms reported by family physicians' patients. Raters reported being motivated to learn more about the Highlight topics in 45.7% of their ratings. The highest proportion of ratings 'I am motivated to learn more' was reported for the Highlight 'Attention Deficit Hyperactivity Disorder (ADHD)' (56.0%), and the lowest for the Highlight 'Lice and nits' (35.5%). On average, Highlights were found to be relevant to at least one of the raters' patients in 59.3% of ratings. The most relevant Highlight was 'Low Back Pain' (79.4%). The least relevant Highlight was 'Metoclopramide and Corticosteroids' in chemotherapy induced nausea and vomiting (37.9%), which corresponds to highly specialized care. Table 5 describes the proportion of ratings per Highlight for the three items of interest. A graphical representation of the three items of interest is presented in Figure 9.

Table 5 IAM ratings per e-Therapeutics+ Highlight for three items of interest

Highlight Title	Ratings (N)	Learning %	Motivation %	Relevance %
ADHD	**1176**	59.6	**56.0**	64.5
Alteplase	859	53.3	50.4	48.9
Cannabis & Psychosis	**415**	60.5	49.2	47.0
Endophthalmitis	738	67.5	47.0	50.3
CBT	642	56.5	49.1	50.6
Pneumonia	666	50.9	48.2	67.3
RLS	759	66.8	49.9	61.1
Atopic Dermatitis	740	67.4	47.0	73.8
OCP Failure	627	62.7	43.4	49.4
Lice and Nits	715	50.1	**35.5**	62.5
PAD	671	69.0	53.7	57.7
Rosacea	707	49.9	41.6	63.6
LGV	590	**74.2**	55.4	43.2
Omega-3	642	50.8	46.9	55.8
UTI	826	34.9	35.6	66.2
Rhinosinus Disease	657	55.6	42.8	66.5
Oral Rehydration	554	45.1	42.4	50.9
Bi-polar Diagnosis	571	47.8	53.1	59.0
Low Back Pain	635	**26.9**	38.3	**79.4**
Metoclopramide & Corticosteroid	538	67.3	41.3	**37.9**
Hyperkalemia	585	46.3	38.6	74.9
COPD 2.2	541	34.8	39.7	74.5
Mean	675.2	54.5	45.7	59.3
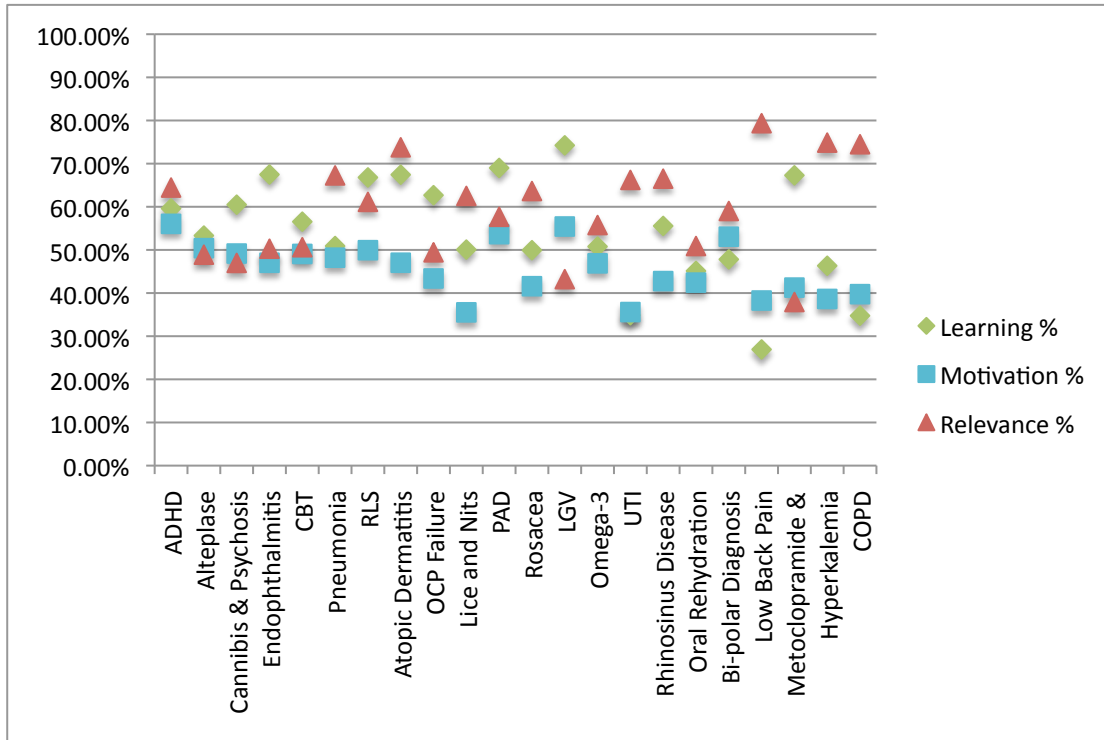
Figure 9 Comparison of learning, motivation, and relevance ratings included in the 22-Highlight data set.

5.2 Qualitative Results

Quantitative results concerning the demographics of family physicians, their work environments, practice area and the IAM ratings of learning, motivation, and relevance were presented to the CME key informants in the qualitative component of this research (see Appendices H and I for the interview guides in English and French).

All key informants participating in this investigation held senior leadership positions at academic centres or at the national regulatory and accreditation level. Maritime (1), Central [Quebec (1), Ontario (2)], and Western (2) provinces were represented in an effort to achieve maximum variability in geographic sampling

which, as one informant noted, is comparable to the composition of the National

Committee on Continuing Professional Development. These six interviewees

consisted of a mix of researchers and administrators with the majority having

significant experience in dual or hybrid roles. After formal consent to be

interviewed was obtained, I carried out structured phone interviews lasting 45 min

to one hour with the interviewees.

5.2.1 Thematic analysis

Key informants' interpretation of and thoughts about the data fell into five

overarching themes: (1) family physician learning needs, (2) needs assessment,

(3) IAM data and its uses, (4) the knowledge product, and (5) reflective practice

in continuing professional development. Each theme integrated several subthemes

that, when appropriate, were organized using the framework provided by

qualitative description (Who, What, When, Why and Where).

Theme #1: Family physician learning needs

According to CME experts, what does IAM data reveal about family

physician learning needs?

For most of the informants, IAM data is difficult to interpret, especially in

the absence of physician demographic data that includes geographic location: *"If I*

was able to use it I would like to have some geographic differentiation." And:

> *"Well that's something that you may look at the data is there a difference*
> *between male and female physicians how they score that particular one*
> *just because you know female physicians typically see more female*
> *patients but not always. It depends on the community of course and the*
> *physicians that practice in that community."*

And:

> *"So if I was going to use for [place removed], I want to have the dated just for the respondents from [place removed]. And I'd have to have some idea of the summary I'm sorry I forgotten what you call of them…And I'd like to know if possible about the docs themselves so are the docs with a special interest you know some family docs will have a special interest in pain management or sports medicine".*

They also consider that IAM data does reveal confirmatory information about the types of clinical problems family physicians face in practice and the knowledge they possess. It provides data from family physicians themselves at a depth not usually seen in needs assessment. Some informants suggested that the data does not reveal anything directly about learning needs of family physicians who participate in the program, because it may be difficult to define learning needs in the context of such a diverse medical specialty. As one of the informants stated:

> *"The problem with the nature of family practice is you don't know how relevant it's going to be. The problem with family medicine is you have to know something about everything. And so every kernel is just about as valuable as every other. Some of them you're going to use more but it doesn't mean that one is less valuable than the other because when you really need it you need it."*

Also:

> *"I think if you sat right in the office and saw people come in with these problems you wouldn't be surprised to see any of these topics, any of these things in a given day. And you need to be knowledge ready for them."*
>
> *"Well basically it's [needs assessment] a big black box that we are feeling around in. I think it's guesswork"*

Regarding the context of its application, i.e. where, and while this IAM data was collected nationally, all informants stressed the need for the data to describe smaller, more specific populations of family physicians, for example rural, urban, provincial, and regional (see also the practice settings described in

the quantitative results section): *"The combined data can be used by planners –*

but you have to be careful, it's aggregated data. I would like to see the

researchers present the data by region with the limits [of the data] well

described."

Theme #2: Needs assessment

According to the experts in CME, why is IAM data of interest with respect

to needs assessment?

In keeping with the literature, informants stated that high-quality scientific

need assessments in CME are difficult to conduct (Eva & Regehr, 2008; Myers,

1999):

> *"Something like a real good needs assessment is hard work. To determine*
> *what the needs are and rather than just getting sent e-mails or something*
> *in the mail from educational company saying what you want to know or*
> *would you like to learn more about A B or C you really have to do a lot of*
> *work."*

As a result, there is a perceived paucity in the quality of data program participants

have been exposed to in practice: *"Well I think this is novel because we haven't*

had it before you know were all struggling to get better data that can guide

educational programs." Data in general, specifically new types of high quality

data are needed, sought, and valued by CPD researchers and administrators.

Informants in my study consider that multiple sources of data (e.g. electronic

medical records and billing documents) are necessary for confirmation of learning

needs and IAM data may fill this role as one type of data:

> *"Maybe you need to work with the ministries of health and the ICD codes.*
> *Or really doing a lot of research and saying "what's the environmental*

scan on diabetes…" I mean, if you did some really good data mining and got a lay of the land well, why are all these people in renal failure?"

In particular, IAM data may help to reveal learning needs that are not

recognized by physicians when they are directly asked about their needs.

Currently there exists disconnect between data collection in needs assessment and

the actual practice of family medicine. Reflective learning is featured, though

implicitly, throughout CPD activities including needs assessment. As noted by

one of the informants:

> *"And I mean honestly it would be a lot of work but that's what the needs should come from because do I know my needs? I don't know. But maybe if you look at the data and analyze what I do either myself or in a collective, then maybe they can determine what the needs are."*

Additionally, the topic of industry-bias in needs assessment was raised.

With the a marketing driven approach to needs assessment that is often seen by

pharmaceutical interests consulting firms and medical education firms often act as

middlemen: *"Sorry I said that kind of tongue-in-cheek. I have a bias against big*

Pharma. They kind of promulgate the program". And:

> *"So they hire a medical communication company and the medical education company sends out questionnaire to a bunch of docs either electronically or by mail or whatever. And then you know the questionnaire says do you want to learn more about diabetes and you know most of us say yeah sure why not. You want to learn more about stroke? And of course to my mind driving these assessments is the pharma company desire to promote their drug"*.

What is more, it was suggested several times that there is disconnect

between the data collection process in needs assessment (and the needs

assessment process in general) and the practice of family medicine:

> *"Yep yeah and umm again you've got to make sure that you have good data. In [place removed] and it's probably similar in other provinces if I see a patient I fill out you know I bill for my service okay so you're only*

allowed one diagnosis so because that's when all you can but all you can do in one visit. So I might see someone in diabetes but they might have diabetes and high blood pressure and osteoarthritis and etc. But the people who collect the data won't know that. So like I say you know we have to keep stepping back and say do we have valid data and sometimes I think we are quite lacking in data and data collection."

Theme #3: IAM data and its uses

For whom is IAM data of interest?

Informants considered that IAM generated data may be useful for program planners but, as mentioned under theme #1, must be presented by researchers in a meaningful way. Specifically, demographic and defined regional data should be made available to program planners and their collaborators:

"No, no, I think just as I mentioned if I was going to use it I wanted to have a little more detail behind it I'd want to run it by my own planning committee unlock the details for [place removed] docs and then I would want it in Excel so I could play with it myself and I would want to be able to organize [unintelligible] want to and presented to my own clinic and see what they thought about it see what their response was whether it be you it's good to be prompting some thoughts".

They also consider that the most identified potential users of this data were anyone with a stake in assessing the quality of a given knowledge product: *"So maybe what's being commented on here is not about the physicians but is about the learning product that they had to deal with. In some ways that is what they are being asked about isn't it?"*

IAM serves to bridge the gap between the practice of family medicine and the CME organizations. Informants also think that the data generated by IAM might be used to support findings for further needs assessment research by major agencies. As noted by one of them:

"People who are funding CE [continuing education] like CIHR CE research. I think it's you know ultimately what are some of the ultimate uses…certainly for determining whether a given developed knowledge product is useful and worthwhile to use or whether it needs more investment of time and energy that might be something that you could do with it."

Theme #4: The knowledge product

According to CME experts, what does IAM data reveal about the knowledge product?

Many of the informants interpreted the IAM data they were presented with as indicative of characteristics of the knowledge product as it is about the raters: *"In some ways that is what they are being asked about isn't it? How well does this product [unintelligible]. So maybe what they were seeing has to do with variation in the quality of the content."* Also:

"So I think I would find it easier to interpret the spread especially when the relevance is high but the motivational aspect and learning aspects are low. I think that means that not a very good quality learning product."

And:

"Having looked at low back pain, I was just at a conference where low back pain … I remember thinking that the Tylenol stuff was on the guidelines … Really, it is not that much that you can do on the frontline. Anyway, and maybe that's why they're not learning enough there's not a whole lot of new stuff, that is, recently where some of your more exotic things that are not probably exposed to very often."

Theme #5: Reflective practice in continuing professional development

Prevalent in all interviews was the notion that the term reflection means different things to everyone. On informant expressed this directly: *"I saw that question and I guess I was going to ask you what you mean by reflection as I hear this term a lot."* Another informant was clear about his understanding of

reflection as an activity that is already widely in practice in continuing medical

education. He was not convinced about the need to label it though:

> *"I don't think [labelling] it would make much of a difference. As long as you do it, we're probably going to call on practitioners to reflect and to get better reflection, to get better at using reflection, it seems to me part of one of the imperatives of lifelong learning is reflection and the analysis of reflection. So I think we've got to get better at it so if getting better at it means labelling it and treating it as a skill that can be enhanced in the individual then sure."*

While this same informant had difficulty spotting the reflective elements

of the e-Therapeutics+/IAM program, others were quite impressed by it:

> *"This has a pretty good reflective piece. When you go to most programs, you know conferences etc., a lot of the post-reflective pieces are ...they're kind of simple. Because you, look you got a bunch of busy doctors and they'll spend a lot of time filling out forms so you get a lot of this is zero to five kind of... good speaker, good topic, blah blah blah... Will you use this in your practice? And then there's an empty space and if you have any further comments please recommend and they check off a few things and then they hand in the paper so it's not it doesn't really help in terms of evaluation."*

Informants were especially impressed with the depth of the IAM data. The

graph of the 3 IAM sub-items learning, motivation, and relevance proved to be the

most interesting to informants. Relevance was listed as a familiar indicator in

needs assessment. Motivation levels were variable but noted to be fairly

consistent across all 22 Highlights by informants. Informants suspected that this

was because by nature of the diversity of family practice clinical presentations,

family physicians are motivated to learn about all topics because they are indeed

all relevant to the practice of family medicine as a whole. It was also noted that

there appeared to be no pattern between the three sub items. In other words, by

visual inspection, trends of the three sub items appeared to be unrelated.

