

Mount Saint Vincent University
Department of Applied Human Nutrition

**Development of Evaluation Tools for Dietitians of Canada's Practice-based Evidence
in Nutrition (PEN) Service**

By
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Submitted in partial fulfilment
of the requirements for the degree of
Master of Science in Applied Human Nutrition

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Dedication

To my father, George Hemming, who taught me the value of knowledge and persistence.

Abstract

Background: Evidence-based practice (EBP) uses the best available research evidence, in combination with clinical expertise and client values, to guide practice decisions (1). Dietitians recognize the benefits of using an evidence-based approach, but do not routinely incorporate it into their practice (2, 3). Lack of time and the skills needed to find and critically evaluate the published research are cited as barriers to adopting evidence-based practice (3). The knowledge translation and transfer (KTT) process can assist in bridging the gap between evidence and practice (4).

In September 2005, Dietitians of Canada (DC) launched Practice-based Evidence in Nutrition (PEN), an online evidence-based knowledge translation/transfer (KTT) service for dietetic practice. PEN must be evaluated to determine if the service meets the needs of users and to assess its effectiveness as a KTT tool for incorporating evidence-based knowledge into dietetic practice.

Objective: The aim of this research was to develop two evaluation tools for PEN: a web-based questionnaire to collect demographic and quality assurance data (PEN Evaluation Questionnaire) and a set of interview questions to evaluate PEN as medium for KTT and its impact on dietetic practice (PEN Evaluation Interview Guide).

Methods: The questionnaire was developed using a structured four-step process. An advisory panel (n=14) validated the researcher-developed questionnaire and guided the development of its online format. The resulting questionnaire was pilot tested with a purposive sample (n=19) of PEN subscribers and non-subscribers. The interview guide was developed with the assistance of an expert panel (n=7) using a three round modified Delphi process.

Results: The questionnaire development process resulted in a 46 item web-based questionnaire to collect demographic and quality assurance data on the PEN service. The findings confirm that successful questionnaire development requires the use of a systematic approach including a comprehensive review of face and content validity.

The Delphi process was successful in bringing together a diverse group of experts with extensive knowledge in KTT and EBP to produce an interview guide containing open-ended questions focusing on respondents' understanding of evidence-based practice and PEN, the use of PEN by dietitians and other disciplines, the perception of the quality/usefulness of PEN and barriers and facilitators to PEN use.

Conclusions: Quantitative and qualitative evaluation tools, validated by experts in the KTT and dietetics fields, will provide a comprehensive evaluation of PEN's impact on practice and its effectiveness as a KTT tool and ensure the quality and relevance of the data collected.

This research adds to the limited body of knowledge regarding the formal evaluation of on-line evidence systems and KTT strategies.

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1.0 Introduction

1.1 Problem Statement

Evidence-based practice (EBP) uses the best available research evidence, in combination with clinical expertise and client values, to guide practice decisions (1). Dietitians recognize the benefits of using an evidence-based approach in their practice, but do not routinely apply it (2, 3). Lack of time and the skills needed to find and critically evaluate the published research are cited as barriers to adopting evidence-based practice (3). By removing some of the more time consuming and skill dependent aspects of finding, appraising and synthesizing the literature, the knowledge translation and transfer (KTT) process can increase the accessibility of relevant research findings; thus assisting in bridging the gap between evidence and practice (4). Knowledge translation and transfer involves the exchange, synthesis and communication of relevant research findings to end users through effective dissemination strategies (5). Knowledge translation and transfer is enhanced when practitioners are able to access relevant evidence and practice guidelines at the time and place they are needed (6, 7), which has led to the development of several on-line decision support services for health professionals.

In September 2005, Dietitians of Canada (DC) launched Practice-based Evidence in Nutrition (PEN), an innovative web-based professional KTT service. The researcher, in partnership with Dietitians of Canada, developed evaluation tools to quantitatively and qualitatively assess the effectiveness of PEN as a decision support service and its impact on dietetic practice. Appropriate evaluation tools are necessary to ensure the quality and

relevance of the data collected (8), as this data will form the basis for future decisions regarding the development and promotion of the PEN service.

1.2 Relevance of the Study

An evaluation of PEN is critical as it is only through “iterative evaluation and redesign” (9) that PEN can successfully meet the needs of users, thus ensuring its effectiveness as a medium for KTT and its integration into dietetic practice.

The development of both quantitative and qualitative evaluation tools will provide a comprehensive evaluation of the PEN service (10, 11). The PEN Evaluation Questionnaire will be used to gather demographic information on PEN users and to collect quantitative data to evaluate the mechanics of the PEN service and its usefulness as an on-line decision support tool. The PEN Evaluation Interview Guide will be used to collect qualitative data to evaluate PEN as a medium for KTT and its impact on professional practice.

This research will also add to the limited body of knowledge regarding the formal evaluation of KTT strategies (12) and provide additional insight into changing professionals’ practice behaviour through KTT.

1.3 Research Objective

The aim of this research was to develop and validate two evaluation tools for Practice-based Evidence in Nutrition (PEN):

1. A web-based survey tool to collect demographic and quality assurance data on the PEN service (PEN Evaluation Questionnaire); and
2. A set of interview questions to assess the effectiveness of PEN as a KTT tool and its impact on dietetic practice (PEN Evaluation Interview Guide).

1.4 Definitions

Dietitians of Canada (DC) – is the national organization of dietitians in Canada.

Evidence-based Practice (EBP) – is a term to describe the process of using the best available research evidence, in combination with clinical expertise and client values when addressing patient care (1, 13).

Knowledge Translation - is “the exchange, synthesis and ethically-sound application of knowledge – within a complex system of relationships among researchers and users – to accelerate the capture of the benefits of research for Canadians through improved health, more effective services and products, and a strengthened health care system” (14).

Knowledge Transfer – is “a systematic approach to capture, collect and share tacit knowledge in order for it to become explicit knowledge. By doing so, this process allows

individuals and/or organizations to access and utilize essential information, which previously was known intrinsically to only one or a small group of people” (15).

Practice-based Evidence in Nutrition (PEN) – an online decision support service for dietetic practitioners. The service was launched by DC in September 2005.

PEN Evaluation Framework Logic Model – a document prepared for DC by an external evaluation consultant that outlines the desired short and long term outcomes for the PEN service and corresponding indicators that must be assessed when evaluating PEN.

2.0 Literature Review

2.1 Dietitians of Canada

With just under 6000 members, Dietitians of Canada (DC) is the “voice of the dietetic profession” (16). DC is the only national organization of dietitians in Canada and one of the largest dietetic organizations worldwide (16). The association’s goal is to have a positive impact on the nutritional health of Canadians by providing evidence-based nutrition advice and supporting the profession through standards, professional development opportunities and evidence-based practice tools such as Practice-based Evidence in Nutrition [PEN] (16). PEN is an on-line decision support service that provides evidence-informed practice guidance to questions that arise from everyday dietetics practice (17).

2.2 Evidence-based Practice

Evidence-based practice is an extension of evidence-based medicine, a new philosophy of medical education developed by faculty in the Department of Clinical Epidemiology and Biostatistics at McMaster University in the early 1990s (1). Evidence-based medicine represents a movement away from the traditional reliance on expert opinion to guide practice decisions (7, 18) and instead encourages physicians to use the best available research evidence, in combination with clinical expertise and client values, when addressing patient care (1, 13). Since the scope of evidence-based medicine has broadened to include other health professionals, the concept is now more commonly referred to as evidence-based practice (EBP). A fundamental principle of EBP is that recommendations are based upon a systematic review of the relevant evidence and that an

explicit grading system is used to determine the strength of the evidence (13). Although several hierarchies for classifying evidence exist, most are based upon study design (Table 1).

Table 1 – Hierarchy of Evidence¹

Grade/Rank of Evidence		Study Design	PEN Grade Equivalent
A	1a	SR (with homogeneity of RCTs)	A
	1b	Individual RCT (with narrow CI)	
B	2a	SR (with homogeneity) of cohort studies	B
	2b	Individual cohort study and low-quality RCTs	
	2c	Outcomes research	
	3a	SR (with homogeneity) of case control studies	
	3b	Individual case-control	
C	4	Case series (and poor-quality cohort and case-control studies)	C
D	5	Expert opinion	
-	-	No evidence from well designed studies or authoritative sources found	D

RCT = randomized clinical controlled trial

SR = systematic review

CI = confidence interval

¹Adapted from: Research: Successful approaches. American Dietetic Association. 2003. p. 167.

Evidence-based practice supports Dietitians of Canada’s goal to position itself and its members as “the source for trusted, evidence-based nutrition information” (19), and enhances the credibility of the dietetics profession, both with other health professionals and with the general public. EBP is also a key component for quality care (20), as it ensures that dietetic advice is based upon current scientific knowledge and allows practitioners to counter nutrition misinformation (21).

Dietitians recognize the value of research to the profession. Eighty-three percent (83%) of the 122 clinical dietitians surveyed by Morley-Hauchecorne & Lepatourel thought that research findings should form the basis of standards of care (such as those outlined in the Manual of Clinical Dietetics) and 80% felt that the credibility of nutrition and dietetics in health care would be enhanced if practice was more research based (1). Similar beliefs have been reported by physicians, physical therapists and nurses (7, 22, 23).

Although EBP is supported by dietitians, it is not routinely incorporated into practice. While 90% of the 59 paediatric dietitians surveyed by Thomas et al. believed in an evidence-based approach, 73% either did not use EBP or regarded themselves as beginners (3). Other health professions, such as medicine and nursing, suffer from a similar “theory to practice” gap (24).

Incorporating research into practice requires both time and skill. Merely keeping up with the literature can be a challenge given the large number of new research studies reported, approximately 150 in the medical literature alone each day (3). Additionally, it takes approximately 2-3 hours to critically review a single article (24). Unfortunately, given the ever greater demands on dietitians’ time in this era of downsizing and cutbacks to healthcare spending, time is often in short supply. Considerable skill is also needed to find the articles, evaluate their quality and determine their applicability to one’s clients (3).

Consequently, it is no surprise that dietitians cite time constraints and lack of skills as barriers to evidence-based practice. In a study by Thomas et al., the three top barriers to adopting an evidence-based approach were lack of time [90%], lack of skills to evaluate research quality [86%] and lack of skills needed for literature searches [81%] (3). Retsas' study of registered nurses in Australia had similar findings, with insufficient time to read research and limited understanding of statistics identified as barriers to using research evidence in nursing practice (23).

Adoption of evidence-based practice is also hampered by clinicians' perceived inability to apply research findings to their practice. A survey of physical therapists conducted by Jette et al. revealed concerns that many research studies do not reflect the realities of practice, such as client preferences and values (7). General practitioners and nurses have expressed similar doubts of the applicability of research findings to their specific clients and unique practice settings (22, 23). These results indicate a need for interpretation of original research findings to assist clinicians in utilizing EBP.

In the past, several authors have argued that EBP would be facilitated by incorporating more education on research methods and critical appraisal into both dietetic training and continuing education programs (25, 26). However, one must question whether it is realistic to assume that the majority of practitioners will be able/willing to take the time necessary to develop these skills given that current research identifies lack of time as a major barrier to adopting EBP (3, 20). This is supported by McColl et al.'s findings that

only 5% of 302 general practitioners thought that identifying and appraising the primary literature or systematic reviews was the best way to move towards EBP (18).

2.3 Knowledge Translation and Transfer

Recently there has been a growing focus on the knowledge translation and transfer (KTT) process as a means of bridging the gap between evidence and practice (4).

Knowledge Translation is “the exchange, synthesis and ethically-sound application of knowledge - within a complex system of relationships among researchers and users - to accelerate the capture of the benefits of research for Canadians through improved health, more effective services and products, and a strengthened health care system” (14).

Knowledge Transfer is “a systematic approach to capture, collect and share tacit knowledge in order for it to become explicit knowledge. By doing so, this process allows individuals and/or organizations to access and utilize essential information, which previously was known intrinsically to only one or a small group of people” (15).

Evidence-based summaries and guidelines incorporate the KTT principles of integration and simplification (27) and are considered to be more effective ways to move physicians to EBP than appraising the primary literature (18). An evaluation by Brassey et al. of Ask Trip To Rapidly Alleviate Confused Thoughts (ATTRACT), a service that provides evidence-based summaries to general practitioners, revealed that by removing some of the more time consuming and skill dependent aspects of EBP, evidence-based summaries

helped to facilitate adoption of EBP by practitioners (6). The service was also successful in changing behaviour because it adopted a “pull” approach that allowed practitioners to access information when and where they needed it (6), instead of simply “pushing” information at them (28).

2.4 On-line Decision Support Services and Databases

A variety of on-line decision support services and databases, based upon the principles of KTT, are available to assist health professionals, particularly medical practitioners, in adopting EBP. These systems are designed to overcome the barriers of time constraints and varying critical evaluation skills by synthesizing the relevant literature for a variety of topics. Additionally, since these services are available on-line they address practitioners’ desire for access to evidence-based information at the time of decision making. On-line sources are dynamic as new content can easily be added and existing content can be quickly updated as further information becomes available. Practitioners can shape content by identifying gaps or faults in the reviews and offering suggestions for topics for future review (29). For example, the Cochrane Database of Systematic Reviews provides abstracts of systematic reviews of healthcare interventions as well as plain language summaries of the core findings of the reviews (29). The Physicians’ Information and Education Resource (PIER), a service of the American College of Physicians, provides guidance to practitioners through graded recommendations based upon reviews of the literature (30).

2.5 Practice-based Evidence in Nutrition (PEN)

In September 2005 Dietitians of Canada launched its own on-line KTT decision support service, Practice-based Evidence in Nutrition (PEN). Topics cover a broad spectrum of dietetic practice areas such as clinical, community health and professional education and are organized as “knowledge pathways” (17). Each pathway contains succinct guidance statements and practice recommendations “synthesized from validated filtered literature and graded for the strength of evidence by experts in the topic” (17). In addition, each pathway contains links to supporting research documents and related tools and resources. This design enables a busy practitioner to quickly answer a specific practice question and/or locate a client resource congruent with the science-based evidence, and then go back and review the evidence when time allows.

The most effective methods in promoting practice change incorporate multiple intervention strategies as well as active learning techniques and are based on learners’ needs (28, 31). The PEN service utilizes these methods. It augments the many professional development tools offered by DC, including the Canadian Journal of Dietetic Practice and Research and a variety of continuing education courses and programs. The design incorporates active learning techniques by enabling practitioners to “pull” information as needed and giving them the opportunity to shape content by submitting a practice question and/or contributing to the development of a knowledge pathway with the support of DC’s Evidence-based Tutorial (32) and PEN Writers’ Guide (33). PEN provides knowledge that is relevant to the learner since the learner is accessing the

service based upon questions that arise from his/her practice and the technology enables practitioners to access information at the time and place it is needed.

Although the American Dietetic Association offers some similar services through its on-line Diet Manual and Evidence Library, PEN is unique because the content is based upon questions from dietitians in all areas of practice, not just clinical settings, and seeks to build communities of practice that will take responsibility for ensuring that the content remains current and relevant to practice (34). The feature of integrated client and health professional resources also distinguishes PEN from these other tools.

By increasing dietitians access to evidence-based knowledge, it is anticipated that PEN will have a positive influence on dietetic practice and that ultimately it will become a “best process” as well as a repository for “best practice” guidance (35). It is further anticipated that the application of evidence-based nutrition knowledge in “policy making and service delivery” (35) will lead to improved health outcomes of the population.

3.0 Theoretical Frameworks

Estabrooks et al. have suggested using more than one theoretical framework when evaluating a KTT initiative (36). Two theoretical models underpinned the PEN evaluation: 1) Rogers' Diffusion of Innovations Theory, in particular the characteristics that influence the rate of adoption of an innovation, and 2) the four sequential steps leading to behaviour change outlined in The Pathman Awareness-to-Adherence Model. These models are appropriate as they relate to some of the key theory of change assumptions that underlie the PEN service (35) and consider issues related to both the PEN service itself and potential users, ensuring a comprehensive evaluation.

3.1 Rogers' Diffusion of Innovations Theory

Rogers outlines five characteristics that positively influence the rate of adoption of an innovation (37). These are outlined below, along with how they relate to the PEN evaluation (also see Figure 1):

1. Relative advantage – the perception that an innovation is better than those that precede it. PEN offers dietitians easy access to credible evidence-based guidance which is an advantage over searching for, evaluating and synthesizing the relevant research oneself and then deciding how best to incorporate it into one's practice.