When viewed in combination, a distinct interpretation of the pattern of

high relevance but low learning and low motivation emerged. All informants

arrived at the same conclusion when presented with this particular pattern. They

all concluded that when physicians indicate that a topic is very relevant to their

practice yet they have experienced low levels of learning then this may be an

indicator of a problem with the content or the quality of that particular Highlight:

> *"I guess that just means that whatever was in there, there's not much new in there. A lot of them knew it anyway and they want to learn more … I guess I can't get any further than they want to learn more about this."*

And:

> *"So I think I would find it easier to interpret the spread especially when the relevance is high but the motivational aspect and learning aspects are low. I think that means that not a very good quality learning product. That's probably the only conclusion I would be able to easily draw from this."*

Based on this observation, informants postulated that the Information

Assessment Method might also be useful as an evaluation tool of knowledge

products where knowledge products are the continuing medical education activity

and its content:

> *"I think it's you know ultimately, what are some of the ultimate uses… certainly for determining whether a given developed knowledge product is useful and worthwhile to use or whether it needs more investment of time and energy that might be something that you could do with it."*

6. Discussion

Being interested in exploring an innovative way to assess CME needs, I have focused in this investigation on the data generated via a reflective process in the context of a CME program for Canadian family physicians. More specifically, I wanted to examine whether family physician learning needs can be revealed through the reflective process prompted by the Information Assessment Method, and whether Highlight ratings may contribute to the identification and prioritization of Canadian family physician learning needs. The answers to these questions vary depending on the types of IAM ratings.

With respect to the IAM rating 'I am motivated to learn more', the results of this exploratory study suggest that IAM data reveals learning needs. This assertion is further given credibility by CME experts (key informants), who state that a high proportion of raters (physicians who participated in the program) reporting a motivation to learn more about a clinical topic raised by a Highlight might suggest learning needs of physicians who participate in the program. This evidences how IAM data provide information at a depth not usually seen in traditional needs assessment. However, this identification of learning needs is limited without additional information about respondents' professional activity and their geographical area. In other words, adjusting the analysis of the aggregation of IAM data to take into account professional roles might contribute to address the recent call for a reformulation of the CME needs assessment agenda to include uses of reflection and externally generated data (Eva & Regehr, 2008).

Another of my initial assumptions was that a high proportion of raters

reporting a learning need fulfilled by a Highlight might suggest the importance of

this learning need within the population of family physicians who do not

participate in the program. This was not raised by the key informants. However,

there was support among all informants for combining IAM data with data

derived from other methods of needs assessment. It is in this manner that IAM

data appears to potentially assist in the identification of learning needs missed by

methods where physicians are simply asked to list their needs, as mentioned in the

literature review section (K. V. Mann & Chaytor, 1992). Key informants also

indicated that IAM data must be further analyzed to be shared with CME

providers. For instance, they recommend to present data by type of professional

activity and by geographical area in order to be actually used for planning

complementary CME activities or programs. Raters could be thus seen as

potential sentinels of the population of clinicians with similar professional activity

and working in the same region or province. In fact, the CPhA will launch a

similar CME program for pharmacists in 2012 (i.e., reading and rating weekly

Highlights on email), and it is planned to collect the following information when

participants register to the program: (a) the type of professional activity, and (b)

the first three letters of the postal code of the main practice site. The CPhA is a

national CME provider, and can support such analysis for planning tailored

complementary CME activities to targeted areas. For example, for all community

pharmacists working in an area (population), topics can be identified and

prioritized using the top-5 Highlights combining the highest proportion of

program participants working the same area (sentinels) and reporting 'I learned something new' about the clinical topic raised by the Highlight.

With regards to the IAM relevance ratings, the results of this investigation suggest that the analysis of the aggregation of IAM data may in effect contribute to the prioritization of learning needs. Findings from such analysis, e.g., Highlights with the lowest proportion of program participants reporting a relevant clinical topic, can suggest areas that are likely to be low-priority learning needs for family physicians. For instance, the CPhA can identify and prioritize topics as mentioned above and taking into account the relevance ratings. Moreover, these relevance findings can potentially be used in conjunction with other sources of data to provide CME program planners with information about the topics family physicians commonly encounter in their practices. Informants viewed these IAM data also as novel high quality data that is in short supply in the traditional CME needs assessment processes featured in the literature review (Allan & Schaefer, 2005). They endorsed this approach of using many sources of data, particularly via reflection, which is supported by the literature, and is even suggested as a future direction for research (Eva & Regehr, 2005).

IAM data provide evidence about: (1) the knowledge base of a sample of Canadian family physicians, (2) the types of clinical problems presented to Canadian family physicians, (3) relevance ratings that were seen as a proxy for assessing the importance of a CME topic, and (4) an evaluation of the information contained within a CME product. Thus, IAM data can either suggest areas that are

not likely to be learning needs for family physicians, or the fulfillment of a need for the confirmation of knowledge.

Physicians confirmed information within their knowledge base for the given clinical topic presented in the Highlight. This confirmation can be interpreted as the fulfillment of a learning need where physicians are seeking to affirm knowledge they already possess. Informants interpreted this pattern to mean IAM is a method for evaluating the content of CME knowledge products for fit with family physicians' practices and knowledge bases, thus providing a potential for evidence based CME development as championed by Fox (2000). It is in this area of knowledge product evaluation that IAM is poised to make an immediate contribution according to CME planners. In practice, the content providers of the e-Therapeutics+ already are using IAM in this way to edit the content of the Highlights. Though knowledge products can benefit from this use of IAM, the value of knowledge products that offer physicians a reminder of information they have already been exposed to must not be overlooked. The converse pattern, when learning was high but relevance was low, yielded uncertainty in its interpretation. Informants labelled these topics as 'exotic', for example a Highlight where this occurred was 'Lymphogranuloma venereum'. At a population level, this pattern does not suggest a universal learning need, but when viewed for individual physicians or for a very well defined population of family physicians, relevance ratings take on a more specific meaning. This pattern could, in those circumstances, reveal a direct learning need.

With respect to the identification and prioritization of learning needs, relevance ratings were particularly difficult to interpret due to the absence of geographical data about the raters. Wong and Stewart (2010) have found that the scope of practice of office-based family physicians (in a Canadian context) is most strongly determined by geography. Rural, semi-rural and specific provinces (British Columbia, Alberta, and Saskatchewan) were most positively associated with greater scopes of practice scores. In spite of the limitation of absent geographical context, relevance and also total number of ratings were still identified as a proxy measures for the importance of a topic and might have a role to play in the prioritization of CME topics for development. This potential use for prioritization underscores the importance for geographically reported data for planners as expressed by informants. One key informant suggested that other, non-explicitly learning based and non-cognitive, IAM measures might be useful in needs assessment, particularly 'My practice will be changed and improved'.

Similarly, the breadth of the knowledge based required to practice family medicine was reinforced by the findings of this study. A prevailing idea among informants was that family physicians need to be prepared to manage any presentation that may arrive at their doors. This corresponds to the traditional broad scope of knowledge (therefore, learning needs) needed for high quality family medicine practice, although it appears to be in partial conflict with the findings of Chan (2002) who concludes that there was a "decline in the provision of comprehensive care by general practitioners and family physicians in Ontario." Chan's conclusions are supported by Wong and Stewart (2010) and raises

questions about the nature of family physician learning needs. This conflict is not surprising as there is a history of debate about the more generalist or specialist role to be played by family physicians, and accordingly, the definition of family physicians' learning needs (Grant, 2002).

In summary, the analysis and interpretation of the results suggest that: (a) IAM captures data at a level not often seen by CME planners, (b) there exists the potential for IAM data to inform the content of CME programming, especially when analyzed by professional activity and geography, and coupled with other data sources, and (c) IAM data can be used to guide editorial content in CME programming.

6.1 Study strengths and limitations

As any other, the present study faces limitations. More specifically, I would like to discuss, three limitations for the quantitative phase, and one for the qualitative phase, which can however be balanced by the strengths of the investigation. Firstly, the quantitative data show that the program participants do not constitute a representative sample of the population of the Canadian family physicians; therefore the results cannot be generalized to this population. Participants represent a younger and more female population of family physicians than is reported in the 2010 National Physician Survey. This survey, conducted collaboratively by the CFPC, the Canadian Medical Association (CMA), and the Royal College of Physicians and Surgeons of Canada (RCPSC) reported the following demographic data about family physicians: 55.6% male, 44.0% female, 68.9% aged 45 and older, and 63.6% worked in private offices or clinics

("National Physician Survey," 2010). In the present study, these proportions were

48.0%, 52.0%, 57.0% (41 and older compared to 45 and older[5]), and 66.5%,

respectively. The e-learning format may explain the perceived age difference as

younger physicians may have a higher level of computer literacy. The higher

proportion of female physicians in the younger age groups reflects the general

trend of feminization of medicine in Canada (Dhalla, et al., 2002).

Secondly, with data from more than 3600 raters in 22 weeks, it is consider

that the e-Therapeutics+ Highlight program has been very successful and its

format constitutes a valuable contribution to CME programming. The program

has been pursued, and to date more than 5500 CFPC members have participated.

We calculated that the participation rate in 2010 was 31.4%. In contrast, for

another program, where family physicians use IAM to rate InfoPOEMs (emailed

synopses of original clinical research selected for relevance to primary care), and

earn CME credits, the participation rate in 2010 was 15.3%. Furthermore,

considering only the potential audience, i.e., family physicians doing online CME

activities, nearly two third of the target CFPC membership have participated in

the Highlight CME program. According to the National Physician Survey, 83.5%

of Canadian family physicians had access to an email account, but only 52.4%

participated in online CME activities ("National Physician Survey," 2010).

Internet made the program accessible to almost all Canadian physicians, while the

moderate adoption of online CME made it deliverable to only about half of this

audience. In fact, this participation rate is *unprecedented* according to the Director

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[5] The data set did not allow for the calculation of the number of raters aged 45 or
older for a direct comparison with the data from the National Physician Survey.

of the Continuing Professional Development of the CFPC, and demonstrates a

deep desire by physicians to learn in this manner. In contrast to CME conferences

or workshops, participants did not have to pay, and could integrate program

activities into their busy day. The mean rating over the 22 weeks of data

collection for the Highlight (675.2) in contrast to the empirical studies discussed

in the literature review is also high. Considering the overall number of

participants who rated at least one Highlight (3690), and the average number of

ratings per Highlight (680.0) it appears that physicians were selective in the

Highlights they chose to rate despite the potential to earn 0.1 Mainpro credits per

rated Highlight existed. A drop in response rate has been seen after weeks one and

two of the data collection period. This coincides with the first and second weeks

of the program, and is suggestive of a novelty or curiosity effect among recipients

of this email.

Thirdly, a self-selection of motivated individuals who participated in the

program and rated Highlights (self-reported ratings) could be noted. Those

physicians with high levels of computer literacy and access to computers at work

or at home may have been more comfortable participating in this CME program.

The group of physicians who would learn something might not have participated

in the program. It was possible for raters to have rated information outside of the

green Highlight text and within the main e-Therapeutics+ chapter. In addition, it

was not possible to track the number of physicians who opened the emails and

then chose not to rate the Highlight using the IAM questionnaire. This is known to

have happened in some instances based on comments left in the IAM free text

comment box.

Finally, with respect to the qualitative phase of this thesis, six senior key

informants were interviewed though more than 20 key informants were identified

and invited via email and follow-up phone calls. Despite this small number, data

saturation and maximum variation was achieved, in particular with respect to

background, experience, and geographic location. In particular, this variation in

geographic distribution of informants lends a truly national flavour to this work

with respect to quantitative and qualitative components. This sample represented a

high level of CME administration across Canada and was targeted in the

identification and recruitment strategy outlined in the qualitative methods section.

Not surprisingly, those experts have significant experience in both research as

well as administration.

6.2 Implications for practice and directions for future research and implications for practice

There are two main implications of the results of this study: 1) IAM has

already been applied to revise the content of the CME programming by the CPhA,

and 2) IAM data can be linked to additional demographic data (e.g., the area of

practice given by the first 3 characters of practice area postal code) as learning

needs assessment tool of Canadian pharmacists. Additionally, program partners

(CPhA and McGill) discussed the integration of the following question into IAM

in this context: 'Did reading and rating this Highlight make you feel the need for

an additional continuing education activity?' If answered YES, pharmacists will

then be invited to specify a continuing education (CE) topic in a new comment

box. The rationale behind posing this question is that reading and rating

Highlights may prompt raters to identify related and unrecognized educational

needs.

This work has also contributed to the body of learning needs assessment

literature by serving as an example where a concerted effort was made to base

data collection of learning needs to educational and reflective practice theory. The

notion of linking theory to the practice (research) of needs assessment was not

raised by any informants, although one informant made reference to linking CME

activities to theory, specifically Moore's conceptual framework (2009), where

CME activities may be characterized (and eventually accredited and administered)

by the tasks involved in completing the activity. This was surprising as most of

these senior CPD players had been or are still actively involved in research and

had completed formal research training. Reflection was also not spoken about in

theoretical terms, in keeping with the characteristics of the needs assessments

discussed in the literature review. The study by Mann (2009) was the only one to

reference as reflective learning framework. Other needs assessments discussed

reflection in a much less formal way and made no explicit connection between

employing reflection to elicit needs and theory (Lockyer, et al., 1996; Perol, et al.,

2002; Toews, et al., 1996). In this study, reflection was routinely characterized as

a natural part of learning and a strategy that has been employed implicitly in

needs assessment by participants. Donald Schön's reflective learning cycle forms

the theoretical basis for several of the CFPC's CME programs (Silver, et al.,

2008). This theory presents the cyclical nature of the events involved in retrieving

and applying knowledge in clinical situations. Two types of reflection are described: reflection-in action where reflection occurs at the moment of encountering a clinical problem and reflection-on-action where reflection occurs after the fact. Knowing-in action is the retrieval of information at the time of clinical problem or surprise. IAM is conceptually recognized to be a reflective tool and may be viewed in the context of Schön's adapted reflective learning cycle not as reflection-on-(past) action but as a reflection-on-future-action that hopefully will facilitate knowing-in-action when faced with a clinical surprise. When placed in this context, IAM data may support a new type of reflective construct that either consolidates learning or express a knowledge deficit by reflecting on future action.

7. Conclusions

The results of the present investigation suggest IAM data might have a role to play in the identification and prioritization of the learning needs of Canadian family physicians and the evaluation of knowledge products. Future applications of IAM for these purposes will include an amendment to its demographic collection to include specific geographic data to facilitate the interpretation of ratings. When taken into account with data from other sources, IAM data may reveal fulfilled learning needs for confirmation of knowledge or areas where physician knowledge is high.

The needs assessment of family physician learning needs is a complex task that involves asking questions about the nature of learning needs in such a broad based specialty. It is unlikely that one tool will be able to satisfy the multifaceted nature of needs assessment. Multiple types and sources of data are wanted by program planners to inform continuing medical education programs and individual knowledge products. The data generated by the IAM has the potential to contribute to needs assessment as supplemental data regarding the relevance of continuing education topics for family practice and about the fit of information with educational needs.

Beyond the potential needs assessment uses, there is a potential for IAM data to contribute theoretically to the understanding of the reflective learning cycle first put forth by Schön. The concept of 'reflection on future action' using a known patient as a priming activity for retrieving knowledge in action, especially

in clinical situations involving that particular patient should be further explored.

As well, this work provided an example of incorporating theoretically based tools

in needs assessment in a participatory way. This serves as a first step towards

rectifying the current ad hoc and industry-driven nature of needs assessment.

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Appendices

Appendix A e-Therapeutics Email Example

Earn Mainpro M1 Credits rating e-Therapeutics Highlights
College of Family Physicians of Canada [cfpc@cfpc.ca]

Sent: Tuesday, March 02, 2010 8:39 AM
To: Denice Lewis

Earn Mainpro M1 Credits rating *e-Therapeutics Highlights*

We value your comments and suggestions as we launch this new initiative. Please read this week's updated FAQ at www.cfpc.ca/etHighlights as it contains important updates.

As a service to CFPC members, CFPC and the Canadian Pharmacists Association are excited to offer weekly **e-Therapeutics (e-T) Highlights** – from the online version of **Therapeutic Choices** – as MainPro M1 credits. Click on the link below to view an e-T Highlight, which will appear as *green text* within the condition topic. Each completed impact questionnaire qualifies for 0.1 MainPro M1 credits.

e-T Highlights build on McGill's CIHR-funded research on e-learning and are designed to disseminate timely, relevant bites of clinical information for family physicians. The content is written and reviewed by expert Canadian physicians and pharmacists and derived from chapters in CPhA's Therapeutic Choices. Highlights for this project are pre-approved by CFPC.

This week's highlight: Restless Legs Syndrome: Look for iron deficiency as possible cause

Frequently Asked Questions

For more information please contact Dilip Patel at 905-629-0900 ext 332 or dpatel@cfpc.ca

This email was sent to denice.lewis@mail.mcgill.ca by cfpc@cfpc.ca.
Click here to Unsubscribe from e-Therapeutics Highlights | Privacy Policy.

Appendix B Endorsement of IAM items

51 e-Therapeutics+ highlights were emailed from January 20 2010 to January 14 2011. 31,429 rated e-Therapeutics+ highlights were submitted by 5,346 CFPC members from January 20 2010 to January 19 2011. On average, each CFPC member rated 6.1 highlights (range 1-57), not counting those that were re-rated.

I. COGNITIVE IMPACT*

What is the impact of this e-Therapeutics Highlight on you or your practice?

	yes	no	possibly	disabled
My practice is (will be) changed and improved	35.65 %	44.29 %	20.06 %	0.00 %
I learned something new	54.64 %	38.58 %	6.79 %	0.00 %
I am motivated to learn more	45.99 %	44.93 %	9.07 %	0.00 %
This information confirmed I did (am doing) the right thing	50.15 %	39.30 %	10.55 %	0.00 %
I am reassured	53.00 %	40.65 %	6.35 %	0.00 %
I am reminded of something I already knew	44.72 %	49.17 %	6.11 %	0.00 %
I am dissatisfied	0.95 %	98.18 %	0.88 %	0.00 %
There is a problem with this information	0.73 %	98.30 %	0.96 %	0.00 %
I disagree with the content of this information	0.69 %	98.44 %	0.88 %	0.00 %
This information is potentially harmful	0.30 %	98.98 %	0.72 %	0.00 %

II. CLINICAL RELEVANCE
Is this e-Therapeutics Highlight relevant for at least one of your patients?

	Totally Relevant	Partially Relevant	Not Relevant
	59.82 %	29.89 %	10.29 %

III. INFORMATION USE*
Will you apply this e-Therapeutics Highlight to at least one patient?

	yes	no	possibly	disabled
	59.97 %	7.63 %	22.15 %	10.25 %

If yes, how will you apply it?

	yes	no	possibly	disabled
To better understand a particular issue related to this patient	28.17 %	29.78 %	3.06 %	38.98 %
To justify or maintain the management of this patient	42.14 %	16.45 %	2.43 %	38.98 %
To modify the management of this patient	30.91 %	24.80 %	5.30 %	38.98 %
To persuade this patient or other health professionals to make changes	14.52 %	39.92 %	6.58 %	38.98 %
Other	8.29 %	47.44 %	4.13 %	40.14 %

IV. EXPECTED PATIENT HEALTH BENEFITS*
Do you expect any health benefits from applying this e-Therapeutics Highlight to a particular patient?

	yes	no	possibly	disabled
Increasing patient knowledge about health or healthcare	21.89 %	18.57 %	1.92 %	57.62 %
Avoiding unnecessary or inappropriate treatment, diagnostic procedure or preventive intervention	23.21 %	17.46 %	1.71 %	57.62 %
Increasing patient acceptability of treatment, diagnostic procedure or preventive intervention	25.99 %	14.62 %	1.76 %	57.62 %
Preventing disease or health deterioration (including acute episode of chronic disease)	23.33 %	17.08 %	1.97 %	57.62 %
Improving patient health or functioning or resilience (the way patients face difficulties)	19.84 %	20.48 %	2.06 %	57.62 %
Other	1.39 %	39.52 %	1.46 %	57.62 %

Appendix C Information Assessment Method

Q1. What is the impact of this e-Therapeutics Highlight on you or your practice?
Check Yes or No for each item.

2	Y	N
My practice is (will be) changed and improved		
I learned something new	Y	N
I am motivated to learn more	Y	N
This information confirmed I did (am doing) the right thing	Y	N
I am reassured	Y	N
I am reminded of something I already knew	Y	N
I am dissatisfied	Y	N
There is a problem with this information	Y	N
This information is potentially harmful	Y	N

If this e-Therapeutics Highlight has no impact at all on you or your practice,
check here.

Q2. Is this 'e-Therapeutics Highlight' relevant for at least one of your patients?
Totally Relevant
Partially Relevant
Not Relevant

Q3. Will you apply this e-Therapeutics Highlight to at least one patient?   Y

    N

To better understand a particular issue related to this patient

    Y   N

To justify or maintain the management of this patient

  Y N

To persuade other health professionals or patients to make changes

  Y N

Q4. Do you expect any health benefits from applying this e-Therapeutics

Highlight to a particular patient? Y N

If YES, what are these benefits? Check Yes of No for each item.

Increasing patient knowledge about health or healthcare	Y	N
Avoiding unnecessary or inappropriate treatment, diagnostic procedure or preventive intervention	Y	N
Increasing patient acceptability of treatment, diagnostic procedure or preventive intervention	Y	N
Preventing disease or health deterioration (including acute episode of chronic disease)	Y	N
Improving patient health or functioning or resilience (i.e., how well the patient faces difficulties)	Y	N

Appendix D IAM Reflective Learning Framework (Leung et. al)

Reflective learning processes	Cognitive Tasks	Definition
Interpretation	Identifying relevant information	Selecting information that is useful to address problems at hand or reduce uncertainty
	Questioning or specifying important or controversial issue	Asking questions or stating issues that are of value or subjected to controversy to practice
	Comparing with norms, research, or practice of others	Examining similarities and (or) differences of ideas or practice using norms, research or practice of others as criteria
Verification	Agreeing with the information provided	Explaining and agreement with and idea or practice described in the information
	Identifying flaws in the information provided	Explaining a flawed idea or practice identifies in the information provided
	Assessing one's knowledge and practice	Evaluating ones' own knowledge base and experience
Generalization	Drawing a conclusion based on research or experience	Synthesizing information with other research-based information or experience to make a conclusion
	Planning to apply or looking into information provided	Making an arrangement to use information selected, or to seek complementary information from

		other sources
	Applying information provided in other contexts	Using information provided for other purposes
Change	Revising an idea or practice	Reviewing, reorganizing, amending a current idea or practice for an update or improvement
	Adopting a new idea or practice	Selecting and following a new complementary idea or practice
	Replace and idea or practice	Switching a current practice or idea to newly introduced one

Appendix E McGill IRB Ethics Approval

McGill

Faculty of Medicine
3655 Promenade Sir William Osler
Montreal, QC H3G 1Y6

Faculté de médecine
3655 Promenade Sir William Osler
Montreal, QC H3G 1Y6

Fax/Télécopieur 514 398-3595

September 20, 2010

Dr. Pierre Pluye
Department of Family Medicine
McGill University
517 Pine Avenue West
Montreal Quebec H2W 1S4

Re: IRB Study Number A09-E65-10B

Dear Dr. Pluye,

Thank you for submitting the request for review by the IRB of the study proposal entitled "Using the information assessment method as a reflective tool to identify learning needs" on behalf of your Master's student Denice Lewis.

Since this study involves no more than minimal risk, and in accordance with Article 1.6 of the Canadian Tri-Council Policy Statement of Ethical Conduct for Research Involving Humans and U.S. Title 45 CFR 46, Section 110 (b), paragraph (1), we are pleased to inform you that expedited approval for the study and interview consent form (September 3, 2010) was provided by the Co-Chair on September 20, 2010, valid until **September 2011.** The study proposal will be presented for corroborative approval by the Board at the next IRB committee meeting. The Certificate of Ethical Acceptability will be issued to you at that time.

Take note that a review of all research involving human subjects is required on an annual basis in conjunction with the date of initial approval. The application for continuing review should be submitted at least one month prior to **September 2011.**

If any modifications occur to the study prior to the annual review, please inform the IRB promptly.

Sincerely,

Harvey Sigman, MD
Co-Chair
Institutional Review Board

cc: Ms. Denice Lewis
          A09-E65-10B

Appendix F Highlights by week and topic

Week	Topic	Highlight
1	ADHD	Long-acting stimulant formulations such as Concerta, Biphentin and Adderall XR (see Table 2) are as effective as appropriately dosed shorter-acting stimulants. These formulations have a duration of action of 8-12 hours. Advantages of these long-acting products include single daily dosing, potential for improved adherence, avoidance of the need for medication administration at school, decreased abuse potential and decreased risk of rebound hyperactivity. Given these advantages, it has been recommended that long-acting agents be used as first-line treatment of ADHD.
2	Alteplase	Alteplase should be administered (iv) as soon as possible following stroke onset for patients who meet strict eligibility criteria, (Figure 1, Table 2, Table 3, Table 4). Health Canada currently approves administration within 3 hours of stroke onset, though evidence from randomized trials demonstrates benefit up to 4.5 hours.

Week	Topic	Highlight
3	Cannibis & Psychosis	Substance use (particularly cannabis) is common in first-episode psychosis. Individuals may therefore be misdiagnosed with a substance-induced psychosis and not receive appropriate ongoing treatment. Cannabis use can trigger the onset of a schizophrenia spectrum disorder in genetically vulnerable individuals.
4	Endophthalmitis	Worsening vision, floaters and increasing eye redness, especially in the first postoperative week, should be considered an endophthalmitis until proven otherwise, and necessitates an urgent assessment by an ophthalmologist.
5	Cognitive Behviour Therapy	Cognitive behavioural therapy (CBT) including counselling regarding belief systems about chronic fatigue and illness, usually in association with progressive exercise therapy, results in best outcomes. Randomized controlled trials of cognitive behavioural therapy have shown improvement in 60 to 75% of patients receiving this treatment, compared with < 30% of patients receiving standard care.
6	Pneumonia	Administer antibiotic therapy to patients presenting to emergency room with pneumonia

Week	Topic	Highlight
		as soon as possible after diagnosis. A significantly lower mortality was noted for patients $= 65$ years who received antibiotics within 4–8 hours of presentation.
7	Restless Leg Syndrome	Iron deficiency states are a known cause of secondary RLS; iron replacement therapy is indicated in the presence of low serum ferritin level or iron deficiency.
8	Atopic Dermatitis	A systematic review of once-daily versus more frequent use of potent topical corticosteroids in atopic dermatitis found little difference between regimens with respect to clinical outcomes and adverse events.
9	OC Failure	There is an increased risk of oral contraceptive (OC) failure in women taking enzyme-inducing AEDs (carbamazepine, phenytoin, phenobarbital, primidone). The estrogenic component of the OC should be $= 50$ μg ethinyl estradiol. In addition to using systemic (hormonal) birth control, the use of a barrier method (i.e., condoms) should be

Week	Topic	Highlight
		encouraged, for increased contraceptive effect and to reduce the risk of sexually transmitted infections. However, barrier methods should not replace more effective methods of contraception such as OCs.
10	Lice & Nits	Although time-consuming and tedious, lice and nits should be mechanically removed after pharmacologic treatment. Because of increased resistance to various pharmacologic treatments, nit removal is becoming increasingly important.
11	PAD	ACE inhibitors reduce the risk of ischemic events beyond that expected from lowering blood pressure in patients with PAD. Ramipril demonstrated similar effects in patients with or without PAD in the HOPE study. Ramipril also increases walking time and distance over a 6-month period in patients with PAD, according to the results of a small randomized study.

Week	Topic	Highlight
12	Rosacea	Avoid topical corticosteroids; they can precipitate or worsen rosacea by adding to the dermal dystrophy that characterizes the disorder.
13	LGV	Lymphogranuloma venereum (LGV) has recently surfaced in Canada and is caused by C. trachomatis serovars L1, L2 and L3. These strains are more invasive; they preferentially affect the lymph tissue. LGV is transmitted through vaginal, anal or oral sexual contact. Complications include colorectal fissures and secondary bacterial infections. Test and treat sexual partners (Table 2).
14	Omega-3	There is no conclusive evidence that omega-3 supplementation reduces vascular risk, although dietary recommendations suggest including these foods in a balanced diet. Interpretation of data regarding omega-3 fatty acids (found in oily fish and plants) is hindered by poor study design. Reduction of risk by vitamin therapy (e.g., folic acid,

Week	Topic	Highlight
15	Urinary Tract Infection	vitamin E) in patients with established vascular disease has largely been shown to be ineffective, and current data do not support supplementation in primary prevention. A systematic review concluded that cranberry juice or tablets were effective in reducing the incidence of UTI in young women with recurrent acute uncomplicated urinary infection; however, the optimal dose and method of administration have not been identified. Cranberry products are, however, much less effective than antimicrobial prophylaxis for prevention. Large quantities of cranberry juice may interact with warfarin.

Week	Topic	Highlight
16	Rhinosinus Disease	Chronic upper airway cough syndrome secondary to rhinosinus diseases (previously referred to as postnasal drip syndrome): a combination of a first-generation antihistamine and a decongestant is recommended empirically for cough related to postnasal drip; first-generation antihistamines are usually more effective than the newer antihistamines in this setting.
17	Oral rehydration	Oral rehydration is the treatment of choice in children with mild to moderate dehydration. It can be used in all types of dehydration provided that hypo- and hypernatremic dehydration are not at the extremes of the spectrum. The fluid deficit is calculated and the rate of replacement is based upon the degree of dehydration. In the child who is mildly to moderately dehydrated, the rate of replacement is 50 mL/kg over the first 4 hours; for the child who is moderately to severely dehydrated, the rate of replacement is 100 mL/kg over the first 4 hours. The rehydration phase may last from 4 to 12 hours depending upon the degree of dehydration as well as the ability of the child to tolerate oral rehydration.

Week	Topic	Highlight
		After the first 4 hours, replace the remainder of the deficit over the next 6 to 8 hours.
18	Bi-polar diagnosis	It is estimated that one-third of patients appearing in primary care settings with symptoms suggestive of unipolar major depression are actually experiencing depression in the context of bipolar illness. Ask all depressed patients about possible hypomanic or manic symptoms in their past. While no screening test is ideal, the Mood Disorder Questionnaire (MDQ) is a helpful, self-completed form that asks systematic yes/no questions about the symptoms of mania; an adolescent version also has been developed. Two or more "yes" answers on the MDQ should prompt a more thorough clinical review of symptoms, including questioning family/friends if possible.
19	Low back pain	For acute uncomplicated low back pain, NSAIDs are effective for pain relief, particularly during the first few weeks, but there is no evidence that one NSAID or COX-2 anti-inflammatory is more effective than another. Therefore, when selecting an NSAID, consider tolerability, patient contraindications, and cost. There is moderate evidence that

Week	Topic	Highlight
		NSAIDs are not more effective than acetaminophen for back pain. Given the greater safety profile compared to NSAIDs, a trial of acetaminophen, or acetaminophen with codeine is a reasonable option in acute uncomplicated back pain.
20	Chemotheraphy induced N&V	For delayed nausea and vomiting, metoclopramide plus a corticosteroid are as effective as a serotonin antagonist plus a corticosteroid and are more cost effective. A limitation to metoclopramide use is the development of extrapyramidal side effects.
21	Hyperkalemia	Closely monitor potassium after introducing or changing the dose of any medication that could induce hyperkalemia such as ACE inhibitors, ARB, K-sparing diuretics, in particular in patients at risk of hyperkalemia, e.g., renal failure, elderly, cardiac insufficiency. Monitoring is even more important when a combination of these medications is prescribed (ACE ARB spironolactone). Measure potassium 3 days and one week after the introduction of these medications and after any change in the dose. It is also recommended to measure creatinine and potassium at least monthly for 3 months

Week	Topic	Highlight
		and, if stable, every 3 months thereafter.
22	COPD	Inhaled corticosteroids (ICS) are no longer recommended as monotherapy in the management of COPD symptoms. ICS and long-acting beta-agonists (LABA) in combination are more effective than either drug alone in terms of exercise endurance, symptom control, lung function and exacerbation rates.