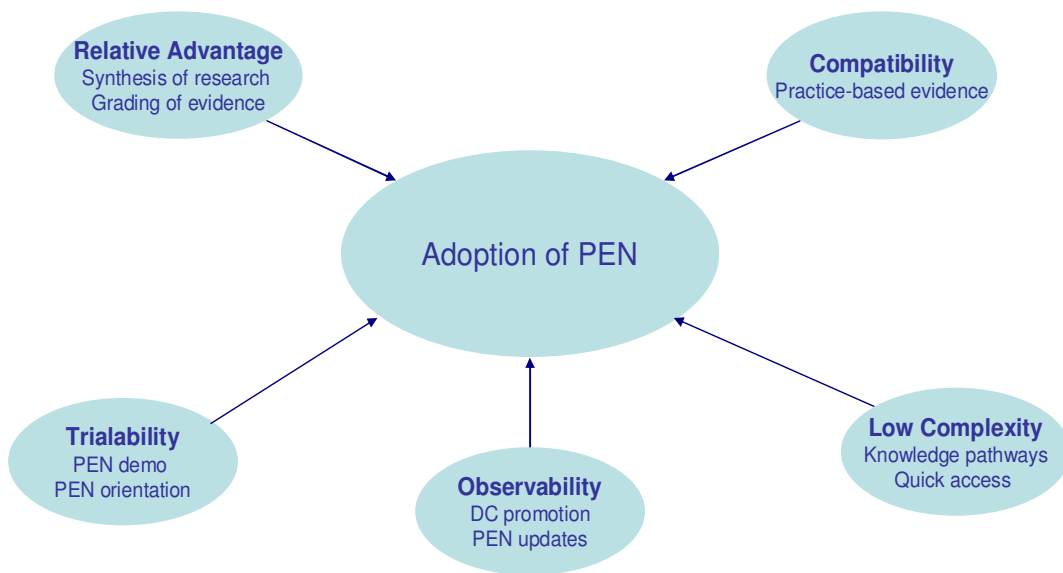
2. Compatibility – the perception that an innovation is consistent with existing values, beliefs and needs. Dietitians value evidence-based practice, but cite lack of time and critical evaluation skills as barriers to adopting this approach (3). The PEN service facilitates evidence-based practice by providing dietitians with quick and efficient access to practice-based evidence.
3. Complexity – the perception that an innovation is relatively simple and easy to use. The overall design of PEN and the organization of the material into knowledge pathways ensure quick access to information.
4. Trialability – the ability to experiment with an innovation prior to formally adopting it. DC offers a free PEN orientation teleconference and a PEN demonstration on its website, both of which allow members to experience PEN before they purchase the service.
5. Observability – the innovation is seen by others to be in use. DC actively promotes the PEN service to its members and provides updates on the growth in subscribers to PEN.

3.2 Pathman Awareness-to-Adherence Model

The Pathman Awareness-to-Adherence Model outlines four sequential steps leading to behavioural change: awareness, agreement, adoption and adherence (38). In their study of family physicians' compliance to national pediatric vaccine recommendations, Pathman et al. found that in order to comply with guidelines, physicians must first become aware of the guidelines, intellectually agree with them, adopt them into their

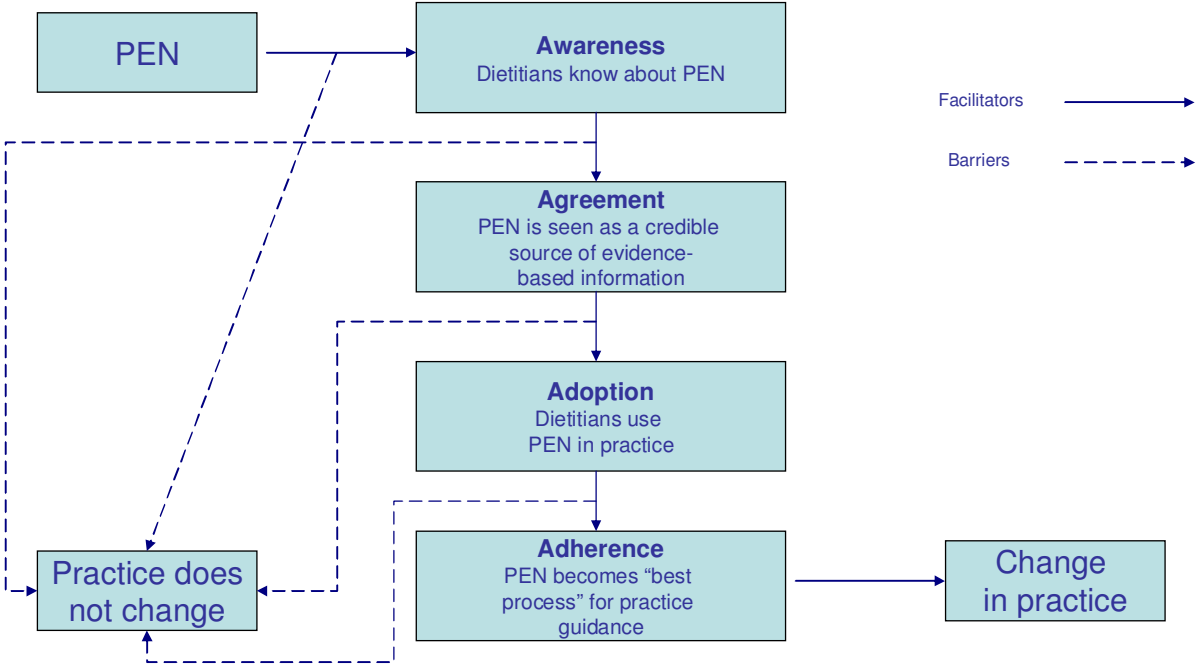
practice and regularly adhere to them (39). Applying this model to PEN as a medium for KTT and a catalyst for moving knowledge to action (40), the assumption is that if dietitians know about PEN (awareness), find it to be a valuable resource for credible, comprehensive and up-to-date evidence-based information (agreement), they will come to routinely use it in their day to day practice (adoption and adherence) [also see Figure 2]. However, as Pathman et al. note that movement through the four steps can be aided or impeded by many influences (38), it is important for the PEN evaluation to also consider barriers and facilitators to its use.

Figure 1 - Characteristics of PEN that could positively influence its adoption by dietitians¹



¹Based upon Rogers' Diffusion of Innovations Theory in: Rogers EM. Diffusion of innovations 4th ed. New York, NY: The Free Press; 1995.

Figure 2 – PEN and promotion of evidence-based practice¹



¹Adapted from: Freed GL, Pathman DE, Konrad TR, Freeman VA, Clark SJ. Adopting immunization recommendations: A new dissemination model. *Matern Child Health J.* 1998; 2(4):233.

4.0 Evaluation Tools

4.1 Introduction

The aim of this research was to develop two evaluation tools for PEN: a web-based questionnaire to collect demographic and quality assurance data (PEN Evaluation Questionnaire) and a set of interview questions to evaluate PEN as medium for KTT and its impact on dietetic practice (PEN Evaluation Interview Guide).

The questionnaire was developed using a structured four-step process. An advisory panel (n=14) validated the researcher-developed questionnaire and guided the development of its online format. The resulting questionnaire was pilot tested with a purposive sample (n=19) of PEN subscribers and non-subscribers. The interview guide was developed with the assistance of an expert panel (n=7) using a three round modified Delphi process.

The researcher worked in partnership with DC to develop the evaluation tools for PEN. The project was funded by a grant obtained by DC from the Canadian Council on Learning and overseen by the PEN Evaluation Project Manager (EPM), an employee of DC and a member of the researcher's thesis committee.

This research was approved by the Mount Saint Vincent University, University Research Ethics Board (Appendix A).

The methods, results and discussion are presented separately for each evaluation tool.

4.2 PEN Evaluation Questionnaire

4.2.1 Methods

4.2.1.1 Research Design

The development of the PEN Evaluation Questionnaire took place from April to October 2007. A structured four-step process adapted from the four stage pretesting sequence outlined by Dillman (41), as described in Figure 3 below, was used to develop and validate the questionnaire. An advisory panel (subsequently referred to as the validation panel) assisted with phase 2 and 3b) of the project.

4.2.1.2 Phase 1: Researcher-Developed Questionnaire

4.2.1.2.1 Content Areas

Questionnaire content areas were derived from selected indicators outlined in the PEN Evaluation Framework Logic Model. Indicator selection criteria included: suitable for quantitative assessment, compatible with the evaluation goal of collecting demographic and quality assurance data on the PEN service and answerable by all PEN users.

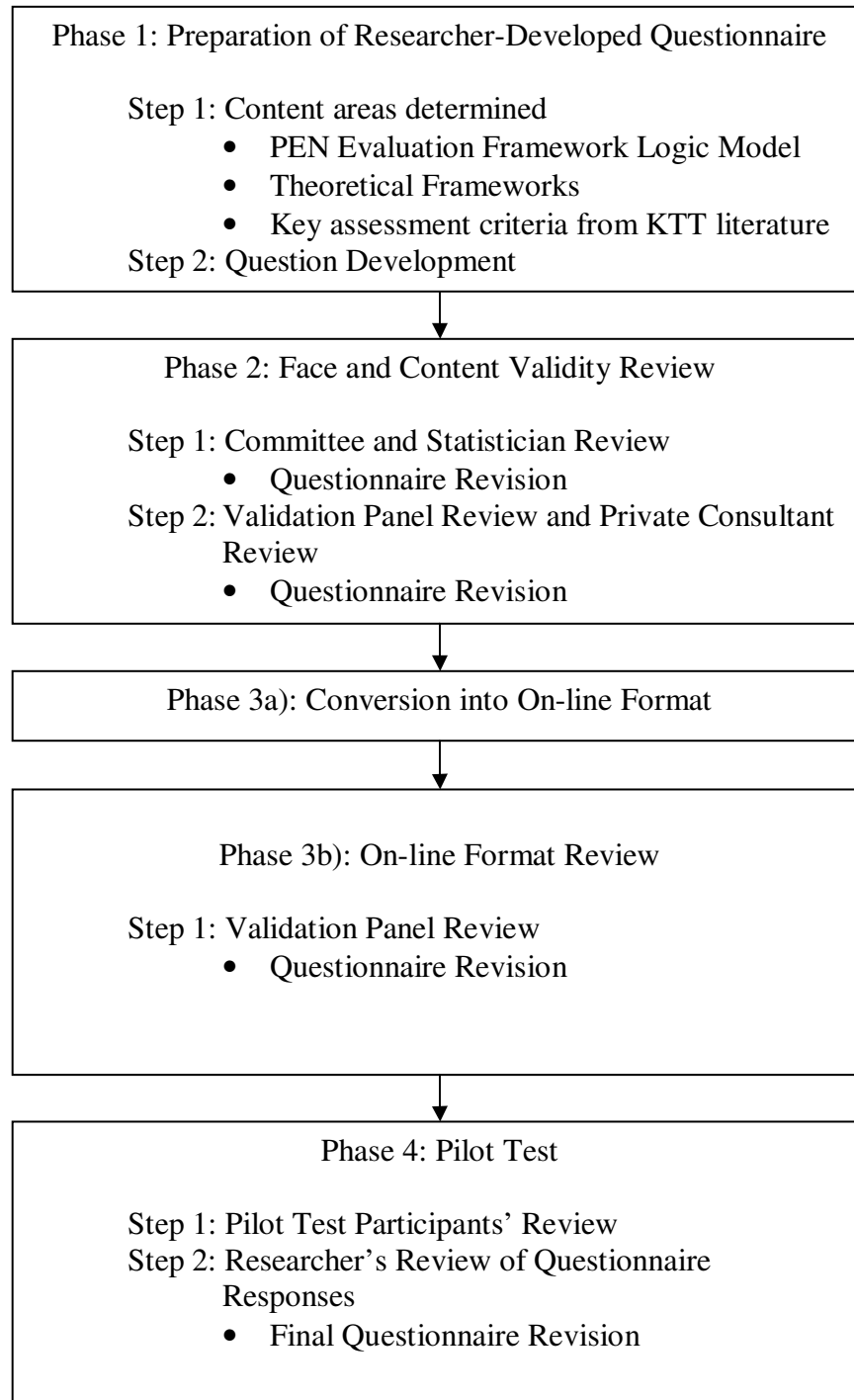
Questions were also included to address concepts from the theoretical frameworks underpinning the evaluation.

4.2.1.2.2 Question Development

The researcher consulted questionnaire design resources (books and published articles) for assistance in developing the questionnaire. Drawing upon information provided by Berdie et al. (42), Dillman (41) and Trochim (43), the following principles guided the question and response format development:

- A closed-ended question format was used throughout the questionnaire except for the open-ended format that was used in the comment section at the end of several questions.
- Question types included: dichotomous, multiple choice and interval. Interval questions included a middle/neutral position.
- Questions were as short, clear and unambiguous as possible.
- Contingency (i.e. filtering) questions were included, as necessary.
- All questions used structured “check the answer” response formats.
- Both single option variable and multiple option variable response formats were used.

Figure 3: PEN Evaluation Questionnaire Development Process



4.2.1.3 Phase 2: Face and Content Validity Review of the Paper Version of the Questionnaire

In relation to questionnaire evaluation, face validity is an assessment of how the questionnaire appears, i.e., whether it is well-designed and will provide the information that the researcher is hoping to obtain (44) while content validity determines whether the questionnaire “measures content relative to study objectives” (45).

The face and content validity of the PEN Evaluation Questionnaire was determined in three ways:

1) Thesis Committee and Statistician Review

Prior to distribution to the validation panelists, the researcher-developed questionnaire was reviewed for face validity by thesis committee members and a statistician, who all had considerable experience in questionnaire development. These reviewers provided feedback on the organization of the questionnaire, the wording of the questions and the appropriateness of the response categories. Thesis committee members were also provided with a document outlining the links between the questionnaire questions and particular concepts from the theoretical frameworks (Appendix B) and asked to assess whether these links were accurate. The questionnaire was revised based upon this feedback.

2) Validation Panel Review

The EPM for DC provided a list of 20 potential panelists, including contact information. Potential panelists were purposefully chosen by the EPM from a master list of DC members who were also PEN subscribers and selection criteria

included: representatives from each of the six DC regions, contributors to PEN content (authors and reviewers), educators and members of the PEN Advisory Committee. The participation goal was 50% or a minimum of 10 panelists to compensate for those who might decline to participate.

The researcher contacted individuals on the list via email in April 2007 to invite participation in the validation panel and informed consent was obtained from the 14 who agreed to participate (Appendices C and D). All panelists attended an introductory teleconference and an on-line virtual tour of the PEN site hosted by the researcher and the EPM. The aim of the teleconference was to give panelists a better understanding of the site's content and functionality and to explain the purpose of the validation panel and the questionnaire development process.

Validation panelists were then emailed a copy of the proposed questionnaire and asked to review it for face and content validity using a structured reporting form specifically developed by the researcher for that purpose (Appendix E and F). The reporting form contained five sections: clarity, usefulness, preferred layout, content validity and completion time. Questions in the clarity, usefulness and preferred layout sections were based upon questionnaire evaluation criteria outlined by Neuman (46), Berdie et al. (42) and Dillman (41). Panelists were asked to comment on the clarity of words, questions and response categories; the comprehensiveness and appropriateness of questions and response categories; the sequence and grouping of the questions and the overall design of the

questionnaire. With respect to content validity, panelists were provided with a description of the theoretical frameworks underpinning the evaluation and a document outlining the links between the questionnaire questions and particular concepts from the theoretical frameworks (Figures 1 & 2 and Appendix B) and asked to assess whether these links were accurate. Panelists were also asked to record how long it took to complete the questionnaire and to comment upon its length, as the goal was to have a completion time of 20 minutes or less to minimize respondent fatigue (41).

3) Private Consultant Review

A private consultant with expertise in questionnaire design (who was not affiliated with the researcher) was contracted by DC to assess the face and content validity of the questionnaire. To assist with this task, the consultant was provided with a copy of the PEN Evaluation Framework Logic Model, a description of the theoretical frameworks underpinning the evaluation and a document outlining the links between the questionnaire questions and the theoretical frameworks (Figures 1 & 2 and Appendix B).

The questionnaire underwent further revision based upon comments from the validation panel and the private consultant. Questionnaire modifications are discussed in Section 4.2.2.6.

4.2.1.4 Phase 3a): On-line Format Conversion

The revised questionnaire was submitted to DC's technology consultant firm for conversion into on-line format (Appendix G).

4.2.1.5 Phase 3b): On-line Format Review

Once the conversion was complete, the validation panelists were asked to provide feedback on the on-line format of the questionnaire as per a structured reporting form specifically developed by the researcher for that purpose (Appendix H). The reporting form contained two sections: in the first section panelists were asked to record the time it took to complete the questionnaire and in the second section they were instructed to describe in detail any difficulties they encountered with the on-line format (such as the transition from one page to another, the size of the text or graphics). These potential difficulties had been identified as critical evaluation areas for web questionnaires (47).

Further revisions were made to the questionnaire based upon panelists' feedback. These revisions are discussed in Section 4.2.2.6.