Appendix G Interviewee Email Invitation

Email Invitation
Dear [insert key informant name here]

You have been identified as a leader in continuing medical education/continuing professional development by a member of my thesis committee who is located in the McGill Centre for Continuing Health Professional Education (CCHPE).

I would appreciate conducting a short (30 to 45 minute) telephone interview in November with you for my Master's thesis 'Using reflection to identify family physician learning needs'. Should you agree to share your expertise with me you will be emailed the interview questions and some related data prior to our interview to ensure an efficient use of your time.

A brief synopsis of my project is provided below:

My work will explore the use of guided reflection using the Information Assessment Method (IAM) to reveal unknown learning needs among Canadian family physicians. This will be achieved through a combination of numerical data collected from Canadian family physicians via IAM and interview data collected from national continuing medical education experts. The results of this proposed work will be a preliminary foray into the uncharted territory of the application of guided reflection in continuing medical education to reveal unknown learning needs. It is anticipated that the outcomes of this work will be of interest to those who seek alternatives to the unreliable but still pervasive activity of self-assessment in this context. The outcomes may also provide a new direction for the evaluation of learning needs among the CME development, planning and accreditation communities in Canada.

A mixed methods design will be employed to answer the following research questions:

What family physician learning needs are revealed through the reflective process prompted by the Information Assessment Method?

What is the meaning of the highlight ratings for the identification and prioritization of Canadian family physician learning needs?

Please respond to this email in you have any questions and to arrange for an interview time.

I thank you for your consideration and look forward to speaking with you,

Denice Lewis, BSc, MBChB
MSc Student
Supervised by Dr. Pierre Pluye and Dr. Charo Rodriguez

McGill University, Department of Family Medicine
517 Pine Avenue West, Montreal, QC, Canada, H2W 1S4
Tel: 514-398-8483; Fax: 514-398-4202;
Email: denice.lewis@mail.mcgill.ca

Appendix H English language interview guide and consent form

Qualitative Interview Guide
E-Therapeutics® Highlights Study

Thank you for taking the time to consider these questions in advance of our conversation. I look forward to speaking with you.

Denice Lewis, BSc MBChB
MSc Student, McGill University
Department of Family Medicine
November 2010

- Thank you for participating as a CME/CPD key informant for my MSc thesis project!

- This project aims to explore the use of guided reflection to identify family physician learning needs using a mixed methods approach.

- The quantitative component consists of the rating of weekly highlights by College of Family Physicians of Canada members.

- As a CME/CPD key informant, you will provide expert context in which to situate these ratings.

FPs receive an email each week that directs them to a highlight. The example below is about muscle cramps. FPs are asked to read the highlight and rate it. When FPs click the link that reads Earn Mainpro Credits they are directed to the IAM questionnaire.

Pharmacologic Choices Back to Top

Quinine sulfate has been used for decades to manage nocturnal leg cramps; its proposed mechanism of action involves decreasing the responsiveness of the motor endpoint to nerve stimulation by increasing the muscle refractory period. Clinical trials have not conclusively demonstrated its effectiveness. A meta-analysis did show a reduction in frequency of cramps but not in severity or duration.[1] It is reasonable to give a patient a four- to six-week trial of quinine at a dose of 200 to 300 mg at bedtime. Higher doses of quinine are associated with dizziness, visual impairment, tinnitus, gait disturbance, headache and hypersensitivity reactions. Fatal thrombocytopenia has also been reported. At the lower doses used for nocturnal cramps, usually only tinnitus is commonly reported. However, patients need to be counselled about the more serious side effects. Treatment should be interrupted every three months to assess further need.[2] [Earn MainPro Credits]

There is minimal evidence for other therapies for leg cramps. A crossover trial of vitamin E failed to show any benefit.[3] Results for magnesium supplementation (300 to 900 mg per day) have been mixed.[4, 5] Small, randomized, double-blind or cross-over studies have shown potential benefit of diltiazem 30 mg daily,[6] vitamin B complex[7] and orphenadrine citrate.[8] Open-labelled trials of gabapentin[9] and verapamil[10] showed some potential benefit. These studies are of insufficient sample size to allow for recommendation of the respective therapies; therefore, risk-benefit analysis must guide therapy for individual patients.

Therapeutic Tips Back to Top

- Check patient's medication history carefully before treating cramps.
- Use quinine cautiously, only if cramps are frequent and severe and nonpharmacologic measures have failed.
- Regularly reassess use of quinine, as cramps can resolve spontaneously or after a short duration of therapy.
- Cramps rarely need referral unless associated with other neurologic complaints or signs.

This is an example of the IAM questionnaire. FPs complete it and may submit a comment in the free text box at the end of the questions (not pictured) . 0.1 Mainpro credits are earned. IAM continues on the next page.

Q1.What is the impact of this e-Therapeutics Highlight on you or your practice? Check Yes or No for each item.	Yes	No
My practice is (will be) changed and improved	○	◉
I learned something new	◉	○
I am motivated to learn more	○	◉
This information confirmed I did (am doing) the right thing	○	◉
I am reassured	○	◉
I am reminded of something I already knew	○	◉
I am dissatisfied	○	◉
There is a problem with this information	○	◉
I disagree with the content of this information	○	◉
This information is potentially harmful	○	◉

If this e-Therapeutics Highlight has no impact at all on you or your practice, check here ☐

Your feedback is important to us. Please help us investigate any concerns by filling in the Comment Box at the end of this questionnaire. Include an e-mail address so that we may contact you for clarification if necessary. Thank you for helping us improve e-Therapeutics.

Q2. Is this 'e-Therapeutics Highlight' relevant for at least one of your patients?

- ○ Totally relevant
- ⊙ Partially relevant
- ○ Not relevant

Q3. Will you apply this e-Therapeutics Highlight to at least one patient? ⊙ Yes ○ No

If YES, how you will apply it? Check Yes or No for each item.

	Yes	No
To better understand a particular issue related to this patient	○	⊙
To justify or maintain the management of this patient	○	⊙
To modify the management of this patient	⊙	○
To persuade other health professionals or patients to make changes	○	⊙

Q4. Do you expect any health benefits from applying this e-Therapeutics Highlight to a particular patient? ⊙ Yes ○ No

If YES, what are these benefits? Check Yes or No for each item.

	Yes	No
Increasing patient knowledge about health or healthcare	○	⊙
Avoiding unnecessary or inappropriate treatment, diagnostic procedure or preventive intervention	○	⊙
Increasing patient acceptability of treatment, diagnostic procedure or preventive intervention	⊙	○
Preventing disease or health deterioration (including acute episode of chronic disease)	○	⊙
Improving patient health or functioning or resilience (i.e., how well the patient faces difficulties)	○	⊙

Demographic Section

1. What is your current role in CPD? Have you held previous roles in CPD? If so please describe them.

2. In your experience, is integrating reflection a priority in developing CPD content/activities/programs?

3. Have you seen reflection used in the identification of learning needs? If so, how? How often?

Data

The following data is from the first 22 weeks of the program

Ratings in order of Highlight delivery

Ratings by highlight topic

'Totally relevant to practice' by % of highlight ratings

'Learned something new' by % of Ratings

'Motivated to learn more' by % of Ratings

Comparison of learning, motivation and relevance (% of ratings)
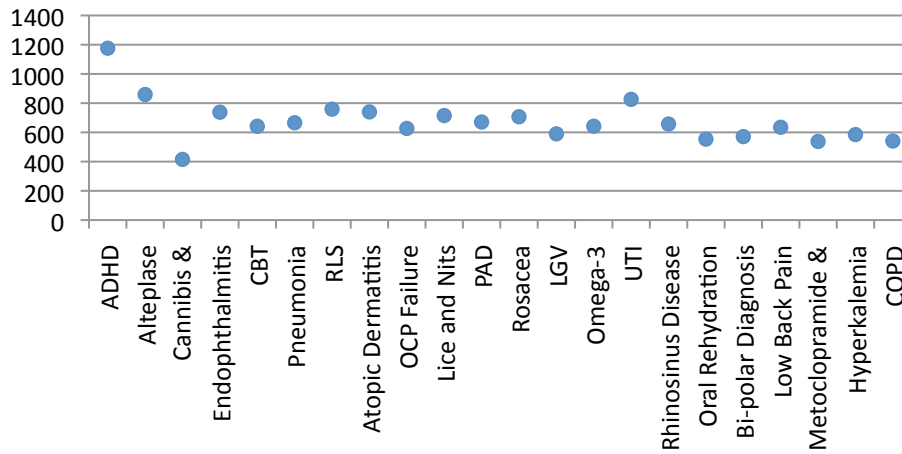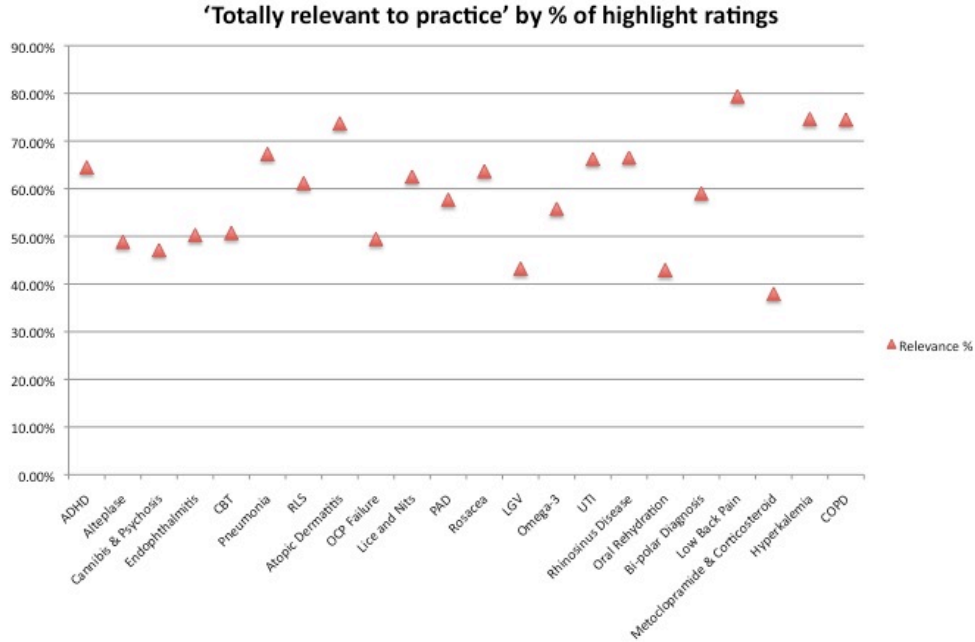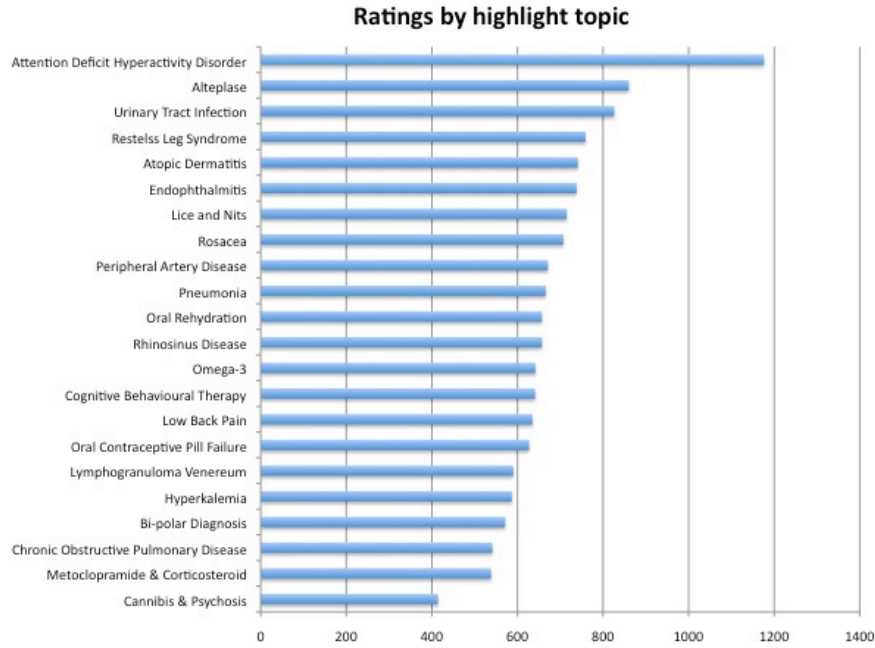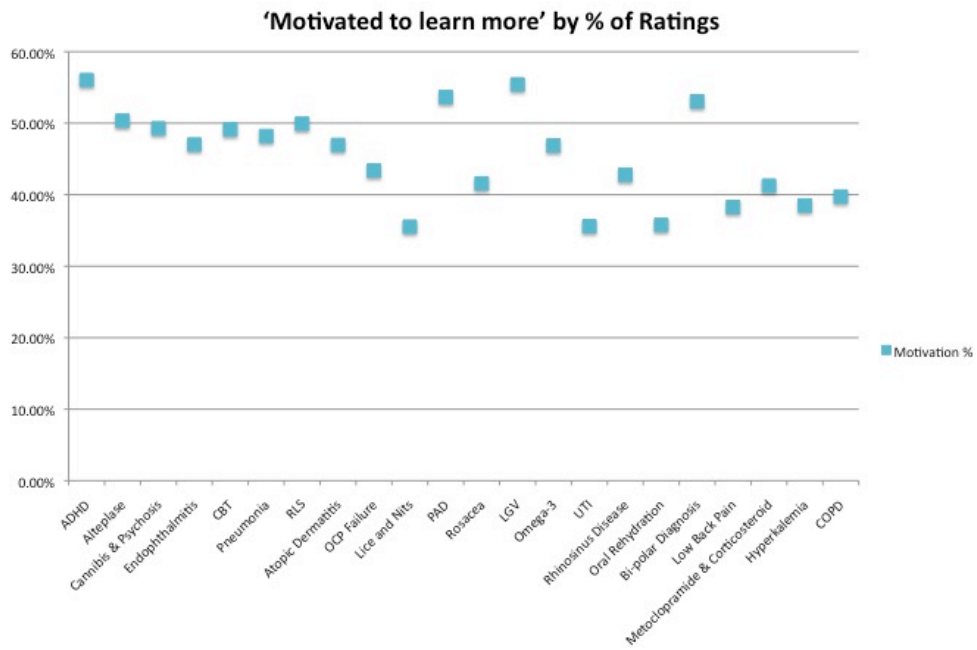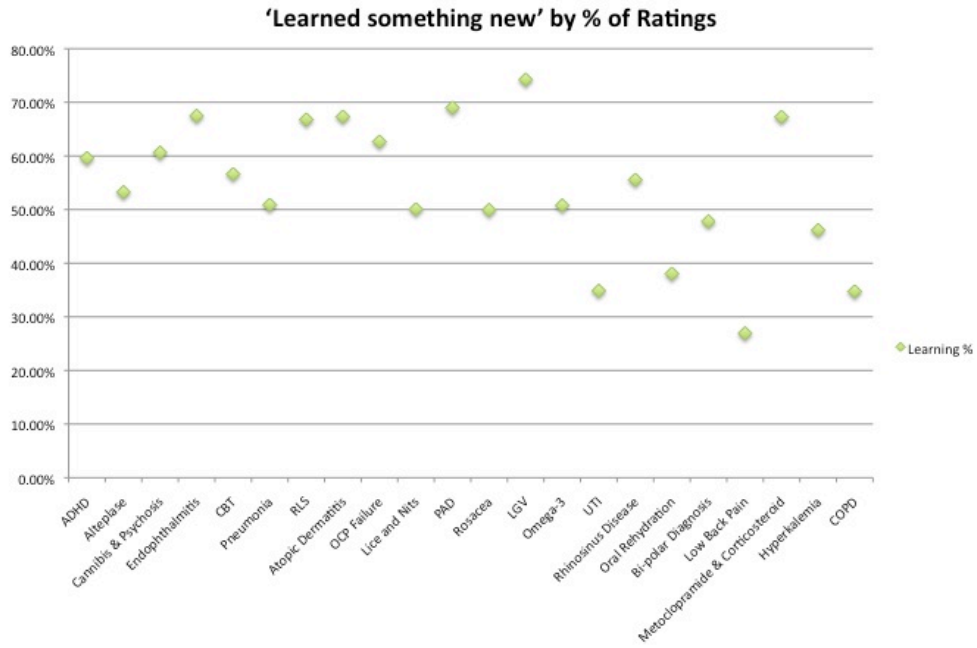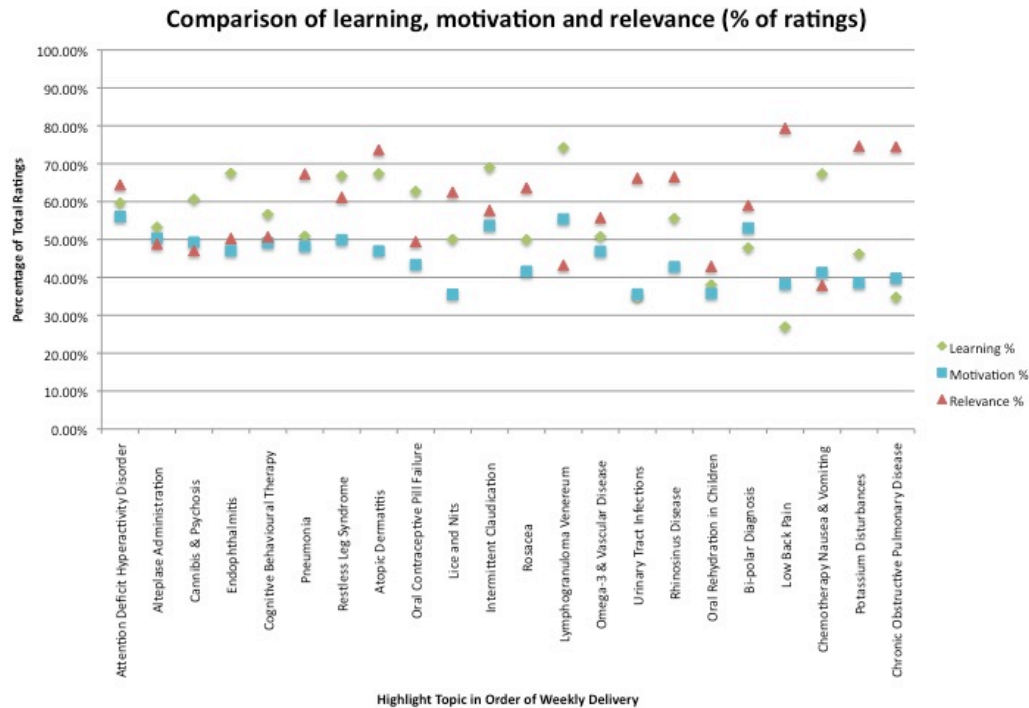
Data interpretation

4. In general, how would you interpret this data? In other words, what do you think it is telling us about Canadian family physicians?

5. What do you think are caveats for interpreting this type of data?

6. Do you think this type of data is important? Why or why not?

7. Do you think this type of data is useful?

8. Do you think this type of data is novel? Why or why not?

9. For whom do you think this type of data is relevant?

10. How might they use this type of data?

11. How would you, or your organization, use this type of data?

Is there anything else you would like to add?

Thank you!

Interview Consent Form
Denice Lewis Master of Science Thesis Project
McGill University, Department of Family Medicine

This study is funded by the Canadian Institutes of Health Research
Using the Information Assessment Method as an Externally Guided Reflection
Tool to Identify Learning Needs: A Mixed Methods Study

The goal of this project is to place topics family physicians identify as learning
needs into a continuing medical education context. Your expertise in continuing
medical education is very valuable in this process. In this interview we will
discuss a list of prioritized learning needs based on family physician ratings and
what they might mean to continuing medical education development and
planning.

Potential Benefits of Agreeing to be Interviewed
By participating in this research project you will help to further the training of a
future clinician researcher. You will contribute your expert knowledge and
experience to what is known about identifying learning needs. You will contribute
to a novel method of identifying family physician learning needs.

Potential Risks of Agreeing to be Interviewed
The risks of participating in this interview are minimal but do include the
possibility of a breech of confidentiality (your identity is accidentally revealed).
We have taken steps to prevent this from happening such as removing names and
other identifying information from the interview transcripts. Denice Lewis will
keep the interview tapes and typed copies in a locked cabinet. Her supervisors Dr.
Pierre Pluye and Dr. Charo Rodriguez may view them to help her with her work.

Your Rights as a Study Participant
You are free to withdraw at any time from the interview.
You have the right to ask questions at anytime before, during, or after the
interview.

Study participation is voluntary.

Confidentiality
Your interview will be recorded and typed out by the Master's student. Your
personal identity will be removed from your interview. You will never be named
in the analysis or results of this study.

If you have any questions or concerns about this research please contact:

Denice Lewis, BSc MBChB
Master of Science Student
McGill University, Department of Family Medicine
517 Pine Avenue West, Montreal, QC, Canada, H2W 1S4
Tel: 514-398-8483; Fax: 514-398-4202; Email: denice.lewis@mcgill.ca

The study has been explained to me and I am happy with how my questions have been answered. I agree to participate in this interview.

Print Name	Signature	Date

Thank you for agreeing to participate.

Appendix I French language interview guide and consent form

Guide d'Entrevue
Projet de recherche
E-Therapeutics® Highlights

Merci de lire ces questions avant notre entrevue

Denice Lewis, BSc MBChB
Candidate à la Maitrise (M.Sc. Méd. Exp. Option Méd. Fam.)
Département de Médecine familiale, Université McGill
Novembre 2010

- Merci pour votre participation à ce projet de recherche comme informateur clé.

- Ce projet explore l'emploi de la « réflexion guidée » pour identifier les besoins des médecins de famille (MF) en terme d'apprentissage.

- La phase quantitative est fondée sur l'évaluation des 'highlights' chaque semaine par les MF (membres du Collège des médecins de famille du Canada).

- En tant qu'informateur clé, votre expertise contribuera à mettre ces évaluations en contexte.

Chaque semaine les MF reçoivent un « highlight » par courriel. Ils sont invités à lire et à évaluer chaque « highlight » avec la *Méthode d'évaluation des informations* (MEI). En appuyant sur le bouton 'Earn Mainpro Credits' les MF sont dirigés vers le questionnaire MEI (exemple ci-dessous).

Pharmacologic Choices   Back to Top

Quinine sulfate has been used for decades to manage nocturnal leg cramps; its proposed mechanism of action involves decreasing the responsiveness of the motor endpoint to nerve stimulation by increasing the muscle refractory period. Clinical trials have not conclusively demonstrated its effectiveness. A meta-analysis did show a reduction in frequency of cramps but not in severity or duration.[1] It is reasonable to give a patient a four- to six-week trial of quinine at a dose of 200 to 300 mg at bedtime. Higher doses of quinine are associated with dizziness, visual impairment, tinnitus, gait disturbance, headache and hypersensitivity reactions. Fatal thrombocytopenia has also been reported. At the lower doses used for nocturnal cramps, usually only tinnitus is commonly reported. However, patients need to be counselled about the more serious side effects. Treatment should be interrupted every three months to assess further need.[2]   [Earn MainPro Credits]

There is minimal evidence for other therapies for leg cramps. A crossover trial of vitamin E failed to show any benefit.[3] Results for magnesium supplementation (300 to 900 mg per day) have been mixed.[4],[5] Small, randomized, double-blind or cross-over studies have shown potential benefit of diltiazem 30 mg daily,[6] vitamin B complex[7] and orphenadrine citrate.[8] Open-labelled trials of gabapentin[9] and verapamil[10] showed some potential benefit. These studies are of insufficient sample size to allow for recommendation of the respective therapies; therefore, risk-benefit analysis must guide therapy for individual patients.

Therapeutic Tips   Back to Top

- Check patient's medication history carefully before treating cramps.
- Use quinine cautiously, only if cramps are frequent and severe and nonpharmacologic measures have failed.
- Regularly reassess use of quinine, as cramps can resolve spontaneously or after a short duration of therapy.
- Cramps rarely need referral unless associated with other neurologic complaints or signs.

Voici le questionnaire MEI. Les MF peuvent soumettre un commentaire à la fin du questionnaire. Pour chaque questionnaire complété et soumis, les MF peuvent recevoir 0.1 crédits MainPro M1. L'exemple continue à la page suivante.

Q1.What is the impact of this e-Therapeutics Highlight on you or your practice? Check Yes or No for each item.

	Yes	No
My practice is (will be) changed and improved	○	⊙
I learned something new	⊙	○
I am motivated to learn more	○	⊙
This information confirmed I did (am doing) the right thing	○	⊙
I am reassured	○	⊙
I am reminded of something I already knew	○	⊙
I am dissatisfied	○	⊙
There is a problem with this information	○	⊙
I disagree with the content of this information	○	⊙
This information is potentially harmful	○	⊙

If this e-Therapeutics Highlight has no impact at all on you or your practice, check here   ☐

Your feedback is important to us. Please help us investigate any concerns by filling in the Comment Box at the end of this questionnaire. Include an e-mail address so that we may contact you for clarification if necessary. Thank you for helping us improve e-Therapeutics.

Q2. Is this 'e-Therapeutics Highlight' relevant for at least one of your patients?

○ Totally relevant

◉ Partially relevant

○ Not relevant

Q3. Will you apply this e-Therapeutics Highlight to at least one patient? ◉ Yes ○ No

If YES, how you will apply it? Check Yes or No for each item.

	Yes	No
To better understand a particular issue related to this patient	○	◉
To justify or maintain the management of this patient	○	◉
To modify the management of this patient	◉	○
To persuade other health professionals or patients to make changes	○	◉

Q4. Do you expect any health benefits from applying this e-Therapeutics Highlight to a particular patient? ◉ Yes ○ No

If YES, what are these benefits? Check Yes or No for each item.

	Yes	No
Increasing patient knowledge about health or healthcare	○	◉
Avoiding unnecessary or inappropriate treatment, diagnostic procedure or preventive intervention	○	◉
Increasing patient acceptability of treatment, diagnostic procedure or preventive intervention	◉	○
Preventing disease or health deterioration (including acute episode of chronic disease)	○	◉
Improving patient health or functioning or resilience (i.e., how well the patient faces difficulties)	○	◉

Informations générales

1. Quel est votre rôle dans le domaine du développement professionnel continu (DPC)?
   – Avez-vous eu d'autres rôles ou emplois en lien avec le DPC? Si oui, décrivez-le(s).

2. Selon votre expérience, est-ce que l'intégration des éléments réflexifs est une priorité dans le développement et la planification des activités de DPC?

3. Avez-vous déjà vu la réflexion utilisée pour l'identification des besoins d'apprentissage?
   – Si oui, comment?

Résultats

Les résultats des 22 premières semaines du programme « E-Therapeutics® Highlights » sont présentés dans les diapositives suivantes.