4.2.1.6 Phase 4 - Pilot Test

The final step in the development process was to pilot test the questionnaire with a sample of PEN subscribers and non-subscribers. The statistician who was consulted for advice regarding the sample size advised that ensuring the independence and diversity of the participants was more important than the sample size itself. Therefore, the researcher set a goal of 25 participants as this number would allow for ample diversity while still

being manageable to administer. The EPM for DC provided a list of 50 potential participants and contact information to compensate for those who might decline to participate. Potential participants were purposefully chosen from a master list of DC members to represent diverse DC regions, practice areas and age ranges.

An expedited recruitment process, as described below, was used because the EPM required the completed questionnaire by November 2007 to meet DC's scheduled deadline of December 2007 to collect baseline data. Initially, 25 participants (the first 5 listed for Central/Southern Ontario and the first 4 listed for each of the 5 remaining regions) were contacted by the researcher via email in October 2007 to invite participation in the pilot test (Appendix I). Non-respondents were sent a follow up email at 7 and 12 days with no further follow up. At 12 days the next person on the list with similar characteristics was contacted, until 25 participants were recruited.

The 25 individuals who agreed to participate were emailed a research information sheet and informed consent form (Appendix J) and instructed to provide feedback on the questionnaire using a structured reporting form specifically developed by the researcher for that purpose (Appendix K). The reporting form asked participants to comment upon any problems they encountered with the questions and the on-line format and to record the time necessary to complete the questionnaire.

Additionally, the researcher reviewed the pilot test participants' questionnaire responses to identify any problem questions or inadequate response categories. Problem questions

were defined as interval questions where the distribution of responses was clustered at the extreme ends of the scale and/or a large number of respondents chose the middle (neutral) position (41). Inadequate response categories were indicated by a large number of respondents choosing the “other” response option (42).

Pilot test information was used to finalize the questionnaire (Appendix L).

4.2.1.7 Data Synthesis for Phases 2, 3b) and 4

Data from the face and content validity review, the on-line format review and the pilot test were processed using five sequential steps:

1. *Synthesis* - Participant comments for each section of the reporting form were copied verbatim into a Word document. In the few instances where comments were open to interpretation or could have more than one interpretation, the researcher followed up directly with the individual to ensure the comments were correctly understood.
2. *Organization* - All of the comments were reorganized to correspond with the questionnaire format (i.e. all comments that pertained to Section 1 were grouped together and so on). Comments were then further grouped according to question number within the section.
3. *Consolidation* – Duplicate comments were removed and similar comments were combined into one statement. However, the number of panelists who

originally made the comment was recorded to ensure frequency data were retained.

4. *Assessment* - The researcher then assessed the feasibility of the suggestions based on the following criteria:

- a. Reduced the ambiguity of a question and/or response category
- b. Increased the comprehensiveness of a question and/or response category
- c. Enhanced the overall flow of the questionnaire or the flow within particular sections of the questionnaire
- d. Fell within the scope of the evaluation (i.e. appropriate for a general questionnaire and non-specialized PEN users)
- e. Suited to quantitative assessment
- f. Could be translated into on-line format with the resources available

Unfeasible suggestions were those that:

- Introduced a level of detail/specificity not appropriate for a general questionnaire or non-specialized audiences
- Introduced topics outside the scope of the evaluation
- Were better assessed through qualitative means
- Pertained to information that DC could gather more effectively through other sources (i.e. other surveys and web metrics embedded in the PEN website)

- Were not possible given the project constraints (time, resources, on-line capabilities)

The researcher then prepared a summary report which outlined proposed changes to the questionnaire based on the feasible suggestions. The unfeasible suggestions were also included in the report along with an explanation of why these proposed revisions should not be undertaken.

5. *Revision* - The researcher met with thesis committee members to obtain feedback on the summary report. Committee members confirmed whether the proposed changes: accurately reflected participants' suggestions; improved the clarity, readability and/or organization of the questionnaire; were in keeping with the research objectives, Logic Model and theoretical frameworks; and were possible and acceptable given the project constraints (i.e. time, resources, on-line capabilities).

4.2.2 Results

4.2.2.1 Validation Panel

Seventy percent (14/20) of potential panelists contacted agreed to participate in the study. Six potential panelists declined to participate due to work schedule conflicts and scheduled vacation time. Panel members were employed in a variety of practice settings and represented each of the six DC regions (Table 2).

Table 2: Characteristics of Validation Panelists* (n=14)

Characteristic	Criteria	Number
Employment Setting	Administrative	1
	Clinical	4
	Educator	3
	Public Health	3
	Food Service	1
	Private Practice	2
	DC Region	Alberta/Territories
	Atlantic	4
	British Columbia	2
	Central/Southern Ontario	1
	Quebec/Eastern/North Eastern Ontario	3
	Saskatchewan/Manitoba/North Western Ontario	2

*based on information provided by the PEN Evaluation Project Manager

4.2.2.2 Phase 1: Researcher-Developed Questionnaire

Since this was the first evaluation of PEN, the researcher (in consultation with thesis committee members) decided that the questionnaire would be used to gather general demographic and quality assurance information on the service and that questions should be answerable by all PEN users to ensure maximum participation and enhance the collection of baseline data.

The questionnaire contained 45 questions divided into nine sections and addressed the following areas: demographics of PEN users, frequency and details of use, ease of access, participation in the development PEN content, perception of the quality of PEN content and its impact on practice (Appendix L).

Questions addressed selected indicators outlined in the PEN Evaluation Framework Logic Model and various concepts from the theoretical frameworks underpinning the evaluation (Tables 3 and 4).

Table 3: Links between PEN Evaluation Questionnaire and PEN Evaluation Framework Logic Model

Logic Model Outcomes	Logic Model Indicator(s)	Questionnaire Section and Question Number
1. Knowledge Transfer – Initial Stages <ul style="list-style-type: none"> Subscribers use PEN to meet their information needs 	Demographic information on users	Section 1 Q3, Section 9 Q1-5
	Frequency of use	Section 1 Q6
	Reasons for use	Section 3 Q1
<ul style="list-style-type: none"> PEN is a source of valid and applicable evidence-based dietetic information 	Quality of content*	Section 6 Q1-4
	Availability and use of practical tools/resources for clients	Section 5 Q1-3
4. Knowledge Transfer – Change in Practice <ul style="list-style-type: none"> Individual practitioners base aspects of their practice on the evidence from PEN 	Percentage of practice based on PEN	Section 3 Q5 & Q6
	Increased pride in quality of PEN**	Section 7 Q2-5 and Q7-9
8. Technology <ul style="list-style-type: none"> Technology supports optimal use of PEN 	Ease of access	Section 2 Q1-6
	Responsive and interactive***	Section 4 Q1-4, Section 6 Q3

*Quality was defined as useful, up-to-date, and applicable to practice settings/clients

**Reinterpreted as “increased recognition of the benefits/usefulness of PEN” which included positive impact on practice and enhanced credibility of the profession.

***Responsive and interactive was defined as user’s ability to shape content and timely updating of existing information and addition of new topics

Table 4: Links between Initial PEN Evaluation Questionnaire and Theoretical Frameworks

Questionnaire Section	Model 1 – Based on Rogers’ Diffusion of Innovations Theory	Model 2 – Based on the Pathman Awareness-to-Adherence Model
Section 1: PEN Subscriber	--	--
Section 2: Ease of Access	Relative advantage, low complexity	Adoption, barriers
Section 3: General PEN Use	Relative advantage (Q6), compatibility	Agreement, adoption (Q5), adherence (Q4)
Section 4: Participation in Developing PEN Content	--	Adoption, adherence
Section 5: Use of Tools/Resources	Relative advantage, compatibility	Agreement, adoption, barriers (Q2 & Q3)
Section 6: Quality of Content	Relative advantage, compatibility	Agreement, adoption
Section 7: Importance of PEN and Impact on Practice	Relative advantage, compatibility	Agreement, adoption, adherence, barriers (Q6)
Section 8: Communication about PEN	--	--
Section 9: Demographic Information	--	--

Low Complexity, Relative Advantage and Compatibility

The questions that pertained to low complexity evaluated the mechanics of the PEN service such as ease of access to the site and user satisfaction with search options and printing functions.

A major component of PEN’s relative advantage is that it offers dietitians easy access to credible evidence-based guidance and tools which is an advantage over searching for, evaluating and synthesizing the relevant research oneself and then deciding how best to

incorporate it into one's practice. Therefore, questions related to relative advantage addressed the use of search options, tools and resources, users' perception of the quality of PEN and its importance to practice.

Compatibility questions pertained to users' knowledge and utilization of PEN features based on EBP such as evidence grading, information on knowledge pathway authors and links to referenced articles as well as features that facilitate EBP such as access to useful tools, and relevant, up-to-date information with sufficient detail to guide practice.

Agreement, Adoption, Adherence and Barriers

The concept of agreement is very similar to that of compatibility, in that it relates to the user's perception of PEN as a credible source of evidence-based information so the questions that were linked to compatibility were also linked to agreement.

Questions that pertained to adoption evaluated the use of various aspects of the PEN service such as search options, tools and resources as well as factors that could influence use such as ease of access, satisfaction with search options and printing functions, participation in developing PEN content and the perception of the quality of PEN content and its impact on practice.

Adherence questions related to factors that could encourage continued use of PEN such as participation in shaping PEN content and perceived positive benefits to practice, clients and the profession.

Several questions also addressed potential barriers to PEN use such as access problems, limitations of tools and resources and dedicated time at work to use PEN.

4.2.2.3 Phase 2: Face and Content Validity Review of the Paper Version of the Questionnaire

4.2.2.3.1 Validation Panel Review

The response rate was 100% (14/14). Panelists made 171 comments related to the clarity, usefulness, preferred layout, content validity and completion time of the questionnaire. Not all participants wrote comments in every section of the structured reporting form.

4.2.2.3.1.1 Clarity and Usefulness

One hundred forty-six comments related to the clarity and usefulness sections, particularly to unfamiliar terms and unclear questions. For example, four panelists felt the term broken links (Section 2, Question 3) might not be familiar to all questionnaire respondents and recommended that an explanation of this term should be included in the question. Panelists also suggested adding words to clarify the meaning of questions, such as adding the word PEN before access/license in the question, “What type of access/license do you have?” Two panelists thought the questions related to ease of access would depend on whether an individual had a dial-up or a high-speed internet connection and recommended including this question. Several panelists suggested revisions to response categories such as the addition of university/college professor and

internship preceptor to the response categories for Section 1, Question 4, “How did you find out about PEN?”

One panelist objected to the use of the more current term evidence-informed practice instead of evidence-based practice in Section 7, Questions 4 and 7: “I feel this kind of creates another piece of jargon. Evidence-based is the term used in the PEN title and I think it’s the phrase people will most relate to”. This comment led to the researcher’s decision to use the term evidence-based practice in both evaluation tools.

4.2.2.3.1.2 Preferred Layout

The 21 comments in this section involved relocating questions from one section to another, reordering questions within a section and creating a separate section for questions that did not fit into the category in which they were originally included. Some panelists also suggested changing the format of a particular question. For example, five panelists felt that the questions related to PEN search options (Section 2, Question 5) would be less confusing/unwieldy if they were presented in a table format. To prevent invalid responses, two panelists suggested that questionnaire respondents be instructed to skip follow up questions if they answered never to the first question in a series, such as skipping to the next search option in Section 2, Question 5 if they indicated that they never used a particular search option instead of answering follow up questions related to its effectiveness and their satisfaction with it.

4.2.2.3.1.3 Content Validity

The majority of the panelists (11/14) agreed with the links between the theoretical frameworks and the questionnaire questions.

Three panelists suggested four changes: two thought Question 4 in Section 3 related to agreement rather than adherence, one thought Section 4 questions related to awareness as well as adoption and adherence and one thought Section 1 Question 5 related to trialability and Section 1 Questions 4 and 5 related to awareness.

4.2.2.3.1.4 Completion Time

The average time to complete the questionnaire was 12 minutes. Ten of the 14 panelists indicated that the length of the questionnaire was satisfactory with comments such as “fine”, “adequate” and “appropriate”. Seven panelists commented that the completion time would be dependent upon the number and length of comments that a respondent might make.

4.2.2.3.2 Private Consultant’s Review

There was some overlap in the feedback given by the private consultant and the validation panel. Both reviews indicated that respondents might confuse a PEN orientation with the PEN demo on the website (Section 1, Question 5), suggested adding PEN before access/license in (Section 1, Question 2) and found the response categories in Section 5, Question 3 “too wordy”. The consultant identified a tendency to “move between first person and neutral responses” in Sections 2, 4 and 7 and identified two

questions in Section 7 that required a separate section as they did not relate to the other questions in the section. The consultant did not suggest any changes to the links between the theoretical frameworks and the questionnaire questions.

4.2.2.4 Phase 3b): On-Line Review

The response rate for the on-line review was 100% (14/14). Panelists commented on the completion time of the questionnaire and any difficulties they encountered with its on-line format. Not all participants wrote comments in every section of the structured reporting form.

4.2.2.4.1 Completion Time

The average time to complete the questionnaire was 10 minutes.

4.2.2.4.2 On-Line Format

Fifty percent of panelists (7/14) indicated that they did not encounter any difficulties when completing the on-line questionnaire and did not make any suggestions for revisions.

The remaining seven panelists made 13 comments related to:

- 1) The organization of the information

One participant suggested that navigation instructions should be included on the first page of the questionnaire and another suggested that details of the questionnaire (i.e. number of sections, approximate time needed to complete)

should be located at the top rather than the bottom of the first page so that respondents would be more likely to read this information prior to clicking yes and advancing to the next page. Two panelists commented positively on the questionnaire layout saying it had “very good flow” and “worked well”.

2) The overall appearance of the questionnaire

One panelist commented that some of the sections were “a little crowded”; while three thought the use of colour and/or lines to organize the information was “busy”. Two panelists responded positively to the appearance of the questionnaire commenting that it “look[ed] great” and was a “great looking tool”.

3) Completion problems

Two panelists suggested lengthening the comment boxes so that respondents would not have to keep scrolling back to see what they had written. One participant reported that her computer “timed-out” when transitioning from one page to the next.

4.2.2.5 Phase 4: Pilot Test

4.2.2.5.1 Participants

Initially 25 of the 50 potential participants contacted agreed to participate in the project. However, only 19 completed both the on-line questionnaire and returned their feedback form giving a participation rate of 38% (19/50). A small number of potential participants cited work schedule conflicts as the reason for refusal to participate, with the majority not responding to either the initial invitation or the follow up email. Participants

included four non-subscribers to PEN and represented a variety of practice areas and age ranges as well as each of the six DC regions (Table 5).

Table 5: Characteristics of Pilot Test Participants* (n=19)

Characteristic	Criteria	Number
PEN Subscriber	Yes	15
	No	4
Age (years)	25-34	4
	35-44	8
	45-54	3
	55-64	4
Employment Setting	Clinical	1
	Community	1
	Administrative	2
	Public Health	4
	Food Service	1
	Private Practice	1
	Research/Academic	2
	Internship Practicum	1
	Not working in dietetics	1
Other	5	
DC Region	Alberta/Territories	5
	Atlantic	4
	British Columbia	1
	Central/Southern Ontario	2
	Quebec/Eastern/North Eastern Ontario	4
	Saskatchewan/Manitoba/North Western Ontario	3
	Ontario	

*taken from the PEN Evaluation Questionnaire responses

4.2.2.5.2 Participant Feedback

Participants commented on any problems encountered with the questions and the on-line format and the time necessary to complete the questionnaire. Not all participants wrote comments in every section of the structured reporting form. The researcher also reviewed the questionnaire responses to identify any problem questions or inadequate response categories.

4.2.2.5.2.1 Content

Fourteen of the 19 panelists did not report any concerns regarding the questionnaire content.

The remaining 5 panelists made 6 comments relating to:

1) Clarifications to the terminology used

One participant suggested that a definition of the term hyperlink be included in Section 2, Question 2b, “How often do you encounter a broken link (i.e. a hyperlink that does not work when you click on it)?” Another participant found the terms email broadcast and email newsletter (Section 10, Question 1) confusing.

2) Revisions to response categories

One participant thought the response category of “occasional” should be changed to “casual” for Section 11, Question 3a) Work Status, while another suggested that the option of “high school education” be added to Section 11, Question 2 Highest Level of Education Attained.

3) Additional questions

One participant thought the questionnaire should include a question related to sharing PEN resources with other health professionals, while another suggested asking about the respondent’s satisfaction with DC’s rate of response to suggestions for practice questions/areas that should be included in the PEN service.

4.2.2.5.2.2 On-line Format

Two panelists suggested revisions to the on-line format: one suggested lengthening the comment boxes and the other thought that the button on the final page of the questionnaire should be changed from “next” to “submit survey” so respondents would be aware that once they clicked on the button they would not be able to go back and change their answers.

4.2.2.5.2.3 Completion Time

The average time to complete questionnaire was 20 minutes.