Ratings in order of Highlight delivery

Ratings by highlight topic

'Totally relevant to practice' by % of highlight ratings

'Learned something new' by % of Ratings

'Motivated to learn more' by % of Ratings

Comparison of learning, motivation and relevance (% of ratings)
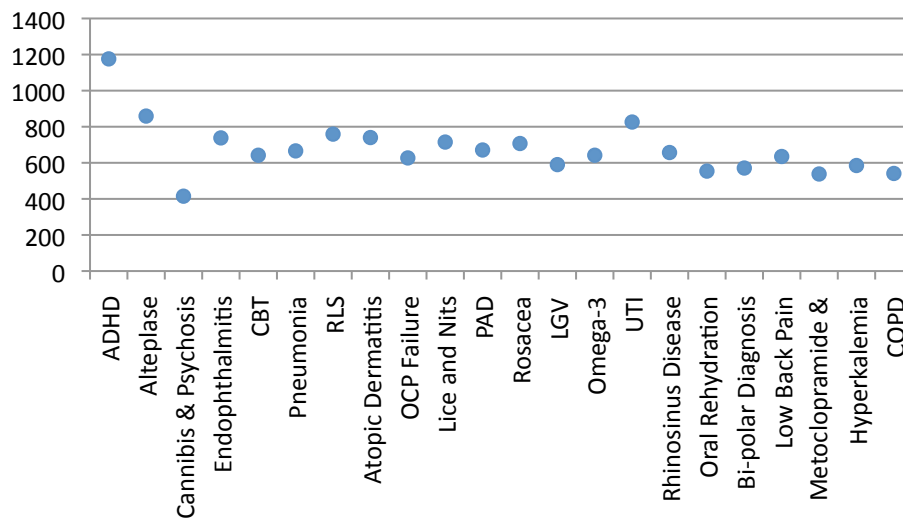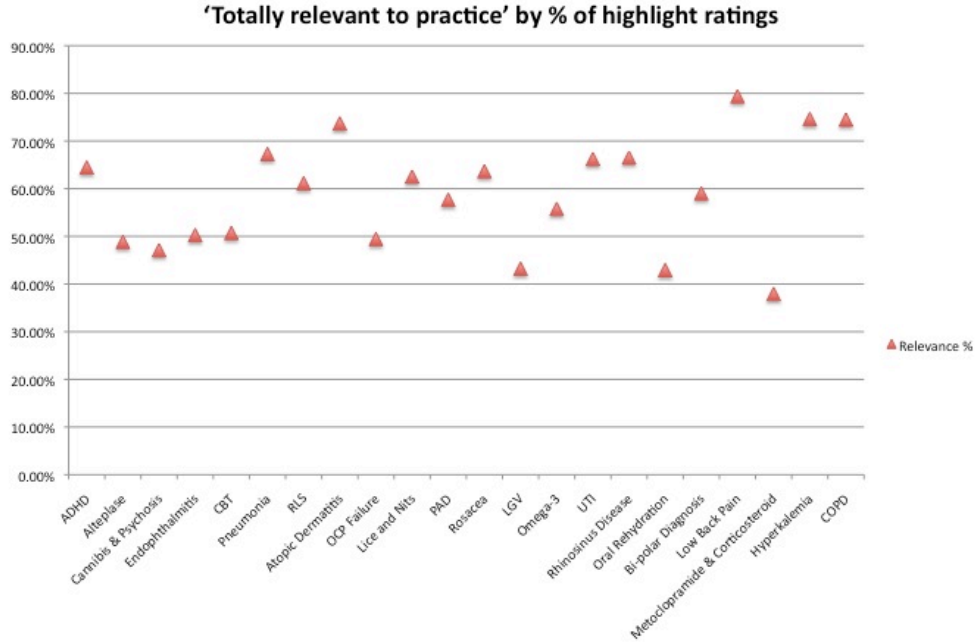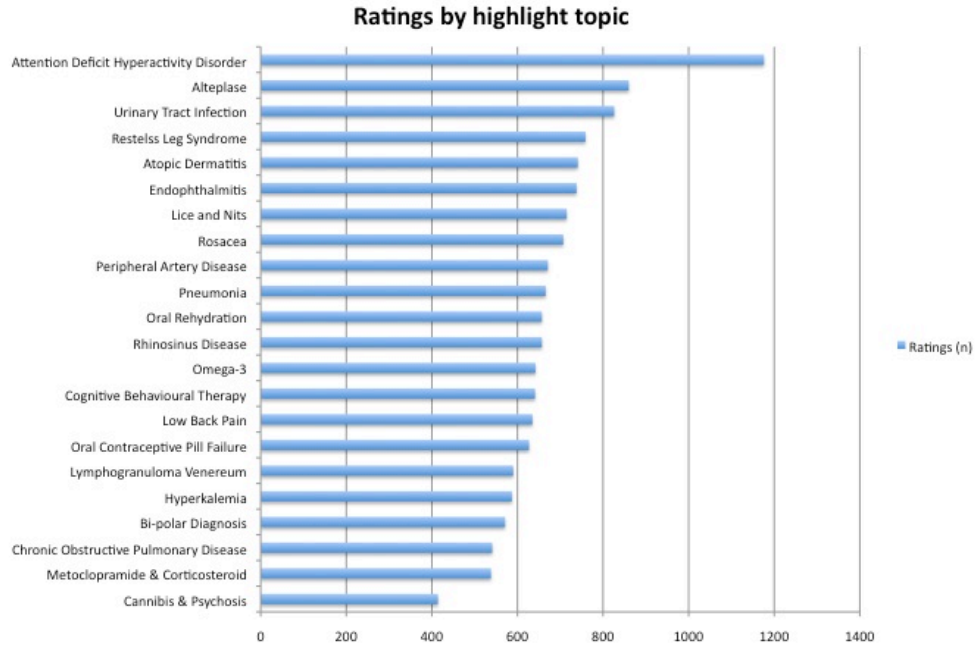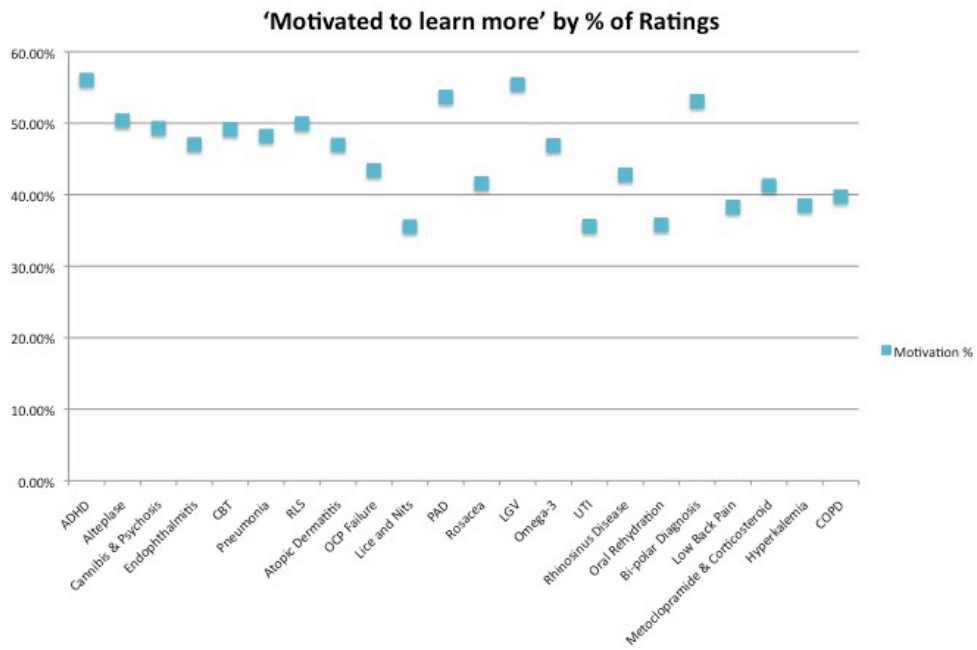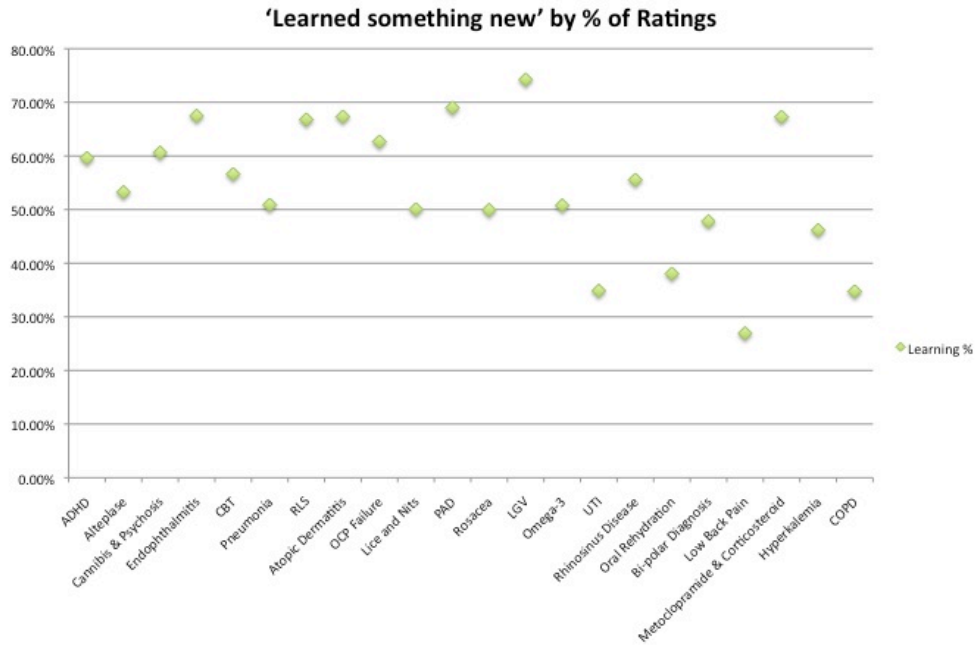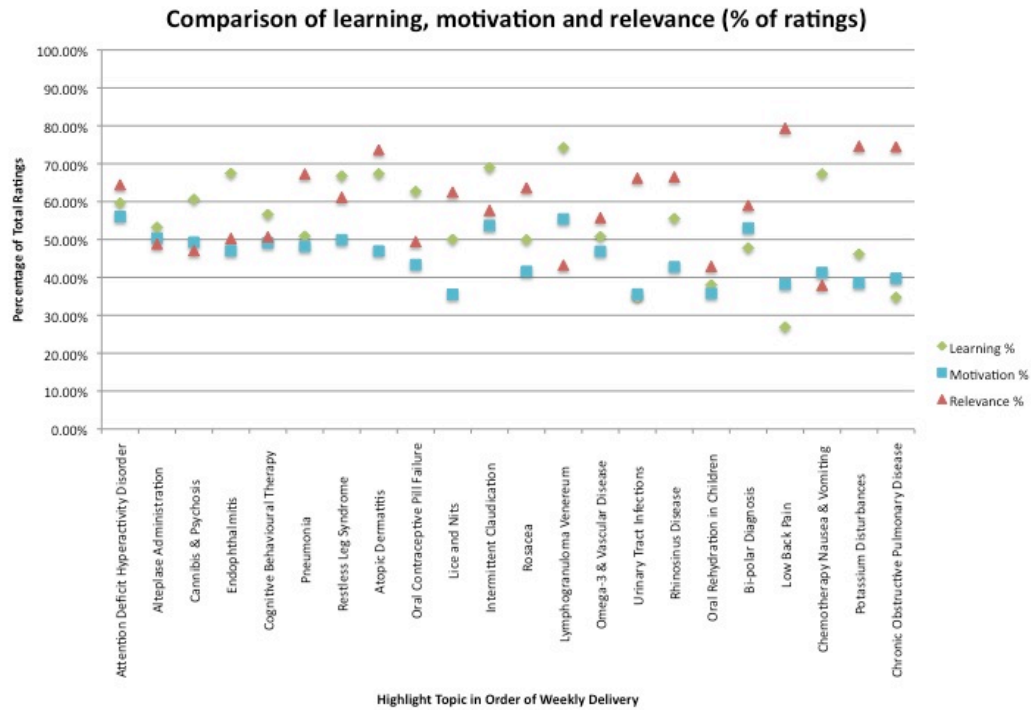
Interprétation des résultats

1. De manière générale, quelle est votre impression ou réaction vis-à-vis de ces résultats?
2. Qu'est-ce qu'ils vous « disent » de la part des MF concernant les besoins en DPC?
   – Est ce que ce type de résultats est nouveau?
3. Quelles sont les limites (les obstacles) pour interpréter ces résultats?
4. Pensez-vous que ce type de résultats est important?
   – Pourquoi est-ce (n'est-ce pas) important?

8. Pour qui est-ce que ce type de résultats pourrait être utile?

9. Comment pourraient-ils utiliser ce type de résultats?

10. Comment pourriez-vous (ou votre organisation) utiliser ce type de résultats?

Avez-vous autre chose à ajouter?

Merci!

Entrevue: Formulaire de consentement

Étudiante à la maîtrise (M.Sc. Exp. Med. Option Fam. Med.)
Université McGill, Département de Médecine familiale

Ce projet de recherche est financé par les Instituts de recherche en santé du Canada

Utilisation de la Méthode d'évaluation des informations (MEI) comme un outil de réflexion guidée pour identifier les besoins d'apprentissage: une étude mixte

L'objectif de ce projet de recherche est d'identifier les besoins d'apprentissage des médecins de famille dans un contexte d'éducation médicale continue. Votre expertise en développement professionnel continu (DPC) est très utile pour ce projet. Dans cette entrevue, nous discuterons les évaluations faites par des médecins de famille en termes d'identification des priorités d'apprentissage, et en quoi ces évaluations pourraient contribuer à la planification du DPC.

Avantages potentiels associés avec la participation à cette entrevue

En participant à ce projet de recherche, vous contribuez à faire avancer la formation d'un chercheur clinicien. Vos connaissances d'expert et votre expérience contribueront aux connaissances sur l'identification des besoins d'apprentissage en DPC. Vous contribuez au développement d'une nouvelle méthode d'identification des besoins d'apprentissage des médecins de famille.

Risques potentiels associés avec la participation à cette entrevue

Les risques associés à cette entrevue sont minimes, mais la possibilité accidentelle d'un bris de confidentialité ne peut pas être absolument garantie. Nous prenons des mesures pour empêcher que cela survienne comme la suppression des noms et autres informations d'identification de la transcription des entretiens. Denice Lewis gardera les enregistrements audio et leurs transcripts dans une armoire verrouillée. Ses superviseurs, Drs Pierre Pluye et Charo Rodriguez, pourraient en prendre connaissance pour l'aider dans ses travaux.

Vos droits en tant que participant sont les suivants.

Vous êtes libre de vous retirer à tout moment de cette recherche.

Vous avez le droit de poser des questions à tout moment avant, pendant ou après l'entrevue.

Votre participation est volontaire.

Confidentialité
Votre entrevue sera enregistrée et transcrite par Denice Lewis. Votre identité sera
retirée de l'entrevue. Vous ne serez jamais nommé dans l'analyse des données ou
les résultats de cette étude.

Si vous avez des questions ou des préoccupations au sujet de cette recherche s'il
vous plaît contacter:

Denice Lewis, BSc MBChB
Étudiante à la maîtrise (M.Sc. Exp. Med. Option Fam. Med.)
Université McGill, Département de Médecine familiale
517 avenue des pins Ouest, Montréal, QC, Canada, H2W 1S4
Tél: 514-398-8483; Fax: 514-398-4202; Courriel: denice.lewis@mcgill.ca

_____

L'étude m'a été expliquée et je suis satisfait des réponses à mes questions. Je suis
d'accord pour participer à cette entrevue.

_____   _____   _____
 Nom   Signature   Date

Je vous remercie pour votre participation.

Appendix J Initial Inductive Codes

Data extract	Coded for
Okay and could you still respond to the first highlight in week 17?	data collection lag effect
I think you've got a bit of a social desirability influence there but having said that when you look at the topics I'm trying to figure out where were the high ones are… so atopic dermatitis	social desirability effect – FPs say they are motivated for appearances
And then COPD… I mean these are really common topics in family docs offices so the ones that are lower are possibly topics they don't see as much or don't like those patients or don't ask about it cannabis and psychosis you probably don't see that much so these are going to be really specific or not specific to the kind of medicine that you're practicing which is why I think they come up higher and lower…	MD interest effect/bias
It's kind of a weird collection of topics though and I don't mean that unkindly…	family medicine topics
I can see why they'd say totally relevant and whereas if you take something that doctors are not comfortable with if you look at psychosis… so I think they may shy away from things that are	MD interest effect/bias

not part of their practice or a desirable part of their practice or one that there truly into. Low back pain makes our docs nutty because you know the patients don't get better if not you can offer them when you try to refer them to a specialist the way time is long specialists require weird stuff so there's a lot of mucking around so the ones that are marked as relevant I would describe them as ones that are quite frustrating for the physician and are probably the ones that the family doctors have to deal with themselves where there's not much support.	
I'm going to a print that page off actually got a copy figure out exactly what you got here cause you got some very interesting findings and [unintelligible - noise of printer] the prevalence in the community whether their support in the community for it there it mean their variations because you're looking across the whole country aren't you?	interesting findings demographics
Really so that's one of your last attended so the ones that they were reading hyperkalemia that's interesting they're reading them if they read them their reading stuff that's interesting I want to look at the motivated.	MD interest effect/bias
Well there's not much you can offer them new there.	Old information

Having looked at low back pain, I was just at a conference where low back pain - I remember thinking that the Tylenol stuff was on the guidelines really is not that much that you can do the frontline anyway and maybe that's why they're not learning enough there's not a whole lot of new stuff that is, recently where some of your more exotic things that are not probably exposed to very often…	Old information Relevance of 'exotic' topics
COPD doctors don't really like. I think it's the since they don't like those old smokers.	MD bias against topics
Motivation to learn more is low and it's probably low cause there's not very much more to learn about lice and nits.	Old information
Yeah so I have to sit here and look at each one individually in terms of learning motivation and relevance on some of that must hang together on frustration. I mean frustration when I hear back from physicians family doctors and they say my god this is complex stuff [unintelligible] referred to as hard to tell a patient with low back pain that we have no solution and then the specialists will see them for two years if that if that is hard to interpret this data without knowing the family physician who provided this information. I mean I only know about stuff in	old information clinical problem cannot be addressed by CME confirmatory data with respect to what it already known about family physicians