4.2.2.5.3 Researcher’s Review of the Questionnaire Responses

The researcher reviewed questionnaire responses using developed criteria (see Phase 4: Pilot Test under the Methods section) and no problems were detected. The responses to interval questions were distributed across the response categories, not clustered at the extreme ends of the scale and a large number of respondents did not choose the middle/neutral option. There was only one question (Section 11, Question 4b) in which more than two respondents chose the other option and no common categories emerged from the details provided by these respondents.

Four participants indicated they were non-subscribers to PEN.

4.2.2.6 Final PEN Evaluation Questionnaire

The questionnaire contained 46 questions divided into 11 sections. A copy of the questionnaire, highlighting the revisions to the original version in boldface type, is included in Appendix L. In summary, the majority of the revisions involved changes to existing questions and response categories and the inclusion of additional response categories. Three questions were added that related to type of internet access (Section 1), suggestions to make PEN more useful as a KTT tool (Section 9) and DC region (Section 11). Two new sections were created for questions related to search strategies and PEN updates.

Feedback from phase 2 and further reflection by the researcher necessitated revisions to the original links document to ensure that the associations between the questions and the concepts from the theoretical frameworks were accurate. The changes are in boldface type in Table 6 below:

Table 6: Links between Final PEN Evaluation Questionnaire and Theoretical Frameworks

Questionnaire Section	Model 1 – Based on Rogers’ Diffusion of Innovations Theory	Model 2 – Based on the Pathman Awareness-to-Adherence Model
Section 1: PEN Subscriber	Trialability (Q6)	Awareness (Q5 & Q6), barriers (Q3), facilitators (Q6)
Section 2: Ease of Access to PEN	Relative advantage, low complexity	Adoption, barriers (Q1)
Section 3: PEN Search Strategies and Tools	Relative advantage	Adoption
Section 4: General PEN Use	Relative advantage (Q3), compatibility	Agreement, adoption, removed adherence
Section 5: Participation in Developing PEN Content	Relative advantage	Awareness , adoption, agreement

Section 6: Use of PEN Tools/Resources	Relative advantage, compatibility	Agreement, adoption, barriers (Q2 & Q3)
Section 7: Quality of PEN Content	Relative advantage, compatibility	Agreement, adoption
Section 8: Importance of PEN and Impact on Practice	Relative advantage, compatibility	Agreement, adoption, adherence, barriers (Q6)
Section 9: Overall Rating of PEN	Compatibility	Agreement
Section 10: Communication about PEN Updates	Observability	Awareness
Section 11: Demographic Information	--	Adoption (Q2, Q3 & Q5), barriers (Q6)

Section 1:

- Question 3 “What type of Internet access do you have?” was added to the questionnaire based on phase 2 feedback. This question was linked to barriers as a dial-up Internet connection could adversely affect the speed and performance of PEN, which in turn could negatively impact use and subscriber satisfaction with the service.
- Question 5 “How did you find out about PEN?” was also linked to awareness at the suggestion of a panelist.
- Question 6 “Have you participated in a teleconferenced or in-person PEN orientation offered by Dietitians of Canada?” was linked to trialability, awareness and facilitators. The links to trialability and awareness were suggested by a panelist because orientation sessions are offered by DC to non-subscribers to PEN as a way of promoting the service. The link to facilitators was based on a comment from the EPM that feedback from the orientation sessions indicated that participation in these sessions enhanced subscribers’ understanding of the benefits of PEN and their ability to navigate the site.

Section 4:

- The link to adherence for question 4 “How often to you link through to read the reference abstracts/articles for key practice points when in a knowledge pathway?” was removed as per feedback from phase 2.

Section 5:

- Links to relative advantage and awareness were added for the questions in this section. The link to relative advantage relates to users’ ability to shape PEN content through suggesting practice questions and/or contributing knowledge pathways which offers an advantage over more static information sources. Panelists’ feedback suggested the link to awareness and this connection became more evident when the response option of “I was not aware that I could do this” was added to several questions in this section.

Section 9:

- The questions in this section were linked to compatibility and agreement because they relate to the perceived credibility of the PEN service and its usefulness to practice.

Section 10:

- Links to observability and awareness were added for questions in this section because they relate to communication about growth in the PEN service (i.e. additional practice questions and/or knowledge pathways) and the number of subscribers.

Section 11:

- Questions 2, 3 and 5 were linked to adoption because the research suggests that age, level of education and years in practice could have an impact on dietitians' attitudes towards research (3), which in turn could influence PEN use.
- Question 6 was linked to barriers because computer skills were identified by the researcher as a potential barrier to PEN use.

4.2.3 Discussion

The results of this study demonstrated the benefits of using a structured questionnaire development process. The review of the Logic Model, related literature and theoretical frameworks in phase 1 was necessary to glean key evaluation areas for the PEN service and to translate these into appropriate questions. Feedback from phases 2, 3 and 4 led to the incremental refinement of the researcher-developed questionnaire to produce the final PEN Evaluation Questionnaire. Phase 2 also provided independent verification of the links between the theoretical frameworks and the questionnaire questions.

4.2.3.1 Phase 1: Preparation of Researcher-Developed Questionnaire

Several steps proved useful in preparing this questionnaire. A review of the Logic Model was the natural starting point when determining questionnaire content areas as it outlined assessment indicators for desired outcomes for the PEN service. Rogers' Diffusion of Innovations Theory and the Pathman Awareness-to-Adherence Model also played a critical role in focusing the questionnaire content. Applying these models to the PEN service allowed the researcher to identify specific characteristics of PEN that could influence its use (such as ease of access to the site and the usefulness of search options

and resources), as well as cognitive and behavioural factors that could influence its adoption (such as users' perception of the quality of PEN content and its impact on practice). Designing questions related to specific domains from the models also provided a framework to guide future data analysis when the questionnaire is administered. Identification of key evaluation criteria in the published EBP and KTT literature assisted in the definition of ambiguous terms found in the Logic Model indicators (such as quality and pride).

4.2.3.2 Phase 2: Face and Content Validity Review of the Paper Version of the Questionnaire

4.2.3.2.1 Face Validity

Each of the three reviews (by thesis committee members/statistician, validation panelists and a private consultant hired by DC) offered a unique perspective due to reviewers' varying experience with questionnaire development and familiarity with the research project and the PEN service. These differing perspectives ensured a well-rounded critique of the questionnaire.

4.2.3.2.1.1 Committee Members/Statistician Review

Results from this review indicated that the feedback was grounded in the reviewers' considerable expertise with questionnaire development, which the researcher lacked. Consequently, they were able to identify unclear questions and response categories and to suggest additional questions that the researcher had overlooked so that any obvious errors or omissions in the initial draft of the researcher-developed questionnaire were rectified prior to distribution to the validation panelists. For example, although Section 2 of the

draft questionnaire contained questions related to the use and effectiveness of various search options, the statistician recommended that the question “Are you usually able to find the information you want by using only one search option?” be included to ensure that information about the adequacy of search options was also captured.

This review also highlighted the benefits of having the end-user involved at the beginning of the questionnaire development process. The EPM (who was a member of the researcher’s thesis committee) had access to information related to the PEN service that was not available to the researcher and so was able to identify questions that could be excluded from the questionnaire because the information was already collected through other DC questionnaires. The EPM could also suggest additional response categories based upon feedback from other PEN related questionnaires (such as including semi/retired as a response option in Section 1, Question 1a) as it had been identified as a reason for non-renewal of PEN subscriptions).

4.2.3.2.1.2 Validation Panel Review

The findings demonstrated the benefit of having individuals outside the initial development phase review the questionnaire as panelists were able to identify unclear questions/terms that were not captured by the researcher or through the committee members/statistician review. Additionally, the specificity of the comments received and the low number of comments related to the overall organization of the questionnaire (5/171) indicated that panelists were focused on details rather than general patterns. This

in-depth review was likely due to panelists' familiarity and interest in the PEN service and was further encouraged by the use of a structured feedback form.

The 12 minute average completion time was satisfactory as it was under the desired maximum completion time of 20 minutes. Although 50% of panelists indicated that completion time would be longer if a respondent made several comments this was not a cause for concern as providing comments was not mandatory. Therefore, individuals who made comments were not likely to regard the extra time this entailed as a burden.

4.2.3.2.1.3 Private Consultant Review

Since the private consultant was not familiar with the PEN service she was able to identify the use of PEN specific terminology that was not questioned by the validation panelists. Additionally, the feedback indicated that she focused considerable attention on identifying problems related to continuity and the overall organization of the questionnaire, in contrast to the validation panel. This was likely due to her expertise in questionnaire design.

The differences in feedback from the validation panel and the private consultant reviews point to a possible limitation in the common practice of obtaining face validity exclusively from experts in the topic under discussion when developing questionnaires. The validation panelists' familiarity with the PEN service enabled them to give valuable suggestions to improve the clarity and comprehensiveness of questions and response categories; it also may have contributed to their failure to recognize PEN specific terminology that was readily identified by the private consultant. Although this

terminology would likely have been captured during the pilot test, it was much easier (and less costly) to make major revisions before the questionnaire was converted into on-line format.

4.2.3.2.2 Content Validity

It was critical to obtain an independent, informed assessment of the content validity of the questionnaire to enhance the credibility of future data analysis. The results of the independent content validity reviews confirmed the accuracy of the links between the questionnaire questions and the theoretical frameworks as reviewers requested very few changes to the links document.

4.2.3.3 Phase 3b): On-Line Format Review

Some of the formatting problems identified in this review (such as the inadequate length of the comment boxes) would not have been obvious through a casual completion of the on-line questionnaire. The fact that 50% of the panelists did not identify these problems at least suggests that they might not have completed the questionnaire as thoroughly as the researcher had anticipated they would. This conclusion is further supported by one panelist's comment that it would have taken longer to complete the questionnaire if she "had used the comment boxes" and another's remark that she "breezed through some of the questions". Two aspects of the on-line review design might have unintentionally dissuaded panelists from fully assuming a respondent role: having the same group conduct both the face and content validity review and the on-line review and informing

the panelists that their responses could not be saved because the questionnaire was on a developmental site.

The research design would have been strengthened if the researcher had used a separate group for the on-line review as Carayon et al. did in their development of a questionnaire to evaluate the causes and consequences of turnover intention among information technology workers (48). It would also have been beneficial if the researcher had refrained from informing panelists that their responses could not be saved.

4.2.3.4 Phase 4: Pilot Test

At 19, the pilot test sample was below the goal of 25 participants. Although the researcher would have preferred a larger group, the purposive selection process ensured the diversity of the participants.

It was significant that 6 of the participants who initially agreed to participate completed the on-line questionnaire, but did not return their feedback form. This suggests that they might have felt, due to problems with the feedback form itself and/or the feedback process, that the costs of participating in the pilot test outweighed the benefits (41).

Although the researcher attempted to streamline the feedback form as much as possible, the necessity of including detailed instructions as well as checkboxes for each question and adequate space for comments made the form appear quite long and complicated at first glance. Additionally, the feedback process was somewhat cumbersome as participants were required to print off a hard copy of the feedback form to manually fill

out while completing the questionnaire on-line and then return the feedback form via fax or mail. Although this process was not ideal, it was considered to be the best option as time and budget constraints did not allow for the development of an on-line system that would allow for simultaneous completion of the on-line questionnaire and feedback form.

The findings of this phase indicated that the pilot test was a crucial component of the questionnaire development process as participants identified content problems that had not been captured in the previous reviews. Additionally, the pilot test compensated for the shortcomings of the on-line review by capturing formatting problems missed by the validation panel.

The pilot test also provided the researcher with the first opportunity to review the questionnaire responses which was critical as it revealed a significant problem with one of the questions. Four participants indicated non-subscriber status when completing the questionnaire, but only two participants had been identified as non-subscribers by DC. Although this discrepancy could have been due to changes in subscription status not reflected in DC's records, it also suggested that participants were misinterpreting the question "Are you a subscriber to PEN?"(Section 1 Question 1) to relate to an individual subscription only, not a subscription through their employer.

4.2.3.5 Links between PEN Evaluation Questionnaire and Theoretical Frameworks

Rogers' Diffusion of Innovations Theory was central to the development of the PEN Evaluation Questionnaire because the purpose of the questionnaire was to evaluate the

mechanics of the PEN service and this theory outlines characteristics that might influence the adoption of an innovation. Although each of the model domains was important, and the questionnaire contained questions to assess all of them, the domains of relative advantage and compatibility received more emphasis due to their connection to the following key assumptions underlying the PEN service: that the service offers significant advantages over other practice information sources by providing dietitians with timely access to credible evidence-based guidelines and since dietitians value EBP, but lack the time and skills necessary to adopt this approach, these features are compatible with dietitians values and needs.

Research suggests that an innovation is not always adopted even when it has obvious advantages over those that precede it (49), indicating that the questionnaire should consider issues related to potential adopters in addition to the service itself. The Pathman Awareness-to-Adherence model was useful in this regard due to its focus on individuals and the steps leading to behaviour change. The questionnaire concentrated on the domain of agreement because agreement is the critical step that will lead to adoption. With respect to PEN, dietitians must agree that the service is a valuable source of useful evidence-based practice information before they will adopt it. Additionally, since initial adoption does not guarantee continued use, questions to address factors influencing adoption, including barriers, were particularly important.

4.2.3.6 Evaluation of the PEN Evaluation Questionnaire Development Process

4.2.3.6.1 General Observations

The findings of this research revealed that successful questionnaire development requires the use of a systematic approach including a comprehensive review of face and content validity. As reviewers quickly become familiar with the questionnaire content, increasing the potential to overlook obvious errors, it is recommended that independent reviewers be used for each stage of the development process. It is also recommended that experts as well as non-experts in the topic under discussion be recruited to ensure input from differing perspectives. Additionally, the findings illustrate the importance of having access to the questionnaire responses from an early stage in the development process as some problem questions cannot be detected by any other means.

4.2.3.6.2 Constraints

Throughout the questionnaire development process it was evident that decisions related to the content and appearance of the questionnaire were constrained by issues related to utility and technology.

4.2.3.6.2.1 Utility

In general, questionnaire development is an applied exercise as well as an academic one as the goal is to produce a tool that will not only collect useful data, but is also acceptable to the end-user. Dillman highlights the influence sponsors have on shaping questionnaire content by listing sponsor acceptance as one of the criteria for assessing survey questions (41). Consequently, in some instances revisions suggested by panelists and/or pilot test

participants were not undertaken because they did not support DC's goals for the PEN evaluation. For example, feedback from phase 2 indicated that three panelists were not comfortable with Section 7 Question 5 (PEN has lead to a positive health benefit for my clients) as they indicated that it would be difficult to judge this without a controlled intervention and suggested that the question be reworded to "PEN appears to have led..." or the option of "I don't know" or "It is too early to say" be included in the response categories. However, as the question was not intended to obtain clinical evidence, but rather to gauge PEN users' perceptions of whether or not PEN was having a positive impact on clients (one of the major anticipated outcomes of the PEN service), the suggested changes were not made, although the question was revised to "In my opinion, PEN has led to positive health benefits for my clients" instead. As well, a small number of the additional questions suggested by participants were not included in the questionnaire because they related to aspects of the PEN service that could not be changed. For example, a pilot test participant suggested adding a question related to subscribers' satisfaction with the response rate to submissions for additional practice questions/categories, but since the response rate would not likely change given the resources available, the question was not included.

4.2.3.6.2.2 Technology

DC uses a standard format for on-line questionnaires. Since any major modifications to this format would have resulted in unacceptable costs and/or time delays, some of the suggestions from the on-line review and the pilot test could not be accommodated. For example, it was not possible to present Section 2, Question 5 in table format and the

comment boxes could not be made any longer, as per a pilot test participant's suggestion, as they had already been increased to the maximum length possible based on feedback from the on-line review.

These limitations did not detract from the credibility of the resulting questionnaire. Although the panelists and pilot test participants offered valuable feedback on the questionnaire, their comments were not informed by familiarity with the research goals or the needs of the end-user. Consequently, it was the responsibility of the researcher to exercise discernment when revising the questionnaire to ensure that it continued to support the original research questions (50) and was acceptable to DC.

4.3 PEN Evaluation Interview Guide

4.3.1 Methods

4.3.1.1 The Delphi Technique

4.3.1.1.1 Overview

The Delphi technique (subsequently referred to as the Delphi) was originally developed by the Rand Corporation in the 1950s to aid in technological forecasting (51). It is a structured process for achieving consensus from a panel of experts by completion of two or more rounds of questionnaires with feedback between rounds (52). Unlike other consensus methods such as committee meetings or round-table discussions, the Delphi is anonymous as panelists do not meet as a group, but instead individually receive the material for each round and respond directly to the researcher (53).

4.3.1.1.2 The Modified Delphi Technique Used

The Delphi has several strengths that made it well-suited to the development of the PEN Evaluation Interview Guide. It allows participants to deal systematically with a complex problem or task (54), in this case the formulation of appropriate interview questions to evaluate the extent to which PEN has been an effective medium for KTT and resulted in a change in dietetic practice. Since there is no need to bring participants together physically, it provided an economical and efficient means of gathering opinions from our geographically dispersed panelists (52). The method minimizes some of the negative aspects of group interactions such as peer pressure and side-tracking into unrelated matters (53, 54) while still allowing the researcher to capture some of the synergy of group interactions because panelists are able to reflect upon the opinions of other panel members when formulating their own responses (55, 56). Also, it was thought that the Delphi would encourage maximum expert participation because panelists would be able to respond at their own convenience instead of having to set aside time in their busy schedules to attend a meeting or a conference.

However, the Delphi technique is limited by a high attrition rate due to its time consuming nature (51) and the potential for “hasty, ill-considered judgments” (57) because of the lack of accountability conferred by anonymity. Additionally, decisions related to panel size, how an expert is defined and what constitutes consensus tend to be regarded as purely arbitrary as there is little agreement on these issues (51, 55, 57). Finally, researcher bias can be introduced during data analysis (55).

4.3.1.2 Research Design

The PEN Interview Guide is a set of interview questions designed to assess the effectiveness of PEN as a KTT tool and its impact on dietetic practice. It was developed with the assistance of an expert panel using a three round modified Delphi process during the period of April to October 2007 (Table 7).

Table 7: PEN Evaluation Interview Guide Development Process

Delphi Round	Starting Material	Requested Panel Activity
1	Predetermined by the researcher – list of 13 desired outcomes for the PEN service	<ul style="list-style-type: none"> • Suggest corresponding indicators and questions for those outcomes deemed important • Add outcomes (and corresponding indicators and questions) as desired
2	Master list of 18 unduplicated outcome/indicator/question sets generated from Round 1 input	<ul style="list-style-type: none"> • Choose a maximum of 10 essential outcomes from the master list • Pick one indicator and one corresponding question from those listed for each outcome chosen • Modify existing questions if desired
3	Draft interview guide developed from Round 2 input	<ul style="list-style-type: none"> • Final comments and revisions

Several features of the study design sought to address the limitations of the Delphi. To reduce participant burden and mitigate the high attrition rate, initial response deadlines were flexible to account for panelists’ busy schedules and summer vacations.

Additionally, the study followed a “reactive Delphi” format (57). This format reduces the number of rounds by providing researcher-developed starting material for panelists consideration in the first round instead of using this round to generate the starting material (usually through a series of open-ended questions). This modification did not negatively impact the integrity of the process as participants were free to respond

selectively to the starting material and to add any information they thought was missing. The traditional Delphi format was also modified by giving panelists partial rather than full anonymity (i.e. response anonymity was maintained but the identity of the panelists was known) in order to motivate them to participate more fully in the project (57).

Explicit inclusion criteria were determined for potential panelists prior to recruitment (dietitian or other health professional and acknowledged expertise in knowledge translation, evaluation methodology and/or critical appraisal) and consensus was set at agreement by 80% or more of panelists prior to data collection to avoid the criticism that the selection of “expert” panelists and the level of consensus were purely arbitrary.

Researcher bias was minimized through confirmation of the researcher’s interpretation of the results of each round of the Delphi by thesis committee members and by providing panelists with the opportunity to make revisions to the materials during each round and encouraging them to give feedback on the Delphi process by contacting the researcher directly or by including their comments when responding to the Delphi rounds.

4.3.1.2.1 Delphi Panel Recruitment

A list of 13 potential panelists and contact information was provided by the EPM for DC. The researcher aimed to recruit 10 Delphi panelists, a number which would provide an ample diversity of opinions, while still remaining manageable to administer. However, it was anticipated that recruiting panelists would be a challenge as the pool of potential participants was limited because KTT is a relatively new area of research and all potential

participants were busy professionals, with little free time to devote to participation in a Delphi panel.

The researcher contacted individuals on the list via email in April 2007 to invite participation in the Delphi panel and informed consent was obtained from those who agreed to participate (Appendices M and N). All panelists attended an introductory teleconference and an on-line virtual tour of the PEN site hosted by the researcher and the EPM. The aim of the teleconference was to give panelists a better understanding of the site's content and functionality and to explain the purpose of the panel, the Delphi process and expected outcomes.

4.3.1.2.2 Round 1

4.3.1.2.2.1 Questionnaire and Activities

The content of the questionnaire for the first round of the Delphi was predetermined by the researcher and consisted of a list of 13 outcomes derived from the PEN Evaluation Framework Logic Model (Appendix O). To prepare the list, the researcher carefully evaluated the Logic Model to determine which outcomes would be most suitable for qualitative evaluation and the resulting outcome list was then further divided into those outcomes that could be assessed by all PEN users (core outcomes) and those that were better assessed by specialized users. Only core outcomes were included in the questionnaire.

Panelists were emailed the outcome list and asked to suggest indicators and corresponding questions for those outcomes that they felt were important to the PEN evaluation and to add any outcomes (including corresponding indicators and questions) that they felt should be included on the list. Detailed instructions accompanied the questionnaire to ensure that panelists understood their required tasks. Copies of the article *Lost in Knowledge Translation: Time for a Map?* by Ian D. Graham et al., the PEN Evaluation Framework Logic Model, the researcher-developed PEN Evaluation Questionnaire (Appendix E) and a table outlining the links between the theoretical frameworks and the questionnaire questions (Appendix B) were also forwarded to panelists to provide background information on KTT and the PEN evaluation.

4.3.1.2.2.2 Data Synthesis

Round 1 comprises the exploratory phase of a Delphi process (54). This is a critical period because panelists are given the opportunity to fully explore the topic under discussion, provide additional information and study and react to others' opinions (54). Since the first round of the Delphi had been somewhat structured by the use of predetermined starting materials, the researcher was wary of cutting short the exploratory phase by summarizing the input too early in the process. Therefore, the researcher decided to minimize manipulation of the data in this round and simply synthesize the material into a master list of outcomes for round 2. Data were streamlined by combining related outcomes and similar questions. Outcomes were also renamed, as necessary, to make their implied connection to PEN explicit. Except for these minor

changes and the correction of obvious typographical errors, the information remained as it was submitted by panelists.

4.3.1.2.3 Round 2

4.3.1.2.3.1 Questionnaire and Activities

The questionnaire for this round consisted of a master list of 18 outcomes with corresponding indicators and questions listed in no order of importance generated from the round 1 input (Appendix P).

Unfortunately, time constraints did not allow for a separate round to give panelists an opportunity to react to others' input and suggest revisions and additions to the master list prior to commencing the evaluation (ranking) phase of the Delphi. Instead panelists were required to narrow down the list of outcomes in this round by choosing a maximum of 10 outcomes from the master list that they believed directly related to the interview goal along with one indicator and one corresponding question from those given. In order to provide at least some means for panelists to respond to the round 1 data, they were encouraged to modify the questions for the outcomes they had chosen if they desired, although they were not given the opportunity to add to the list. Detailed instructions were included and panelists were asked to submit their feedback using a structured reporting form specifically developed by the researcher for that purpose (Appendix Q).

4.3.1.2.3.2 Data Synthesis

The researcher prepared a list of all of the outcomes, indicators and questions chosen by panelists and noted any suggested modifications to existing questions. The level of

support was then determined for each outcome. Three levels of support were used: consensus (chosen by at least 6 of the 7 panelists), moderate support (chosen by 3-5 panelists) and low support (chosen by fewer than 3 panelists).

These resulting data then underwent an extensive reorganization to produce a draft interview guide. The outcomes were categorized according to aspects of PEN use and factors that could influence use because monitoring use is a key assessment area when evaluating a KTT tool (40). This resulted in four categories of outcomes: use of PEN by dietetic professionals, use of PEN by those outside the dietetic profession, perception of the quality/usefulness of PEN and barriers and facilitators to PEN use. Some questions such as “What is your understanding of evidence-based practice” related more to context than to use, so these were placed in a separate grounding/context category. Similar indicators and questions were combined and indicators and questions were relocated to outcomes that were more appropriate. Outcomes with consensus and moderate support were retained while those with low support were dropped, with the exception of two outcomes related to the use of PEN by those outside the dietetic profession. The researcher retained these outcomes at DC’s request because the associated questions would provide baseline data for the growth in the use and influence of the PEN service over time.

To ensure the number of questions was appropriate for a one hour interview with non-specialized PEN users, related questions were combined into one general question with probes as necessary and some questions were re-worded to make them more open-ended.

A question relating to the responsive and interactive nature of the PEN service was removed as this topic was thoroughly addressed in the PEN Evaluation Questionnaire. The resulting draft interview guide had nine open-ended questions: two were grounding/context questions and the other seven assessed the 12 remaining outcomes.

4.3.1.2.4 Round 3

4.3.1.2.4.1 Questionnaire and Activities

The questionnaire for this round consisted of the draft interview guide developed from the input from round 2 (Appendix R). Panelists were asked to provide any final comments about the interview questions and to suggest any revisions they felt were necessary to ensure that the questions would capture information related to the outcome(s) with which they were associated. The interview guide content was finalized based upon this feedback.

4.3.1.2.4.2 Data Synthesis

Panelists' comments were copied verbatim into a Word document and reorganized to correspond with the interview guide format (i.e. all comments that pertained to Category I were grouped together and so on). The researcher then divided the suggested changes into two categories: recommended and not recommended. The only suggested change that was not recommended proposed the use of terminology that was not compatible with that used in the PEN Evaluation Questionnaire. The researcher then prepared a summary report which outlined proposed changes to the interview guide based on the recommended suggestions. The suggestion that was not recommended was also included

in the report along with an explanation of why it should not be made. The researcher met with thesis committee members to discuss report and finalize the interview guide content.

4.3.1.2.5 Final Interview Guide Assessment

The researcher assessed the final interview guide to determine the relationships between the questions and concepts from the theoretical frameworks underpinning the evaluation as well as key evaluation areas for a KTT initiative identified by Graham et al. (40).

These areas were:

- The three levels of knowledge use: conceptual (changes in understanding or attitudes), instrumental (changes in behaviour or practice) and strategic (using knowledge for specific goals)
- Knowledge use by a broader audience than the initial target users
- Barriers to sustained knowledge use
- Knowledge impact at the practice, health and system level

4.3.2 Results

4.3.2.1 Delphi Panel

Of the 13 potential panelists contacted, 8 agreed to participate in the study, giving a participation rate of 61.5% (8/13). Although the number of Delphi panelists fell short of the original goal, it was within the general guidelines of 5-10 people for a heterogeneous population (58) and included members from a variety of work settings and health professions. Additionally, the panelists brought a level of experience and knowledge of KTT and EBP to the development of the interview guide that the researcher could not have obtained through a literature review.

4.3.2.2 Round 1 Responses

One participant dropped out of the Delphi prior to the closing date, citing lack of time due to professional commitments, giving a response rate of 54% (7/13).

Panelists' responses to the round 1 questionnaire were varied as one participant provided indicators and corresponding questions for all of the outcomes listed, while the remaining six panelists only provided indicators and questions for selected outcomes. These panelists indicated that the outcomes they did not respond to were inappropriate for the interview guide with comments such as "interview not the best way to assess this" and "not a key concept to me". Two panelists added outcomes to the original list. Two panelists also offered comments related to the research method, recommending that the development of the interview questions be informed by the responses to the PEN Evaluation Questionnaire.

4.3.2.3 Round 2 Responses

The response rate for round 2 was 100% (7/7).

Five of the seven panelists completed the task as requested. Four of these panelists chose the maximum of 10 outcome/indicator/question sets, while the remaining one chose seven outcome/indicator/question sets. Two panelists suggested minor modifications to some of the existing questions they had selected.

Two panelists did not follow the instructions and instead chose multiple indicators/questions for certain outcomes and/or added outcome/indicator/question sets rather than choosing from those offered and did not submit their feedback using the structured reporting form. Both of these panelists commented on the perceived lack of organization and analysis of the data from round 1. Although the researcher could have returned the questionnaires and requested the two panelists complete them as per the original instructions, this would have prolonged the round with no guarantee of achieving the desired result so the researcher accepted the input as received and incorporated it into the list of all of the outcomes, indicators and questions chosen by panelists.

Panelists' desire for more organization of the materials, as well as results that indicated a high level of agreement among panelists (11 of the 17 outcomes had at least moderate support [chosen by 3-5 panelists]) led to the researcher's decision to extensively reorganize the input from this round to produce a draft interview guide for distribution to panelists in round 3.

4.3.2.4 Round 3 Responses

The response rate for round 3 was 100% (7/7).

Three of the seven panelists did not suggest any changes to the interview guide. The remaining four panelists suggested rewording questions to improve clarity and to neutralize those considered to be "too leading" and adding demographic questions related

to “time working in the field and educational attainment...because both have been shown to influence use of evidence”.

Six panelists gave positive comments such as “I believe the questions are good and will provide you with valuable information” and “I think this will be a great tool to accomplish your objectives.”

4.3.2.5 Final PEN Evaluation Interview Guide

The final interview guide contained 18 questions divided into seven categories. The first category consisted of the same six closed-ended demographic questions used in Section 11 of the PEN Evaluation Questionnaire. Categories II- VI contained open-ended questions that focused on respondents’ understanding of evidence-based practice and PEN, the use of PEN by dietitians and other disciplines, the perception of the quality/usefulness of PEN and barriers and facilitators to PEN use. Category VII consisted of a concluding question to capture any additional information not elicited from the previous interview questions (Appendix S).

Additionally, the questions addressed a variety of concepts from Rogers’ Diffusion of Innovations Theory and the Pathman Awareness-to-Adherence Model and various levels of knowledge use and knowledge impact (Table 8 below).

Table 8: Links between the PEN Evaluation Interview Guide, Theoretical Frameworks and KTT Evaluation Criteria

Interview Guide Category	Rogers' Diffusion of Innovations Theory	Pathman Awareness-to-Adherence Model	Knowledge Use	Knowledge Impact
I: Demographic	--	adoption barriers	--	--
II: Grounding / context	--	awareness agreement	--	--
III: Use of PEN by dietetic professionals	compatibility relative advantage	agreement adoption	instrumental use	practice level health level
IV: Use of PEN by those outside the dietetic profession	--	--	broad use	--
V: Perception of the quality /usefulness of PEN	--	--	strategic use	system level
VI: Barriers and facilitators to PEN use	--	barriers/ facilitators adherence	sustained use	--
VII: Conclusion	--	--	--	--

4.3.3 Discussion

4.3.3.1 Delphi Panel

Seven of the 8 panelists who started the Delphi process completed all three rounds, suggesting a high level of commitment. Additionally, the 100% response rate in rounds 2 and 3 indicated the success of modifications to the method that were put in place to encourage full participation in the project and mitigate the high attrition rate, (i.e. using researcher-developed starting materials for the first round, providing panelists with partial rather than full anonymity and having flexible response deadlines). Panelists' enthusiasm for the project may also have been enhanced because it was not merely an academic exercise, but one intended to produce an interview guide for immediate use by DC (54).

4.3.3.2 Round 1

There were several advantages to using a researcher-developed questionnaire in this round instead of having panelists generate the starting material through a series of open-ended questions: it minimized the number of required rounds, provided a starting point for panelists' thoughts (59) and ensured that desired outcomes identified in the PEN Evaluation Framework Logic Model would be considered by panelists for inclusion in the interview guide. Although some authors have expressed reservations about the use of predetermined starting materials (51, 55, 60), in this case their use was not expected to negatively impact the integrity of the process as panelists were free to respond only to those outcomes they thought were important and to add any outcomes they thought were missing. Other Delphi studies that used predetermined starting materials, such as The University of Waterloo's School Health Action, Planning and Evaluation System (SHAPES) research to identify a common set of indicators and measures for healthy eating behaviours among school-aged children and adolescents (61) and MacLellan & Berenbaum's investigation of client-centred nutrition counselling (62) also followed a similar process of allowing participant modifications/additions to avoid limiting a thorough exploration of the topic under discussion.

The findings suggested that the use of predetermined starting materials did not inhibit the panelists as they did selectively respond to the outcomes provided and add outcomes to the original list. It is interesting to note that the panelist who was involved in the development of the Logic Model for DC added back some of the outcomes that the

researcher had excluded when preparing the first round questionnaire. The researcher only became aware of this panelist's connection to the Logic Model while processing the feedback from round 1, and discussed how to proceed with thesis committee members. The decision was made not to remove the panelist from the Delphi panel due its small size and to retain the additional outcomes for round 2 as the design of the Delphi process used in the study ensured that these additional outcomes would be included in/excluded from the final interview guide based upon group support in round 2.

While it is considered beneficial to provide panelists with background information in round 1 (54), the results indicated that including a copy of the PEN Evaluation Questionnaire in the materials for this round was problematic. Although this information was simply to give panelists an understanding of which aspects of the PEN service were being addressed in the questionnaire, two panelists seemed distracted by the questionnaire and included comments that related to the research method, instead of the research objective, in their feedback.