[place removed]… we work and try and figure out what it is a family physicians really know. some of this is really quite congruent with what I would have predicted or based on the clinical problems the specialist [unintelligible] so the family physician managing it then what the physician would see and and potential treatments so I look at oral contraception it sort of middle-of-the-road there it's not high it's not super low it's just out there that's probably about right because we haven't had that much new about it I don't think.	3
Yeah that might be yeah do the female male distribution of this stuff?	physician demographics
Well that's something that you may look at the data is there a difference between male and female physicians how they score that particular one just because you know female physicians typically see more female patients but not always. it depends on the community of course and the physicians that practice in that community.	physician demographics patient demographics
This looking at the chemotherapy induced nausea and vomiting you got high learning which is interesting most of them don't see themselves as doing what that and their motivation isn't so great which is probably typical because most of those patients at the point of chemo are being	uncommon to most family practice

seen at the cancer clinic and so the clinic will be following up with them regarding treatment issues are many physicians haven't learned about it because it's a system presented to them.	
Your LGV your OC failure and else and endo, endoph…They seem to be you know that seems to be very exotic. I guess a lot of these are forming the narrower parts of practice and so the potential for learning is high because you don't know very much but the relevance might be low and their motivation to learn more I'm looking to see what those things are… interesting they tend to be middle-of-the-road don't think there's nothing that really stands out is high or low with respect to motivation to learn more.	uncommon to most family practice Relevance of 'exotic' topics even levels of motivation
Oh I think geography where the physicians practice the kind of practice they have you know I mean at some point you have to you have to say so what so what is your plan for using this so using it to develop an educational programs or tells me that family physicians are generally because of the nature of their work their motivation isn't particularly focused in one area although I suspect if you were talking to a physician had morphed into a niche area or who was spending a day a week you know in some aspect they would certainly demonstrate high	MD interest and motivation interest versus being ready for anything uses for this data

motivation but overall if you're working as in general family medicine you probably everything is of interest because anything coming in the door.	
We found that the most successful programming is broadly based…Family physicians. the most successful programs are broad unless it's a skill or new skill that physicians are really looking for but by and large our most successful programs are certainly 15 subjects over three days or workshops you know where physicians can pick and choose.	broad based CME programming best
It would be nice if I was able to use it I would like to have some geographic differentiation. is a different province, differed by gender maybe age although that's not always relevant probably more by practice you may be over under 50 over under for the it's not always relevant	physician demographics patient demographics
Well I think is novel because we haven't had it before you know were all struggling to get better data that can guide educational programs.	need for data to guide programming
Yes and I signed up for the info poems and I did a few of these questions and I got tired of them	boredom of similar similar knowledge product?
That's why and I know [name removed] to you and I asked if this was his work as I was	familiarity with similar knowledge

familiar with these Info poems…I'm on their advisory thingy whatever it's called so I go up there once a year and give them my thoughts on what they should be doing with therapeutic choices and so on	product small CME circles in Canada
I saw that question and I guess I was going to ask you what you mean by reflection as I hear this term a lot.	definition of reflection
I don't know what your experience has been or the kind of information you receive from other folks but I think for most of us in touch identifying learning need to get some docs around you give a survey of much of talk it topics with Likert scales or you present them with some topics and you ask would you think about this or you ask them what kind of things would you like to see covered under this topic so it's pretty informal and in a way they are reflecting on importance of this topic to their practice and thinking about specific areas of a broader topic that might be useful to their practice but I guess that the foremost reflection is just not very coming I have a really hard time with this term reflection because of something that is part of everyday life	definition of reflection implicit reflection traditional methods of needs assessment informal reflection reflective behaviour is natural part of life

I guess the general impression is that there's a fair bit of learning and motivation and relevance going on here they're all 35 to 80% or so or 70% or so so there's hardly any that are really low so maybe if they weren't interested in reading they they would need to answer the first place of the one interested in the topic. They may not take the step to going fill of the questionnaire for things you know that old hat to them they might not have gone any further. The other observation I have is that there doesn't seem to me that a lot of relation between these curves. It's kind of hard to tell but I don't think there is.	MD interest effect no relationship between measures
I don't know. [Laughter] I haven't gotten that far.	difficult to interpret data
I guess that just means that whatever was in there, there's not much new in there a lot of them knew it anyway and they want to learn more … I guess I can't get any further than they want to learn more about this	difficult to interpret data old information
I'm struggling with what all this means. I know even asked me how can I use is for planning programs and always read asked that question because you might have other ones so I really had a hard time interpreting this meaningfully. I think if you could and probably that's beyond	planning uses for data qualitative supplementation wanted from FPs

the scope of your project but you know to talk to some of the docs and asked them what they meant and I'd have to see the highlight I think that might help you interpret rather than just having these spots the no points on the line here	difficult to interpret data
[Sigh] Well I'm thinking as were talking so I didn't think of this last night but I guess I'm kind of surprised that there are not some really really low ratings here I guess that goes back to my earlier comment that maybe some of the people who become that really from interesting answer them in some of the people who didn't want to answer just didn't open them	MD interest effects
Well I was going to suggest that if you have the other domains underneath for each topic that would be easier to understand than the weights depicted with those three lines…Yeah I would try it I don't know who some of those things you have to see it to see how it looks it says this bar graph where that highlights by topic I find that much easier to understand	meaningful presentation of data would be useful
So if I was going to uses for [place removed], I want to have the dated just for the respondents from [place removed]. And I'd have to have some idea of the summary I'm sorry I forgotten what you call of them…And I'd like to know if possible about the docs themselves so are the	physician demographics needed for interpretation

docs with a special interest you know some family doubts will have a special interest in pain management or sports medicine or something do	
No know I think just as I mentioned if I was going to use it unwanted have a little more detail behind it I'd want to run it by my own planning committee unlock the [place removed]detail for [place removed]docs and then I would want it in Excel so I could play with it myself and I would want to be able to organize affiliate want to and presented to my own clinic and see what they thought about it see what their response was whether it be you it's good to be prompting some thoughts	physician demographics patient demographics
Right so if we say is important identify learning needs because 55% of people say they want to learn more about it I would have to confirm that by I have to get some other sources either planning committee or a focus group or however you wanted to do it and say okay this is with it is what are your thoughts about lymphogranuloma venereum and they might say well I never see it so this very important do I would need some sort of confirmatory evidence about these before I would use them	possible planning uses for data supplemental data to other needs assessment data

I'm just looking at the other questions you've picked three domains I'm looking at the rest of them to see what else I might want to pick out of here as opposed to just those three… I think the first one is pretty important my practice will be changed and improved so I'm not sure why you didn't pick that	other measures from IAM might be useful
Yeah I think it is novel… I think it is novel it interesting because you do have such a wide range of topics here	novelty of this typed of data
Sorry I said that kind of tongue-in-cheek. I have a bias against big Pharma. They kind of promulgate the program. When you look at stuff like you know Moore is seven levels etc. and you read their work on how we should develop programs or you read interventions I always have trouble with the word intervention. See I mean in intervention to me sounds like doesn't sound like something that would be educational in all I think of the the TV program you know that your doctor and everyone here loves you and likes you but you can learn more laughter. What I see coming from the Pharma backed programs is and again I'm just kind of suspicious by nature they got a new drug they've got drug addicts and it's just come to market and of	concerns about pharma involvement in CME

theoretical framework for program development

understanding of traditional needs assessment |

course they want everyone to know about it. So they hire a medical communication company and the medical education company sends out questionnaire to a bunch of docs either electronically or by mail or whatever. And the you know the questionnaire says do you want to learn more about diabetes and you know most of us say yeah sure why not. You want to learn more about stroke?. And of course to my mind driving these assessment is the Pharma company desire to promote their drug. And if the drug is about stroke than that for the questionnaires about. And if the drug is about something in diabetes then that's what informs the needs assessment. And that's what concerns me. It it that isn't the way it should work.	
A something like a real good needs assessment is hard work. To determine what the needs are and rather than just getting sent e-mails aged or something in the mail from educational company saying what you want to know or would you like to learn more about A B or C you really have to do a lot of work. Maybe you need to work with the ministries of health and the ICD codes. Or really doing a lot of research and saying what's the environmental scan on diabetes. So if we looked at and again I hate to keep backing this up but it depends on the	potential sources for needs assessment data self-audits in needs assessment individual needs assessment good needs assessment requires a lot or work

quality of information they get. The people who collect all of this data. Okay [place removed] has about X million people in the province. And you know X number of them you know are diabetics we know our diabetics just from the data and those diabetics would've the renal functions. I mean if you did some really good data mining and got a lay of the land well oh my gosh why are all these people in Reno failure? Well maybe the docs should learn more about diabetic nephropathy. And then they could say we should get a program on diabetes and kind of focus on renal disease and that kind of stuff rather than Pharma company acts who happens to have a new diabetic drug tailoring a program to promote their drug. You know what I mean? And I mean honestly it would be a lot of work but that's what the needs should come from because do I know my needs? I don't know. But maybe if you look at the data and analyze what I do either myself or in a collective, then maybe they can determine what the needs are. Which I guess is a lot of work but I don't know that I've done a lot.	needs assessment determined by the quality of information available
Yep. Yep yeah and him again you've got to make sure that you have good data. In [place removed] and it's probably similar in other provinces if I see a patient I fill out you know I bill	disconnect between people who collect data and physician practice

for my service okay so you're only allowed one diagnosis so because that's when all you can but all you can do in one visit. So I might see someone in diabetes but they might have diabetes and high blood pressure and osteoarthritis and etc. but the people who collect the data won't know that. So like I say you know we have to keep stepping back and say do we have valid data and sometimes I think we are quite lacking in data and data collection.	need to assess the quality of data in needs assessment lacking in quality data
And and for the most part in terms of reflection a lot of this [unintelligible]. This has a pretty good reflective piece when you go to most programs you no conferences etc. a lot of the post-reflective pieces are there kind of simple. Because you look you got a bunch of busy doctors and they'll spend a lot of times filling out forms so you get a lot of this is 0 to 5 kind of good speaker good topic was a bias blah blah blah will you use this in your practice and then there's an empty space and if you have any further comments please recommend and they check off a few things and then they handed the paper so it's not it doesn't really help in terms of evaluation.	reflection tends to be after the fact program evaluation not tied to practice
I'm looking at the programs I'm thinking of the programs intended trying to think of the	use of reflection in practice is not

programs that have evaluated I mean they always say that they have but I haven't really seen the data and even when it's not done by drug companies you know a lot of times cancer care will run excellent programs or the regional health authorities who come up with you know a day in pediatrics or a day in you know whenever. And I don't know that the that reflection has been used a lot but I don't really know I haven't seen their data per se.	always clear
And you know we have the guidelines for accreditation… so that's all there in terms of what we look at. I'm always concerned about branding because they shouldn't be branding in the program. We look to keep bias to a minimum and there should be a needs assessment a post exercise evaluation and you know they're supposed to be submitted for us to look at for the accreditation.	current explicit requirements of reflective piece to programs exist for accreditation
If I'm looking at this and okay I'm saying this is definitely not from an expert when it comes to statistical analysis but just looking at the way the chart flows the way the three of them are put together which kind of surprised me because it's good that people are motivated and it's good to learn something new but I know that when I've ever had discussions we've always thought	MD interest surprised to see three measures presented in this fashion measures don't seem to follow a

that relevance to your practice was a big factor. Because you know if you take time out of a busy practice and say okay I want to go to a program because you know what I see a lot of COPD and an so I want to learn more about it because there a lot of you live in my practice and it's interesting that motivated to learn more and learning something new really didn't have that much to do with relevance and practice.	trends with respect to one another
Okay it's very relevant and that's okay that's been established in the literature in terms of what will present to the doctors office with in terms of motivation for learning something new now I don't know about the motivation but learning something new means maybe they've got to look at the program because there is a lot and again this is what I do here at [place removed] so this is a bit of a personal thing there is a lot of newer literature on low back pain in terms of medication diagnostic imaging yes or no treatment you know so there is new stuff and you would think that because it is such an because it is so relevant to practice that you think people would be motivated to learn more but the editing is as a physician I can tell you some of these cases can be very frustrating because you use her to get into chronic pain but am talking about	complex clinical problem may be frustrating that may benefit from learning something new discrepancy between relevance and motivation is surprising: if it is relevant to practice then motivation should be higher

someone who they hurt the back and they're off work for couple of weeks and a couple weeks later there being other back to normal in the correct work and everything is fine. But a certain percentage of these cases will turn into long-term disability cases and I think if you could learn a little more about that it might help turn it around a bit. So yeah.	
Yeah. Because I think it is I think sometimes the data concern confirms current practices and it makes you think and I think that's those are both good in that it might let us know that we're doing a half decent job in terms of education but also to I mean if you look at the results of some data what you might say why did that happen but it makes is kind of rethink things because it is something that should evolve I mean education CPD has changed and will change over the next number of years just in terms of formats and what it is are going for and so I think the data is important and hopefully over time we'll expand it and drill down a little more and get more information.	data has many potential uses: confirmatory or evolutionary
I don't know that it's novel I mean I guess it's something that you would know more about or [name removed] would know more about this kind of stuff I mean I think there is data about	data could be a starting point for directed assessment

this kind of stuff you know why docs go to programs why they choose to go to the programs that they go to. So I don't think it's something that's never been done before but I think it requires looking into more.	
If the planning committee's task was to plan relevant programs that meet the educational needs of groups of physicians and granted we know that needs will vary from area to area. But unfortunately what planning committees under the current system do for the most part is like I say a drug company goes oriented and education company goes and they you know send out the surveys quote needs assessment to XC no hundred docs and then they get the feedback and the planning committee plans the programs so they are in charge of getting the information the format the slides you know the PowerPoint ready and they're supposed to look at this and be involved there supposed to be involved with looking at the needs assessment and other than needs assessment planning the program but I don't know but that always happens.	current disconnect between the needs assessment, program planning and content development
I think we would find it interesting i don't know that we would use it day-to-day but one of the things we'd like to do is and this is something [name removed] could talk about he knows far	potential uses for this data include starting point

more about it than i do is in terms of how we might view it or use it as an example of something is very trying to look at and again [name removed] knows all about this were trying to change how you actually get credit for education.	
And of course we could be sleeping the could be reading the globe and mail and you know there's no way of knowing if they're actually learning anything so what one of the things were thinking of is using something like Moore's levels to say okay if you spend an hour at something that's level ii then you get x credits. If you spend an hour at something that's level x then you get more credits. And its credits not ours which regular [unintelligible] from the time thing time is important but it's not the only thing that's important so using information in terms of relevance and some indicators might give us information about what level you are at and it would probably be user from it for it could kind of be uses a matrix for figuring out what program a program is worth in terms of credits.	potential use for this data regards credit allocation for type of activity not time of activity
I think not at all overtly. I think implicitly, implicitly perhaps but not explicitly by any means…Again, not explicitly. Although you know anytime you ask people to assess their	use of reflection not generally explicit in needs assessment

practice you know you see that lots of times have the patience to say how many patients you see a week how many of them would have X,Y or Z condition… if you assume that those are invitations to reflect or actual categories within which to reflect to guide selection of learning modalities that I guess it's a very common thing.	no one definition of reflection
Yeah okay I think… in some ways it reminds me a little bit of what happens with residents. Residents often complain at the end of a rotation or a valuation you know we never got any feedback. Well of course they been getting feedback the whole time it just wasn't labeled that way. So in fact I think we asked people to reflect all of the time we just don't preface it by saying take a moment to reflect….I think probably reflection is a very common tool that's used in assessing learning needs it's just that we don't call it that.	don't necessarily label it as reflection reflection is common tool use in needs assessment
I don't think it would make much of a difference. As long as you do it, we're probably going to call on practitioners to reflect and to get better reflection to get better at using reflection it seems to me part of one of the imperatives of lifelong learning is reflection and the analysis of reflection. So I think we've got to get better at it so if getting better at it means labeling it and	reflection is an accepted/expected part of lifelong learning

|	
treating it as a skill that can be enhanced in the individual then sure.	
So I am this is where I had a hard time connecting this back to reflection. Maybe you can take me there when we are through.	definition/understanding of reflection is unclear as it relates to this data
Speaking strictly about the data it seemed interesting that it was interesting to look at the places where the ratings clustered weather very close together versus where they were spread. So I was interested in back pain for instance where there was a high need may be one of the things that's not factored in here is the quality of the learning product. So maybe what's being commented on here is not about the physicians but is about the learning product that they had to deal with. In some ways that is what they are being asked about isn't it? How well does this product [unintelligible]. So maybe what were seeing has to do with variation in the quality of the content.	data is 'interesting' easier to interpret where measure diverge per highlight quality of the learning product needs to be considered
But the problem with the nature of family practice is you don't know how relevant it's going to be. The problem with family medicine is you have to know something about everything. And so	all topics are relevant topics in family medicine

every kernel is just about as valuable as every other. Some of them you're going to use more but it doesn't mean that one is less valuable than the other because when you really need it you really need it.	
Well so clearly there was a curiosity factor at the beginning. And I don't know what to make of the dip at the third one. I'm not surprised to see it go down but I am surprised to see a dip below the eventual baseline. For the third one but in fact what one would expect is some sort of plateau. Basically people got used to seeing this in their inbox and so by the sword of the sixth one on you can gauge how many people open it and get an idea of how heated the topic is. I guess it's not opening its opening and rating.	novelty effect in data surprised to see ratings dip well below eventual baseline limitation of study: not able to track openings just ratings
And listen there is no shortage of drug-related CE. Non-drug-related CE is harder to find …It's tainted by definition. Don't know. I don't know enough about it but I know enough about how pervasive pharmaceutical pharmaceutical funding is in CE creation to wonder. And certainly so probably the way I would judge that is by taking a look at the content and how directly they were related to currently highly marketed drugs. I'm encouraged to see the quinine one for	concerns about pharma involvement in CME perception of pharma influence regarding content

instance. Yes because quinine is not marketed at all. You know it's an old treatment that nobody is making any money off of.	
Yeah I think if you sat night in the office and saw people come in with these problems you wouldn't be surprised to see any of these topics any of these things in a given day. And you need to be knowledge ready for them.	all topics appropriate to family medicine
Well basically it's a big black box that we are feeling around in. Gosh, I think it's guesswork. I'm not sure that interpretation is probably the right word I think I would use it as a basis internally for trying to sort some things out like changing the low back pain but apart from that but I don't think I would invest the whole lot of energy in… I think it's really interesting and we haven't had a chance to do it this kind of interpretation in depth in my experience on the learning we subject people to otherwise.	needs assessment can be like guesswork not novel data but more in depth interpretation than before
So let's think about that for a moment. So people would select and open and rate based on based on their inbuilt interest… a lot of times people already know a fair bit and they want to learn about what's new or what the take of this particular service is on their expertise…Yes	MD interest effects interpretation easier when there is a difference between measures,

interest and if they're interested they probably know more than the average person about it already. So but that there's nothing wrong with that. You know it's the age-old problem of getting the right people in the seats when learning is being dispensed and getting people to learn the right stuff but you know there's enough ways for people to learn that were not short. People are offered a lot. So I think I would find it easier to interpret the spread especially when the relevance is high but the motivational aspect and learning aspects are low. I think that means that not a very good quality learning product. That's probably the only conclusion I would be able to easily draw from this.	especially high relevance
People who are funding CE like CHR CE research. I think it's you know ultimately what are some of the ultimate uses… certainly for determining whether a given developed knowledge product is useful and worthwhile to use or whether it needs more investment of time and energy that might be something that you could do with it.	potential uses for data
*Some relate to the program itself… how good the program it or efficiency of the CME program	evaluation of knowledge product

*Not novel data. Has been done before but novel in terms of depth and quality	
*Even levels of motivation across the board	
*could be supportive data for needs assessment	
Maybe if it [CME content] is not biased…	concerns about pharma in CME
It [reflection] has always been important. 5-6 year ago we put the emphasis on in CPD on application to practice…	reflection is and has been important in CME
Combined the data can be useful for planners, but be careful - it's aggregated data. I want to see the data for my area and explained by scientists .... To the extent that the limits are well explained.	physician demographics and patient demographics more meaningful

Appendix K Initial Code Mapping

Appendix L Refined Themes

Themes	Illustrative excerpt
Reflective practice in continuing professional development	
Definition of reflection is not standardized.	'I saw that question and I guess I was going to ask you what you mean by reflection as I hear this term a lot.' 'How many patients you see a week how many of them would have X,Y or Z condition… if you assume that those are invitations to reflect or actual categories within which to reflect to guide selection of learning modalities that I guess it's a very common thing.' 'I don't think [labeling] it would make much of a difference. As long as you do it, we're probably going to call on practitioners to reflect and to get better reflection to get better at using reflection it seems to me part of one of the imperatives of lifelong learning is reflection and the analysis of reflection. So I

	think we've got to get better at it so if getting better at it means labeling it and treating it as a skill that can be enhanced in the individual then sure.'
Reflection is implicitly used in current needs assessment practices.	'I don't know what your experience has been or the kind of information you receive from other folks but I think for most of us in touch identifying learning need to get some docs around you give a survey of much of talk it topics with Likert scales or you present them with some topics and you ask would you think about this or you ask them what kind of things would you like to see covered under this topic so it's pretty informal and in a way they are reflecting on importance of this topic to their practice and thinking about specific areas of a broader topic that might be useful to their practice but I guess that the foremost reflection is just not very [unintelligible] I have a really hard time with this term reflection because of something that is part of everyday life' 'I think not at all overtly. I think implicitly,

	implicitly perhaps but not explicitly by any means…Again, not explicitly.'
Reflective activities are required in current programming accreditation.	'And you know we have the guidelines for accreditation… so that's [reflection] all there in terms of what we look at.'
The execution of reflection in activities is variable.	'This has a pretty good reflective piece. When you go to most programs you no conferences etc. a lot of the post-reflective pieces are there kind of simple. Because you, look you got a bunch of busy doctors and they'll spend a lot of times filling out forms so you get a lot of this is 0 to 5 kind of good speaker good topic was a bias blah blah blah will you use this in your practice and then there's an empty space and if you have any further comments please recommend and they check off a few things and then they handed the paper so it's not it doesn't really help in terms of evaluation.' 'I'm looking at the programs I'm thinking of the programs intended trying to think of the programs that have evaluated I mean they always say that they have but I haven't really seen the data and even when it's not done by

	drug companies you know a lot of times cancer care will run excellent programs or the regional health authorities who come up with you know a day in pediatrics or a day in you know whenever. And I don't know that the that reflection has been used a lot… but I don't really know I haven't seen their data per se.'
Family physician learning needs	
Family physician learning needs are all encompassing due to the broad based nature of family practice.	'But the problem with the nature of family practice is you don't know how relevant it's going to be. The problem with family medicine is you have to know something about everything. And so every kernel is just about as valuable as every other. Some of them you're going to use more but it doesn't mean that one is less valuable than the other because when you really need it you really need it.' 'Yeah I think if you sat night in the office and saw people come in with these problems you wouldn't be surprised to see any of these topics any of these things in a given day. And

	you need to be knowledge ready for them.'
	'We found that the most successful programming is broadly based…Family physicians. the most successful programs are broad unless it's a skill or new skill that physicians are really looking for but by and large our most successful programs are certainly 15 subjects over three days or workshops you know where physicians can pick and choose.'
	'I mean at some point you have to you have to say so what so what is your plan for using this so using it to develop an educational programs or tells me that family physicians are generally because of the nature of their work their motivation isn't particularly focused in one area.'
Complex clinical situations may not be readily solved by continuing medical education.	'Low back pain makes our docs nutty because you know the patients don't get better if not you can offer them when you try to refer them to a specialist the way time is long specialists require weird stuff so there's a lot of mucking around so the ones that are

	marked as relevant I would describe them as ones that are quite frustrating for the physician and are probably the ones that the family doctors have to deal with themselves where there's not much support.'
Needs assessment	
Good needs assessments are difficult to conduct.	Well basically it's a big black box that we are feeling around in. Gosh, I think it's guesswork. 'Something like a real good needs assessment is hard work. To determine what the needs are and rather than just getting sent e-mails aged or something in the mail from educational company saying what you want to know or would you like to learn more about A B or C you really have to do a lot of work.' 'And I mean honestly it would be a lot of work but that's what the needs should come from because do I know my needs? I don't know. But maybe if you look at the data and analyze what I do either myself or in a collective, then maybe they can determine

	what the needs are. Which I guess is a lot of work but I don't know that I've done a lot.'
Needs assessments are perceived to have historically been driven by industry.	'What I see coming from the Pharma backed programs is and again I'm just kind of suspicious by nature they got a new drug they've got drug addicts and it's just come to market and of course they want everyone to know about it. So they hire a medical communication company and the medical education company sends out questionnaire to a bunch of docs either electronically or by mail or whatever. And the you know the questionnaire says do you want to learn more about diabetes and you know most of us say yeah sure why not. You want to learn more about stroke?. And of course to my mind driving these assessment is the Pharma company desire to promote their drug. And if the drug is about stroke than that for the questionnaires about. And if the drug is about something in diabetes then that's what informs the needs assessment. And that's what concerns me. It it that isn't the way it

	should work.'
There is a need for objective data in needs assessments.	'Maybe you need to work with the ministries of health and the ICD codes. Or really doing a lot of research and saying what's the environmental scan on diabetes… I mean if you did some really good data mining and got a lay of the land well oh my gosh why are all these people in renal failure?'
Currently there is disconnect between data collection and the practice of family medicine.	'Yep yeah and him again you've got to make sure that you have good data. In [place removed] and it's probably similar in other provinces if I see a patient I fill out you know I bill for my service okay so you're only allowed one diagnosis so because that's when all you can but all you can do in one visit. So I might see someone in diabetes but they might have diabetes and high blood pressure and osteoarthritis and etc. but the people who collect the data won't know that. So like I say you know we have to keep stepping back and say do we have valid data and sometimes I think we are quite lacking in data and data collection.'

IAM data and its uses	
There does not appear to be a consistent relationship between learning, motivation and relevance.	I guess the general impression is that there's a fair bit of learning and motivation and relevance going on here they're all 35 to 80% or so or 70% or so so there's hardly any that are really low so maybe if they weren't interested in reading they they would need to answer the first place of the one interested in the topic. They may not take the step to going fill of the questionnaire for things you know that old hat to them they might not have gone any further. The other observation I have is that there doesn't seem to me that a lot of relation between these curves. It's kind of hard to tell but I don't think there is
Data should be presented meaningfully by researchers.	Combined the data can be useful for planners, but be careful - it's aggregated data. I want to see the data for my area and explained by scientists .... To the extent that the limits are well explained.
Data should be tailored to specific physician and patient populations.	'Oh I think geography where the physicians practice the kind of practice they have you

	know I mean at some point you have to you have to say so what so what is your plan for using this so using it to develop an educational programs or tells me that family physicians are generally because of the nature of their work their motivation isn't particularly focused in one area'
The type and depth of data generated by IAM is not often seen in needs assessment.	'Well I think is novel because we haven't had it before you know were all struggling to get better data that can guide educational programs.' 'Yeah I think it is novel… I think it is novel it interesting because you do have such a wide range of topics here.'
IAM data is difficult to interpret.	'I guess that just means that whatever was in there, there's not much new in there. A lot of them knew it anyway and they want to learn more … I guess I can't get any further than they want to learn more about this' 'I'm struggling with what all this means. I know you asked me how can I use this for planning programs … I really had a hard time interpreting this meaningfully. I think if you

	could and probably that's beyond the scope of your project but you know to talk to some of the docs and asked them what they meant and I'd have to see the highlight I think that might help you interpret rather than just having these spots on the line here.' 'Well so clearly there was a curiosity factor at the beginning. And I don't know what to make of the dip at the third one. I'm not surprised to see it go down but I am surprised to see a dip below the eventual baseline. For the third one but in fact what one would expect is some sort of plateau. Basically people got used to seeing this in their inbox and so by the sword of the sixth one on you can gauge how many people open it and get an idea of how heated the topic is. I guess it's not opening its opening and rating.' [regarding relevance]
IAM data could be used as supplemental data or as a starting point in a given needs assessment.	'Right so if we say is important identify learning needs because 55% of people say they want to learn more about it I would have to confirm that by I have to get some other

| | sources either planning committee or a focus group or however you wanted to do it and say okay this is with it is what are your thoughts about lymphogranuloma venereum and they might say well I never see it so this very important do I would need some sort of confirmatory evidence about these before I would use them.' '|

'No no I think just as I mentioned if I was going to use it unwanted have a little more detail behind it I'd want to run it by my own planning committee unlock the [place removed]detail for [place removed]docs and then I would want it in Excel so I could play with it myself and I would want to be able to organize affiliate want to and presented to my own clinic and see what they thought about it see what their response was whether it be you it's good to be prompting some thoughts.'

IAM data might be used to justify further continuing professional development funding (ex from CIHR).	'People who are funding CE like CHR CE research. I think it's you know ultimately what are some of the ultimate uses… certainly for determining whether a given developed knowledge product is useful and worthwhile to use or whether it needs more investment of time and energy that might be something that you could do with it.'
Knowledge product	
IAM provides information about the knowledge product.	'Speaking strictly about the data it seemed interesting that it was interesting to look at the places where the ratings clustered weather very close together versus where they were spread. So I was interested in back pain for instance where there was a high need may be one of the things that's not factored in here is the quality of the learning product. So maybe what's being commented on here is not about the physicians but is about the learning product that they had to deal with. In some ways that is what they are being asked about isn't it? How well does this product

	[unintelligible]. So maybe what were seeing has to do with variation in the quality of the content.'
	'So I think I would find it easier to interpret the spread especially when the relevance is high but the motivational aspect and learning aspects are low. I think that means that not a very good quality learning product. That's probably the only conclusion I would be able to easily draw from this.'
	'Having looked at low back pain, I was just at a conference where low back pain - I remember thinking that the Tylenol stuff was on the guidelines really is not that much that you can do the frontline anyway and maybe that's why they're not learning enough there's not a whole lot of new stuff that is, recently where some of your more exotic things that are not probably exposed to very often…'
The development of knowledge products is perceived to have been driven by industry.	'And listen there is no shortage of drug-related CE. Non-drug-related CE is harder to find …It's tainted by definition. Don't know. I don't know enough about it but I know

	enough about how pervasive pharmaceutical pharmaceutical funding is in CE creation to wonder. And certainly so probably the way I would judge that is by taking a look at the content and how directly they were related to currently highly marketed drugs. I'm encouraged to see the quinine one for instance. Yes because quinine is not marketed at all. You know it's an old treatment that nobody is making any money off of.' 'Sorry I said that kind of tongue-in-cheek. I have a bias against big Pharma. They kind of promulgate the program.'

Index of Appendices