This was a difficult situation as these panelists obviously had strong ideas about the "proper" data collection methods that should be followed, perhaps those used in their own research, and wanted to share their thoughts even though the researcher was not soliciting their opinion on this matter. The decision to use concurrent rather than sequential data collection procedures had been made at the outset of the project by DC and approved by the University Research Ethics Board (UREB). Any changes would have necessitated approval by the UREB prior to implementation which would have

delayed the project, which was not desirable given the time constraints. Additionally, changes were not practical as the questionnaire development process was already well underway. Therefore, the researcher decided (in consultation with thesis committee members) to acknowledge the comments in the round 2 instructions and explain that changes were not possible since the method had already been established and approved by the project funding agency and the UREB.

4.3.3.3 Round 2

The failure of two panelists to follow the instructions for this round diminished the synergistic benefits of the Delphi process. Although the choice of multiple indicators/questions for certain outcomes could be accommodated under the established data processing procedure, this same procedure required that the “new” outcome/indicator/question sets that were added by these panelists be dropped from the questionnaire for round 3 due to low support. Consequently, there was no opportunity for the rest of the panel to review and react to these “new” items.

The negative reaction that the same two panelists had to the questionnaire in this round could have been an indication that the researcher had cut off the exploratory phase of the process prematurely by not giving panelists an opportunity to fully comment on the input from round 1 before requiring them to rank the outcomes. Alternatively, the panelists might not have approved of the study design as it did not conform to their previous experience with the Delphi or they might have felt constrained by the structured nature of the method which is supported by one panelist’s comment that she could not complete the

task as requested because she had to reorganize/modify the information to her satisfaction before she could respond because that was “just the way she did things”.

Ultimately, this feedback had a positive impact on the design of the Delphi as it provided valuable information about the effectiveness of the process that assisted the researcher in focusing the questionnaire for round 3 so that panelists would feel their time was being used efficiently (54). It is also likely that providing an opportunity for these panelists to express their concerns and following up on their comments encouraged them to remain engaged in the final round, which was the most important point in the Delphi process as the content of the interview guide was finalized during this round. Brauer et al. reported a similar benefit to holding teleconference discussions between questionnaire rounds to explore controversial issues (63).

The findings indicated that the design of this round was problematic. The difficulties mentioned above might have been avoided if an additional round was added between rounds 1 and 2 to allow panelists to comment on and perhaps categorize the master list of outcomes generated from round 1. Alternatively, the researcher could have undertaken this categorization when preparing the questionnaire for round 2 as Doerries & Foster did in their Delphi study to identify essential skills for structural family therapists (64).

Although these researchers also minimally edited round 1 input into a master list which participants were required to narrow down in round 2, they did not report any dissatisfaction from panel members, likely because of this categorization.

4.3.3.4 Round 3

The continued participation of the two panelists who expressed dissatisfaction with the questionnaire in round 2 and the minimal requested changes to the interview guide indicated that panelists approved of the extensive reorganization of the round 2 data. Additionally, the unsolicited positive comments included in the feedback from the final round suggested that panelists agreed with the results of the Delphi process, which supported the applicability and credibility of the resulting interview guide. This was significant as a formal follow-up was not conducted with the Delphi panelists due to time constraints.

4.3.3.5 Final PEN Evaluation Interview Guide

A final evaluation of both the interview guide and the actual development process was important to determine whether the interview questions accomplished the research objective of assessing the effectiveness of PEN as a KTT tool and its impact on dietetic practice and to gauge the overall success of the research design. The following sections discuss the interview guide in relation to participants' level of support for particular outcomes, connections between the questions and concepts from the theoretical frameworks underpinning the evaluation as well as key evaluation areas for a KTT initiative and the Delphi process used.

4.3.3.5.1 The Tool

4.3.3.5.1.1 Level of Support

It was not surprising that the panel reached consensus on the importance of outcomes 1 and 2. Outcome 1 related to PEN's influence on practice decisions, which is a key evaluation area for a KTT initiative (40) and outcome 2 explored respondents' perception of the validity and applicability of the information PEN provides, two qualities that have been shown to support successful implementation of EBP (65).

Eight outcomes had moderate support which indicated some differences in opinion regarding the importance of these outcomes in assessing the effectiveness of PEN as a KTT tool and its impact on dietetic practice. Outcomes 3 and 4 related to PEN being a "standard" for dietetic education and professional development, while outcome 9 addressed PEN's influence on practice guidelines and resources across the country. The difference of opinion over the importance of these outcomes may have reflected panelists' concern that some of these outcomes were not appropriate for the initial evaluation of PEN as it was too early in the implementation process to assess them effectively. Outcomes 5 and 10 dealt with PEN's influence on dietetic-related health policies and PEN's contribution to a heightened profile of the profession. Comments from round 1 indicated that some panelists were concerned that these outcomes were not appropriate for a dietitian to comment on and better directed at policy makers and those outside the profession.

Although the ultimate goal of a KTT initiative is to improve health outcomes (40) panelists' comments related to outcome 6 in round 1 indicated that some panelists were not convinced that this improvement could be appropriately measured through qualitative means. Three panelists commented that an interview was not the best way to assess whether PEN had resulted in specific health outcomes for individual clients and that this was better assessed through a survey question or case study analysis. It is interesting to note that the PEN Evaluation Questionnaire contained a similar question and some of those panelists also seemed uneasy with this line of questioning. Perhaps this was reflective of the strong clinical focus in dietetics and its emphasis on "hard" data for measuring health outcomes.

Comments from round 1 also indicated that some panelists were divided on the importance of assessing barriers and facilitators to PEN use (outcomes 11 and 12) even though the identification of barriers and facilitators to sustained use has been cited as an important component of an evaluation of a KTT initiative (40). One panelist thought this section should be expanded beyond a general question to include questions to address specific barriers while another indicated that it was not necessary to directly ask these questions as this information would come out in the responses to the other questions.

The two outcomes with low support also appeared to reflect panelists' concerns over including questions related to long term outcomes and specialized audiences as they addressed the extent of PEN use by other disciplines and for inter-professional training.

4.3.3.5.1.2 Links to Theoretical Frameworks

The interview guide contained questions addressing domains from both the Pathman-Awareness-to-Adherence Model and Rogers' Diffusion of Innovations Theory, which was not surprising as issues involving both the potential adopters and the KTT initiative itself can influence its adoption (40). These questions explore the role that agreement plays in the adoption of PEN and characteristics of PEN that could influence agreement and adoption such as compatibility and relative advantage. Dietitians must "buy-in" (agree) to the PEN concept before they will adopt it and this agreement could be influenced by both the benefits PEN provides over other practice information sources (relative advantage) and its ability to support EBP by providing access to credible, up-to-date, practice-based information (compatibility). As one panelist commented, "If they don't believe in it they will not use PEN no matter how good it is".

4.3.3.5.1.3 KTT

The results of this research were congruent with key evaluation areas for a KTT initiative identified by Graham et al. (40) as questions explored the use and impact of PEN at a variety of levels as well as barriers to sustained knowledge use. However, a comparison of support for outcomes in relation to levels of knowledge use and impact revealed that there was consensus on the importance of exploring the use and impact of PEN at the practice level, but less agreement on whether to include questions to evaluate use and impact in a broader context. Again, this likely reflected concern over the appropriateness of including questions related to long term outcomes and specialized audiences in the interview guide.

4.3.3.5.2 The Process

4.3.3.5.2.1 The Delphi Technique

The experience of using the Delphi confirmed some of the benefits and limitations of the method outlined in the literature.

4.3.3.5.2.1.1 Benefits

The Delphi proved to be an economical and efficient means of gathering opinions from our geographically dispersed panelists (52). In fact it was the only viable method, as hosting a conference or conducting private interviews was not feasible due to financial constraints.

The process was greatly facilitated by administering the rounds via email as there was no time delay for receipt of questionnaires or feedback (59) and the feedback was already in a format suitable for data processing (i.e. there was no need to transfer participants' written comments into a word processing program). Additionally, the researcher could immediately respond to panelists' queries or concerns.

4.3.3.5.2.1.2 Limitations

In keeping with the experience of other first time users of the Delphi, the process was more time consuming than originally anticipated (51, 66). Considerable time was required to prepare the questionnaires and instructions for each round. Additionally, reminder emails had to be sent out between rounds and deadlines were extended to accommodate panelists' busy schedules and summer vacations. These actions were

necessary to ensure participation of all panelists in each round, which was critical given the small size of the panel.

The process also illustrated what has been referred to as the “practicality vs science tension” that is inherent in research (54). Although the purpose of the Delphi was to develop an interview guide based on input from experts in KTT and EBP, the resulting guide also had to be satisfactory to the end-user. Consequently, compromises had to be made to ensure the questions were suitable for DC’s purposes. For example, two outcomes with low support were retained in the final interview guide at DC’s request. Also, even though panelists suggested that the more current term “evidence-informed practice” replace “evidence-based practice”, this change was not made as the researcher had decided early in the research process to use the term evidence-based practice in both the PEN Evaluation Questionnaire and the PEN Evaluation Interview Guide as it was likely the most familiar term to general PEN users.

These compromises did not undermine the credibility of the resulting interview guide. The instructions for the final round outlined the rationale for retaining the two outcomes with low support. Panelists had the opportunity to raise any objections to this decision when providing feedback for this round, and did not do so, which suggested that it was acceptable to them. Additionally, even though evidence-informed practice was considered to be the most appropriate term by experts in the field, the term evidence-based practice is still in current use and in this instance, issues of consistency and comprehension were more important than using the most up-to-date terminology.

4.3.3.5.2.1.3 Recommendations

In light of the findings, it is recommended that researchers using the Delphi give careful consideration to the organization and content of the materials for each round and allow sufficient rounds for panelists to thoroughly explore the topic before proceeding to the ranking phase. Researchers using this technique should also be mindful of the challenges posed by expert panelists with strong opinions and extensive experience with the method.

4.3.3.5.2.2 KTT

The findings indicate that experts in the field of KTT were in agreement on the importance of assessing PEN use and impact at the practice level. Panelists had differing opinions over whether to include questions related to long term outcomes and use by those outside the dietetic profession, likely due to the fact that the PEN service is in its infancy. The findings also highlighted panelists' reservations about measuring improvement in health outcomes through qualitative means. Therefore it is recommended that caution be used when interpreting responses to these questions.

5.0 Conclusions and Recommendations

5.1 Introduction

This research represented the first phase of a two-phase project to evaluate the PEN service, namely the development and validation of two evaluation tools. The resulting tools were used to collect baseline data in the fall of 2007. The PEN Evaluation Questionnaire was used to gather information from a random sample of PEN subscribers and non-subscribers, while the interview guide was administered to a small group of key informants. In the fall of 2008 the tools will be re-administered and the results compared to the baseline data to determine the impact that PEN has had on practice. The results will be used to inform further development of PEN as a KTT tool.

5.2 Conclusions

5.2.1 PEN Evaluation Questionnaire

“...a list of questions is only the starting point, and there is much to be done that will significantly influence...overall survey success” (41).

The results of this study support the benefits discussed by other researchers who have used a systematic approach to questionnaire development (48, 67). Each phase of the process identified problems not captured in the previous one and contributed to a comprehensive review of the questionnaire to ensure that it would collect relevant and quality data to evaluate the PEN service. While the number of questions did not substantially change (45 in the initial version compared to 46 in the final version), revisions based upon the comprehensive face and content validity review enhanced the

clarity of the questions and the response categories, improved the continuity and flow of the questionnaire and ensured that the links between the questions and the intended theoretical domains were accurate. The on-line format review allowed some formatting problems to be addressed while the questionnaire was on the developmental site, thereby avoiding costly revisions after the format was finalized. The pilot test provided a final check of the questionnaire content and on-line format so that any remaining problems could be identified and rectified before the questionnaire was administered. Feedback on the completion time confirmed that it did not exceed the desired maximum completion time of 20 minutes.

The findings further point to the value of obtaining face validity from non-experts as well as experts in subject of the questionnaire. The identified design limitations also highlight the importance of using separate groups of participants for each stage of the development process and ensuring that the researcher has early access to the questionnaire responses.

Currently, there is limited research evaluating the use and impact of on-line evidence systems (68), and the research that is available (6, 68, 69) tends to focus on the results of the evaluation rather than providing an in-depth discussion of the development of the evaluation tools. This research extends the current body of knowledge by detailing the process of developing and validating a questionnaire to evaluate an on-line decision support system.

5.2.1.1 Limitations

The quality and comprehensiveness of the initial questionnaire content was dependent upon the researcher's skill in selecting appropriate indicators from the Logic Model, accurately applying the theoretical models to the PEN service and identifying key evaluation criteria in the published EBP and KTT literature. The comprehensive face and content validity review of the initial questionnaire was put in place to address this limitation.

This research involved the collection and interpretation of subjective information so care had to be taken to ensure that participants understood their required tasks and the researcher correctly understood participants' comments. Consequently, the structured reporting forms and instructions were reviewed by thesis committee members for clarity and face validity prior to distribution to the participants. Additionally, the researcher followed up directly with participants in instances where comments were open to interpretation or could have had more than one interpretation to ensure the comments were correctly understood.

The questionnaire underwent an extensive face and content validity review, but was not reviewed for construct validity. However, face and content validity was considered appropriate for a general evaluation questionnaire.

5.2.2 PEN Evaluation Interview Guide

The results of this study indicated that the Delphi was successful in bringing together a diverse group of experts with extensive knowledge in KTT and EBP to produce an interview guide that fulfilled the research aim of providing an assessment of PEN's impact on dietetic practice and its effectiveness as a KTT tool. The interview guide that emerged from the Delphi process was congruent with key KTT evaluation criteria (40) and addressed important concepts from the theoretical frameworks.

The findings also confirm the importance of careful preparation and organization of the questionnaires for each Delphi round and highlight the challenges faced when gathering expert opinion, particularly if the researcher is less experienced in the research method than the expert panelists used in the study.

This research adds to the limited body of knowledge regarding the formal evaluation of KTT strategies (12). While much of the current research focuses on guidelines for specific interventions and their impact at the level of the individual practitioner, this research details the development of an interview guide to assess the impact of a broad-based KTT initiative on both individual dietitians and the profession as a whole.

5.2.2.1 Limitations

The Delphi panel was small at 7 members. However, this number was within general guidelines and the diversity of the panel and high response rate for each round ensured a thorough exploration of the topic.

Concern has been raised over the potential for researcher bias when using the Delphi (51, 56). In this study researcher bias was minimized by providing panelists with the opportunity to make revisions to the materials during each round and to give feedback on the Delphi process. Additionally, the panelists' own words were used as much as possible when preparing the questionnaires for rounds 2 and 3 and care was taken to ensure that any modifications were accurate representations of the original comments by having thesis committee members review the original comments as well as the proposed modifications to verify the accuracy of the interpretation.

The Delphi has been criticized for its lack of reliability, in that there is no guarantee that a different panel from the one used would produce the same results with the same materials (55, 57). Although this may be a valid concern, it is not applicable to this research as the objective was not to produce a set of universal evaluation questions that could be used for any KTT initiative, but rather a specific set of questions to evaluate a specific KTT initiative. The production of an interview guide that was acceptable to all parties, supported outcomes from the Logic Model and addressed key KTT evaluation areas and concepts from the theoretical frameworks underpinning the evaluation indicated that the process was successful in meeting this goal.

5.3 Recommendations

Future research should address the applicability of the PEN Evaluation Questionnaire and the PEN Evaluation Interview Guide to specialized PEN users. The focus of this research

was to develop general evaluation tools for non-specialized PEN users; however, future evaluations will assess PEN use by specialized audiences such as educators and dietetic interns as well as those outside the dietetic profession. Additional research is needed to determine what modifications are necessary to ensure these tools will collect relevant and useful data from these groups.

It is also recommended that future research investigate the comprehensiveness of the topics offered by the service overall, as well as in relation to specific practice areas, in order to identify gaps in the knowledge PEN provides. Additionally, further research is needed to assess the consistency of the information provided among individual knowledge pathways.

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Appendix A



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University Research Ethics Board

UNIVERSITY RESEARCH ETHICS BOARD

Certificate of Research Ethics Approval

Title of project: Development of Evaluation Tools for an On-Line evidence-Based Knowledge Translation/Transfer Service for Dietetic Practice
Researcher(s): Janet Hemming
Supervisor (if applicable): Dr. Daphne Lordly
Co-Investigators: n/a

File #: 2006-097

The University Research Ethics Board (UREB) has reviewed the above named proposal and confirms that it respects the Tri-Council Policy Statement as outlined in the MSVU Policies and Procedures: Ethics Review of Research Involving Humans regarding the ethics of research involving human participants.

This certificate of approval is valid one year from the date of issue. A final report is required within 30 days of expiry. Researchers are reminded that any changes to approved protocol must be reviewed and approved by the UREB prior to their implementation.

Dr. Elizabeth Bowering, Chair
University Research Ethics Board (UREB)

May 17, 2007
Effective Date

[Expires: May 16, 2008]

Renewal is contingent upon submission to the UREB of a written request for renewal accompanied by a satisfactory annual ethics report thirty days prior to expiry.



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University Research Ethics Board

UNIVERSITY RESEARCH ETHICS BOARD

Certificate of Research Ethics Approval [Renewal]

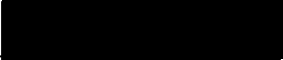
Title of project: *Development of Evaluation Tools for an On-Line evidence-Based Knowledge Translation/Transfer Service for Dietetic Practice*

Researcher(s): Janet Hemming
Supervisor (if applicable): Daphne Lordly
Co-Investigators: n/a

File #: 2006-097

The University Research Ethics Board (UREB) has reviewed the above named proposal and confirms that it respects the *Tri-Council Policy Statement* and the *MSVU Policies and Procedures: Ethics Review of Research Involving Humans* regarding the ethics of research involving human participants.

This certificate of approval is valid one year from the date of issue. A final report is required within 30 days of expiry. Researchers are reminded that any changes to approved protocol must be reviewed and approved by the UREB prior to their implementation.


Dr. Elizabeth Bowering, Chair
University Research Ethics Board (UREB)

March 31, 2008
Effective Date

[Expires: May 16, 2009]

Renewal is contingent upon submission to the UREB of a written request for renewal accompanied by a satisfactory annual ethics report thirty days prior to expiry.

Appendix B

Links between Survey Tool Questions and Theoretical Frameworks

Survey Tool Section	Model 1 – Based on Rogers’ Diffusion of Innovations Theory ¹	Model 2 – Based on the Pathman Theory of Adult Learning ²
Section 1: PEN Subscriber*	--	--
Section 2: Ease of Access	Relative advantage, low complexity	Adoption, barriers
Section 3: General PEN Use	Relative advantage (Q6), compatibility	Agreement, adoption (Q5), adherence (Q4)
Section 4: Participation in Developing PEN Content	--	Adoption, adherence
Section 5: Use of Tools/Resources	Relative advantage, compatibility	Agreement, adoption, barriers (Q2 & Q3)
Section 6: Quality of Content	Relative advantage, compatibility	Agreement, adoption
Section 7: Importance of PEN and Impact on Practice	Relative advantage, compatibility	Agreement, adoption, adherence, barriers (Q6)
Section 8: Communication about PEN*	--	--
Section 9: Demographic Information*	--	--

*Questions in these sections are not directly linked to either of the models, although analysis of data from some questions in Sections 1 and 9 may provide insight into barriers to PEN use.

¹The survey tool will not directly address the concepts of trialability and observability from Model 1 as they can be evaluated using data collected through other means.

²The survey tool will not directly address the concept of awareness from Model 2 as it can be evaluated using data collected through other means.

Appendix C

Validation Panel Invitation

April, 2007
Dear

I'm contacting you on behalf of Dietitians of Canada (DC) and Mount Saint Vincent University to invite your participation in a face validation panel of an evaluation survey for Practice-based Evidence in Nutrition [PEN] www.dieteticsatwork.com/PEN. As you are aware, approximately 18 months ago, DC launched PEN, which is an on-line decision support tool for the dietetic profession. The service is designed to provide evidence-informed practice guidance to dietitians regarding questions that arise in everyday practice. Content experts are recruited to review the relevant literature for each question, synthesize the results and provide graded bottom-line advice or key practice points. Links to the relevant literature and to tested client tools are also integrated into what we call "knowledge pathways". We currently have over 65 knowledge pathways included in the PEN service and we are constantly growing the depth and breadth of PEN, while keeping the existing content up to date.

DC has received funding from the Canadian Council on Learning to support an evaluation, in 2007 and 2008, of the impact that PEN has had on dietetic practice. Janet Hemming, a Masters student from the Department of Applied Human Nutrition at Mount Saint Vincent University in Halifax, will be designing the evaluation tools we will be using as part of the requirements for her Masters work.

Janet and I would like to invite you to participate in validating an evaluation survey tool, one of the instruments to be used to collect data on the application and impact of PEN in practice. The validation process will take place by email during May and June 2007 and should take approximately 3-4 hours of your time in total. Prior to commencement of the validation process, we would like to arrange a one hour teleconference to provide you with a virtual tour of the PEN service to give you a better understanding of its content and functionality. We will follow up the tour with a discussion of the validation panel process.

We would appreciate it if you would respond to [REDACTED] indicating your interest in participating in this panel. If you agree to participate, you will be forwarded an informed consent form for your signature. Once informed consent is received from all panel participants, we will identify a teleconference date that fits everyone's schedule.

Regards,

Lynda Corby MSc, MEd, RD, FDC
Director Public Affairs, Dietitians of Canada
Email: [REDACTED]

Janet Hemming
Master Student, Mount Saint Vincent University
Email: [REDACTED]

Appendix D

Validation Panel Free and Informed Consent Form

Study Title: Development of evaluation tools for an online evidence-based knowledge translation/transfer service for dietetic practice

Researcher: Janet Hemming, MScAHN Student, Department of Applied Human Nutrition, Mount Saint Vincent University

I am a graduate student in the Department of Applied Human Nutrition at Mount Saint Vincent University. As part of my Masters of Science in Applied Human Nutrition thesis, I am conducting research under the supervision of Daphne Lordly, Associate Professor, Department of Applied Human Nutrition, Mount Saint Vincent University and in partnership with Lynda Corby, Director of Public Affairs/PEN Co-Director, Dietitians of Canada and Jayne Thirsk, Regional Executive Director, Alberta, Yukon and Professional Development and Support, Dietitians of Canada. I am inviting you to participate in my study, *Development of evaluation tools for an online evidence-based knowledge translation/transfer service for dietetic practice*. This project is being funded by the Canadian Council on Learning. The purpose of the study is to design, validate and pilot test an evaluation survey tool for Dietitians of Canada's Practice-based Evidence in Nutrition (PEN), a web-based service for dietetic practice.

This study involves participation in an expert panel that will assist in the face validation of the survey tool. You have been selected to participate based on your experience with dietetic practice and your past involvement with Dietitians of Canada. You will be asked to participate in a teleconference, which will include a virtual tour of PEN, and to provide written feedback to assist in finalizing and validating questions for the survey tool. Participation in the study will require approximately 3-4 hours of your time. Dietitians of Canada will use the completed survey tool to aid in evaluation of the PEN service. Upon completion of the research, you will be provided with a written summary of the results, should you wish to have it.

A benefit of your participation in the study is the opportunity to play a role in facilitating further development of the PEN service. Your participation is completely voluntary. You may withdraw from this study at any time without penalty.

Privacy and confidentiality will be maintained throughout the research process. Any information you provide (including summaries made from discussions or other materials) will be edited by the researcher to remove any identifying information and will be stored in a locked cabinet in the faculty supervisor's office when not in use. Additionally, all electronic files containing stored data will be password protected. After completion of the project, all identifying documents (such as consent forms) will be destroyed by the researcher in a secure manner. Any publications or presentations based upon this research will not contain your name or other identifying information without your permission.

If you have any questions about this study, please contact Janet Hemming at [REDACTED] or [REDACTED]. This research activity has met the ethical standards of the University Research Ethics Board at Mount Saint Vincent University. If you have questions about how this study is being conducted, you may contact the Chair of the University Research Ethics Board (UREB) c/o MSVU Research and International Office, who is not directly involved in the study, at 457-6350 or via e-mail at research@msvu.ca.

By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study.

Participant's signature

Date

Researcher's signature

Date

Appendix E

Researcher-Developed Questionnaire

Section 1: PEN Subscriber

1. Are you a PEN subscriber?

Yes – direct to question 2

No

a) Please indicate your reason for not subscribing to PEN (check all that apply).

I do not think PEN will help me in my practice.

I am waiting for PEN content to be expanded.

I think that the cost of PEN is too high for its value to my practice.

I am waiting for my employer to subscribe.

I am not familiar with PEN.

I am semi/retired and do not think that I would make good use of it.

Other (Please specify in the comment box below).

Comment:

b) What sources of practice information do you use? Please check all that apply.

Colleagues

Electronic databases (such as PubMed and National Guideline Clearinghouse)

Electronic Evidence Libraries (such as Health-Evidence.ca, Cochrane Database of Systematic Reviews and The Canadian Best Practices Portal for Health Promotion and Chronic Disease Prevention)

General Internet searches

Online or hard copy journals

Clinical practice manuals

Nutrition-related websites (such as Dietitians of Canada's website)

Print resources (such as textbooks)

Other (Please specify in the comment box below).

Comment:

Those who answer no will then be directed to Section 9 – Demographic Information.

2. What type of access/license do you have?

- Individual
- Group
- Site
- Don't know

3. Are you a member of Dietitians of Canada?

- Yes – direct to question 4
- No If you answered “no”, please tell us your profession. Are you a:

- Dietitian
- Nurse
- Pharmacist
- Physician
- Other (Please specify in the comment box below).

Comment:

4. How did you find out about PEN?

- Dietitians of Canada promotional material
- Friend/colleague
- Key words in search engine
- Link from another website
- Other (Please specify in the comment box below).

Comment:

5. Have you participated in a PEN orientation?

- Yes
- No

6. How often do you use PEN?

- Daily
- At least once per week
- At least once per month
- Less than once per month
- Never

Section 2: Ease of access

1. When accessing the Internet at work:

- I have exclusive use of a computer.
- I share a computer with others at my place of work.
- I need to access the Internet at a location away from my working environment.
- I do not have access to the Internet.

2. Please indicate how often you encounter any of the following difficulties when logging on to PEN:

a) The service is down.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

b) The service is slow.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

c) The service is interrupted.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

d) I am not able to log on as the maximum number of allowable users for our site license has been reached.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

3. Please indicate how often you encounter broken links.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

4. Once you have entered the PEN website:

a) Are you able to find the information you are looking for?

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

b) Can you find information quickly enough for your needs?

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

c) Please indicate how often you encounter any of the following difficulties when printing information from the PEN website:

The document will not print at all.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

The document will print, but the text is out of alignment, a portion of the text is cut off and/or graphics are missing from the document.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

5. PEN provides several options to search for information: key word, practice question, advanced search, Table of Contents or Practice Category.

Please check the statement that best describes your experience in using each of these search methods:

a) Key word

How often do you use this search method?

- I often use this method.
- I occasionally use this method.
- I never use this method.

Comment:

How effective is this search method?

- I find this method to be effective.
- I do not find this method to be effective.

Comment:

How satisfied are you with the response time of this search method?

- The response time is adequate.
- The response time is inadequate.

Comment:

b) Practice Question

How often do you use this search method?

- I often use this method.
- I occasionally use this method.
- I never use this method.

Comment:

How effective is this search method?

- I find this method to be effective.
- I do not find this method to be effective.

Comment:

How satisfied are you with the response time of this search method?

- The response time is adequate.
- The response time is inadequate.

Comment:

c) Advanced Search

How often do you use this search method?

- I often use this method.
- I occasionally use this method.
- I never use this method.

Comment:

How effective is this search method?

- I find this method to be effective.
- I do not find this method to be effective.

Comment:

How satisfied are you with the response time of this search method?

- The response time is adequate.
- The response time is inadequate.

Comment:

d) Table of Contents

How often do you use this search method?

- I often use this method.
- I occasionally use this method.
- I never use this method.

Comment:

How effective is this search method?

- I find this method to be effective.
- I do not find this method to be effective.

Comment:

How satisfied are you with the response time of this search method?

- The response time is adequate.
- The response time is inadequate.

Comment:

e) Practice Category

How often do you use this search method?

- I often use this method.
- I occasionally use this method.
- I never use this method.

Comment:

How effective is this search method?

- I find this method to be effective.
- I do not find this method to be effective.

Comment:

How satisfied are you with the response time of this search method?

- The response time is adequate.
- The response time is inadequate.

Comment:

6. Are you usually able to find the information you want by using only one search method?

- Yes, I usually find the information I want by using only one search method.
- No, I usually must use a combination of methods to find the information I want.

Comment:

Section 3 – General PEN use

1. What are your reasons for using PEN? Please check all that apply.

- To find answers to my practice questions
- To find answers to my clients'/colleagues' questions
- To find teaching materials for clients/colleagues
- For professional development (i.e. to learn more about a particular topic, to review the most current evidence-based guidance on topics of interest)
- Research for preparing presentations, developing new resources and/or defining policy
- Curriculum development (i.e. for academic courses)
- Mentoring students

- Other (Please specify in the comment box below).
Comment:

2. How often do you link through to read the reference articles when in a knowledge pathway?

- Always
 Usually
 Sometimes
 Seldom
 Never

Comment:

3. How often do you refer to the level of evidence grading system [A,B,C,D] in PEN?

- Always
 Usually
 Sometimes
 Seldom
 Never

Comment:

4. How often do you link through and read the information about the authors of a knowledge pathway?

- Always
 Usually
 Sometimes
 Seldom
 Never

Comment:

5. When faced with a practice decision, how often do you use PEN?

- Always
 Usually
 Sometimes
 Seldom
 Never

Comment:

6. How often do you need to consult a source other than PEN to answer your practice questions?

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

Section 4: Participation in developing PEN content

1. I have submitted one or more practice questions to PEN.

- Yes
- No

Comment:

2. I have made one or more suggestions for a topic that should be included in PEN.

- Yes
- No

Comment:

3. I have acted as a reviewer for PEN content.

- Yes

a) I had sufficient guidance in this role.

- Yes
- No

- No

Comment:

4. I have acted as an author for PEN.

Yes

a) I had sufficient guidance in this role.

Yes

No

No

Comment:

Section 5: Use of tools/resources

1. How often do you share the tools/resources included in PEN with clients/colleagues?

Daily

At least once per week

At least once per month

Less than once per month

Never

Comment:

2. Is there anything that limits your use of the PEN tools/resources for your clients?

Nothing limits my use.

The materials are often not at an appropriate reading level.

The materials that I am looking for are not included in PEN.

Other (Please specify in the comment box below).

Comment:

Comment:

3. What kind of tools would you like to see included in PEN that are currently missing? Please check all that apply.

Client handouts at a lower reading level

Client handouts that have been adapted to other languages/cultural groups (Please indicate which languages/cultural groups in the comment box below).

More calculators (Please indicate the kinds of calculators you would find useful in the comment box below).

- More consumer/client handouts (Please indicate topics of consumer/client handouts in the comment box below).
- More nutritional assessment and screening tools (Please indicate the kinds of assessment/screening tools in the comment box below).
- Menu plans (Please indicate what target groups that menu plans would be useful for in the comment box below).
- Nutrition care maps/algorithms (please indicate topics for care maps/algorithms in the comment box below).
- Other (Please specify in the comment box below).
Comment:

Comment:

Section 6: Quality of PEN content

1. I usually receive a satisfactory answer to the practice questions that I have.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

2. The knowledge pathways typically provide sufficient detail to guide practice.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

3. The information is typically up-to-date.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

4. Overall, I am confident in the quality of the information PEN provides.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

Section 7: Importance of PEN and impact on practice

1. What sources of practice information do you regularly use? Please check all that apply.

- Colleagues
- Electronic databases (such as PubMed and National Guideline Clearinghouse)
- Electronic Evidence Libraries (such as Health-Evidence.ca, Cochrane Database of Systematic Reviews and The Canadian Best Practices Portal for Health Promotion and Chronic Disease Prevention)
- General Internet searches
- Online or hard copy journals
- Clinical practice manuals
- Nutrition-related websites (such as Dietitians of Canada's website)
- PEN
- Print resources (such as textbooks)
- Other (Please specify in the comment box below).

Comment:

2. PEN is a valuable tool for my practice.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

3. PEN has positively influenced the way I work.

- Strongly agree

- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

4. PEN enables me to take an evidence-informed approach to my practice.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

5. PEN has lead to a positive health benefit for my clients.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

6. I usually have time at work to spend using PEN.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

7. By promoting evidence-informed practice, PEN can enhance the credibility of dietitians with other health professionals.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

8. I have recommended PEN to colleagues.

- Yes
 No

Comment:

9. Overall, how do you rate the PEN service?

- Excellent
 Very good
 Average
 Fair
 Poor

Comment:

Section 8: Communication about PEN

1. What is your preferred method to receive updates about PEN?

- By email broadcast
 By newsletter
 Through the “What’s New” section on the PEN website
 Other (Please specify in the comment box below).

Comment:

2. How often would you prefer to receive updates about PEN?

- Weekly
 Monthly
 Quarterly
 Other (Please specify in the comment box below).

Comment:

Section 9: Demographic information

1. Age

- Under 25 years

- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 years and over

2. Highest Level of Education Attained

- Some university
- Bachelor's degree
- Some graduate school
- Master's degree
- Working on doctorate
- Earned doctorate

3. Employment

a) Work Status

- Full time
- Part time
- Occasional
- Unemployed

b) Employment setting. Please choose the most appropriate category.

- Clinical
- Community
- Education
- Administrative
- Public Health
- Hospitality
- Food Service
- Private Practice
- Research
- Student
- Not working in dietetics
- Other (Please specify in the comment box below).

Comment:

4. Years in Practice

- Fewer than 2 years
- 2-5 years
- 6-10 years
- More than 10 years

5. Please rate your computer skills.

- Beginner
- Intermediate
- Advanced

SUBMIT

Your survey response has been received. Thank you for sharing your time and insights.

Appendix F

Face and Content Validity Review Reporting Form

Project goal:

To validate a web-based survey tool that will be used to collect quality assurance and demographic data on the PEN service. The validation process is a critical step in the development of an appropriate survey tool that will allow Dietitians of Canada to collect relevant data upon which to base future decisions regarding PEN.

General instructions:

We would like you to provide feedback regarding the clarity, usefulness and preferred layout of the attached survey tool, as well as the time necessary to complete it. We would also like you to comment upon the appropriateness of the survey tool questions in relation to the concepts they are intended to measure. Please refer to the enclosed table which outlines the links between the theoretical frameworks and the survey tool questions.

To facilitate our analysis of the feedback received from panellists, please ensure that your comments are as specific as possible and clearly indicate the appropriate section number and question number for each comment. If you do not have any comments for a particular question, please write “no comment” at the end of the question.

Section 1: Clarity

1. Please indicate any words that are vague or may be unfamiliar to respondents.

Section Number:

Question:

Comment:

2. Please indicate any ambiguous or unclear questions.

Section Number:

Question:

Comment:

3. Please indicate any overly long/wordy questions.

Section Number:

Question:

Comment:

4. Please list any section heading that does not accurately reflect the section content and suggest an alternative heading, if possible.

Section Number:

Comment:

Section 2: Usefulness

1. Please indicate any questions which should be eliminated and explain why they are not needed.

Section Number:

Question:

Comment:

2. Please list any questions which should be added and explain why they are necessary.

Section Number:

Question:

Comment:

3. Please indicate any suggested changes to the response categories for a question (for example, choice of yes/no rather than frequency)

Section Number:

Question:

Comment:

4. Please list any additions/deletions that should be made to the response choices offered in a question.

Section Number:

Question:

Comment:

Section 3: Preferred Layout

1. Please indicate any suggested changes to the order of the sections in the questionnaire.

Section Number:

Comment:

2. Please list any suggested changes to the order of the questions within a section.

Section Number:

Question:

Comment:

3. Please indicate any changes to the general layout of the questionnaire.

Section Number:

Question:

Comment:

4. Please list any suggested changes to the design of the questionnaire (such as the font size).

Section Number:

Question:

Comment:

Section 4 : Content Validity

1. Please indicate any survey tool question that does not reflect the concept(s) that it is intended to measure and suggest an alternative question that would be more appropriate. Please refer to the enclosed table which outlines the links between the theoretical frameworks and the survey tool questions.

Section Number:

Question:

Comment:

Section 5: Completion Time and Feedback

1. Once you have completed your review and feedback on the face and content validity of the survey tool, please complete the questionnaire and record the time (in minutes) that it took you to complete it.

Time required to complete the questionnaire (minutes):

2. Comment upon the length of the questionnaire (i.e. too long, about right).

Comment:

3. Please indicate any questions where you would have liked to express your opinion, but were not given the opportunity to do so.

Section Number:

Question:

Comment:

4. Please indicate any questions that you found offensive or were reluctant to answer.

Section Number:

Question:

Comment:

Thank you for sharing your time and insights.

Appendix G

Revised Questionnaire

Section 1: PEN Subscriber

1. Are you a PEN subscriber?

Yes – direct to question 2

No

c) Please indicate your reason for not subscribing to PEN (check all that apply).

- I do not think PEN will help me in my practice.
- I am waiting for PEN content to be expanded.
- I think that the cost of PEN is too high for its value to my practice.
- I am waiting for my employer to subscribe to PEN.
- I am not familiar with PEN.
- I am semi/retired and for that reason do not think that I would make good use of PEN.
- I do not have access to the Internet at work.
- Other (Please specify in the comment box below).
Comment:

d) What sources of practice information do you use? Please check all that apply.

- Colleagues
- Electronic databases (such as PubMed and National Guideline Clearinghouse)
- Electronic Evidence Libraries (such as Health-Evidence.ca, Cochrane Database of Systematic Reviews and The Canadian Best Practices Portal for Health Promotion and Chronic Disease Prevention)
- General Internet searches
- Online or hard copy journals
- Clinical practice manuals
- Nutrition-related websites (such as Dietitians of Canada's website)
- Print resources (such as textbooks)
- Handouts from conferences/information sessions
- Other (Please specify in the comment box below).
Comment:

Those who answer no will then be directed to Section 11 – Demographic information.

2. What type of PEN access/license do you have?

- Individual
- Group
- Site
- Don't know

3. What type of Internet access do you have?

- High speed
- Dial up
- Don't know

4. Are you a member of Dietitians of Canada?

- Yes – direct to question 5
- No

a) If no, please tell us your profession. Are you a:

- Dietitian
 - Nurse
 - Pharmacist
 - Physician
 - Student/Intern
 - Other (Please specify in the comment box below).
- Comment:

5. How did you find out about PEN?

- Dietitians of Canada promotional material
 - Friend/colleague
 - Key words in search engine (such as Google)
 - Link from another website
- Please give the name of the website:
- University/college professor
 - Internship preceptor
 - Other (Please specify in the comment box below).
- Comment:

6. Have you participated in a teleconferenced or in-person PEN orientation offered by Dietitians of Canada?

- Yes
- No

7. How often do you use PEN?

- Daily
- Not daily, but at least once per week
- Not weekly, but at least once per month
- Sometimes, but less often than once per month
- Never

a) Why not?
Comment:

Those who answer never will be directed to Section 11 – Demographic information.

Section 2: Ease of access to PEN

1. When accessing the Internet in your practice:

- I have exclusive use of a computer.
- I share a computer with others at my place of work.
- I need to access the Internet at a location away from my working environment.
- I do not have access to the Internet at work.

2. Once you have entered the PEN website:

a) Is the PEN site designed to make it easy to find what you are looking for?

- Yes
- No

Comment:

b) How often do you encounter a broken link (i.e. a hyperlink that does not work when you click on it)?

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

3. Do you print information from the PEN website?

No – direct to Section 3, question 1

Yes

If yes, please indicate how often you encounter any of the following difficulties (situations unrelated to hardware printer problems):

i) The document will not print at all.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

ii) The document will print, but the text is out of alignment, a portion of the text is cut off and/or graphics are missing from the document.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

Section 3: PEN Search Strategies and tools

1. PEN provides several options to search for information: key word search, advanced search and topic search by Table of Contents or Practice Category.

Please check the response that best describes your experience in using each of these search options:

a) Key word

How often do you use this search option?

- Often
- Occasionally

Never – direct to the next option

Comment:

Do you find this search option to be effective?

Yes

Sometimes

No

Comment:

Are the search results organized in such a way that you are able to find the information you are looking for in a reasonable amount of time?

Yes

No

Comment:

b) Advanced Search

How often do you use this search option?

Often

Occasionally

Never – direct to the next option

Comment:

Do you find this search option to be effective?

Yes

Sometimes

No

Comment:

Are the search results organized in such a way that you are able to find the information you are looking for in a reasonable amount of time?

Yes

No

Comment:

c) Table of Contents

How often do you use this search option?

- Often
- Occasionally
- Never – direct to the next option

Comment:

Do you find this search option to be effective?

- Yes
- Sometimes
- No

Comment:

Are the search results organized in such a way that you are able to find the information you are looking for in a reasonable amount of time?

- Yes
- No

Comment:

d) Practice Category (Population Health/Lifecycle, Health Condition/Disease, Food/Nutrients and Professional Practice)

How often do you use this search option?

- Often
- Occasionally
- Never – direct to question 2

Comment:

Do you find this search option to be effective?

- Yes
- Sometimes
- No

Comment:

Are the search results organized in such a way that you are able to find the information you are looking for in a reasonable amount of time?

- Yes
 No

Comment:

2. Are you usually able to find the information you want by using only one search option?

- Yes
 No

Comment:

Section 4 – General PEN use

1. What are your reasons for using PEN? Please check all that apply.

- To find answers to practice questions
- To find answers to clients'/colleagues' questions
- To find teaching materials for clients/colleagues
- For professional development (e.g., to learn more about a particular topic, to review the most current evidence-based guidance on topics of interest)
- For research in preparing presentations, developing new resources and/or defining policy
- For curriculum content development (i.e., as an instructor for academic courses)
- For mentoring students
- Other (Please specify in the comment box below).

Comment:

2. When faced with a practice decision, how likely are you to use PEN?

- Very likely
 Somewhat likely
 Not very likely

Comment:

3. How often do you need to consult a source other than PEN to answer your practice questions/make a practice decision?

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

4. How often do you link through to read the reference abstracts/articles for key practice points when in a knowledge pathway?

- Always
- Usually
- Sometimes
- Seldom
- Never
- I was not aware that I could do this.

Comment:

5. How often do you refer to the evidence grade [A,B,C,D] for key practice points in a knowledge pathway?

- Always
- Usually
- Sometimes
- Seldom
- Never
- I was not aware that I could do this.

Comment:

6. How often do you link through and read the information about knowledge pathway contributors?

- Always
- Usually
- Sometimes
- Seldom
- Never

I was not aware that I could do this.

Comment:

Section 5: Participation in developing PEN content

1. Have you submitted any practice questions to PEN?

Yes

No

I was not aware that I could do this.

Comment:

2. Have you been a reviewer for PEN content?

Yes

a) Did you have sufficient guidance in this role?

Yes

No

No

Comment:

3. Have you authored any content for PEN?

Yes

a) Did you have sufficient guidance in this role?

Yes

No

No

Comment:

Section 6: Use of PEN tools/resources

1. How often do you share the tools/resources included in PEN with clients/colleagues?

- Daily
- Not daily, but at least once per week
- Not weekly, but at least once per month
- Sometimes, but less often than once per month
- Never

Comment:

2. Is there anything that limits your use of the PEN tools/resources for your clients?

- Yes

a) If yes, what limits your use of the PEN tools/resources for your clients? Please check all that apply.

- The materials are often not at an appropriate reading level.
- The materials that I am looking for are not included in PEN.
- The materials are often too basic and/or not detailed enough.
- I do not see clients.
- Other (Please specify in the comment box below).

Comment:

- No – direct to question 3

3. What kind of tools would you like to see included in PEN that are currently missing? Please check all that apply and write your specific suggestions in the comment box below.

- Client handouts at a lower reading level
- Client handouts that have been adapted to other languages/cultural groups
- More detailed/advanced materials
- More calculators
- More consumer/client handouts
- More nutritional assessment and screening tools
- Menu plans
- Nutrition care maps/algorithms
- Other (Please specify in the comment box below).

Comment:

Comment:

Section 7: Quality of PEN content

Please indicate the extent of your agreement with each of the following statements:

1. I usually receive a satisfactory answer to the practice questions that I have.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

2. The knowledge pathways typically provide sufficient detail to guide practice.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

3. The information is typically up-to-date.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

4. Overall, I am confident in the quality of the information PEN provides.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

Section 8: Importance of PEN and impact on practice

1. What sources of practice information do you regularly use? Please check all that apply.

- Colleagues
 - Electronic databases (such as PubMed and National Guideline Clearinghouse)
 - Electronic Evidence Libraries (such as Health-Evidence.ca, Cochrane Database of Systematic Reviews and The Canadian Best Practices Portal for Health Promotion and Chronic Disease Prevention)
 - General Internet searches
 - Online or hard copy journals
 - Clinical practice manuals
 - Nutrition-related websites (such as Dietitians of Canada's website)
 - PEN
 - Print resources (such as textbooks)
 - Handouts from conferences/information sessions
 - Other (Please specify in the comment box below).
- Comment:

Please indicate the extent of your agreement with each of the following statements:

2. PEN is a valuable tool for my practice.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

3. PEN has positively influenced the way I work.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

4. PEN enables me to take an evidence-based approach to my practice.

- Strongly agree

- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

5. In my opinion PEN has led to positive health benefits for my clients.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

6. I usually have time at work to spend using PEN.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

7. By promoting evidence-based practice, PEN can enhance dietitians' credibility with other health professionals.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

Section 9: Overall Rating of PEN

1. Have you recommended PEN to colleagues?

- Yes

No

Comment:

2. Overall, how do you rate the PEN service as a practice guidance tool?

- Excellent
- Very good
- Average
- Fair
- Poor

Comment:

3. Is there anything that would make PEN more useful to you as a knowledge translation tool?

- No
- Yes (Please specify in the comment box below).

Comment:

Section 10: Communication about PEN updates

1. What is your preferred method to receive updates about PEN?

- By email broadcast
- By electronic newsletter such as the DC “Members in Action”
- Through the “What’s New” section on the PEN website
- Other (Please specify in the comment box below).

Comment:

2. How often would you prefer to receive updates about PEN?

- Weekly
- Monthly
- Quarterly
- As new information becomes available
- Other (Please specify in the comment box below).

Comment:

Section 11: Demographic information

1. Age

- Under 25 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 years and over

2. Highest Level of Education Attained

- Some university
- Bachelor's degree
- Working on master's degree
- Master's degree
- Working on doctoral degree
- Doctoral degree
- Other (Please specify in the comment box below).
Comment:

3. Employment

a) Work Status

- Full time
- Part time
- Occasional
- On leave
- Unemployed
- Retired
- Student

b) Employment setting. Please choose the most appropriate category.

- Clinical
- Community (i.e. schools, fitness centres, grocery stores)
- Administrative
- Public Health
- Food Service/Hospitality
- Private Practice
- Research/Academic

- Internship Practicum
 - Not working in dietetics
 - Not applicable
 - Other (Please specify in the comment box below).
- Comment:

4. Years in Practice

- Fewer than 2 years
- 2-5 years
- Between 5-10 years
- More than 10 years

5. How would you rate your computer skills?

- Beginner
- Intermediate
- Advanced

SUBMIT

Your survey response has been received. Thank you for sharing your time and insights.

Appendix H

On-line Format Review Reporting Form

Dear

We would like you to provide feedback on the online format, ease of completion and the time necessary to complete the PEN Evaluation Questionnaire. NOTE: Based upon feedback from the validation panel, the questionnaire content (i.e. specific questions) and the order of the questions have been finalized.

The following instructions will assist you in completing this task and we ask that you read them prior to clicking on the link below which will take you to the PEN Evaluation Questionnaire:

1. Click on the link to the questionnaire.
2. Note the time when you begin to complete the questionnaire on the feedback form, which is included as an attachment to this email.
3. Complete the questionnaire and follow the instructions to submit your response.
4. Record the time when you completed the questionnaire on the feedback form.
5. Comment on any difficulties you may have encountered with the online format on the feedback form. Please ensure that your comments are as specific as possible and clearly indicate the section number and question number for each comment, if applicable.
6. Please email your feedback form to **Janet Hemming at [REDACTED]** by **August 8, 2007**.

When you are ready to start the questionnaire click on the following link:

http://mlsurvey.stage.marketlinksolutions.com/frm_survey_view/PENSurvey2007/PENSurvey.asp

Thank you for your assistance.

Regards,

Lynda Corby MSc, MEd, RD, FDC
Director Public Affairs
Dietitians of Canada
Email: [REDACTED]

Janet Hemming
Master Student, Mount Saint Vincent University
Email: [REDACTED]

**Evaluation of Practice-based Evidence in Nutrition (PEN)
Evaluation Questionnaire Feedback Form**

Please note that the survey you are reviewing is on staging (i.e. a developmental site) and your responses will not be saved in the database. Therefore, if you click back to a previous page while completing the survey your responses will not be retained. This is a functionality of staging so please do not report this as an error.

1. Please record the time you started and completed the questionnaire:

Time started:

Time completed:

2. Did you encounter any difficulties with the online format of the questionnaire (such as the transition from one page to another, the size of the text, graphics, etc.)?

No

Yes – please provide details in the space below

Comments:

Appendix I

Pilot Test Invitation

Dear

I'm contacting you on behalf of Dietitians of Canada (DC) and Mount Saint Vincent University to invite your participation in a pilot test of the Practice-based Evidence in Nutrition [PEN] Evaluation Questionnaire. As you are aware, just under two years ago DC launched PEN, which is an on-line decision support tool for the dietetic profession. The service is designed to provide evidence-informed practice guidance to dietitians regarding questions that arise in everyday practice. Content experts are recruited to review the relevant literature for each question, synthesize the results and provide graded bottom-line advice or key practice points. Links to the relevant literature and to tested client tools are also integrated into what we call "knowledge pathways".

DC has received funding from the Canadian Council on Learning to support an evaluation, in 2007 and 2008, of the impact that PEN has had on dietetic practice. Janet Hemming, a Masters student from the Department of Applied Human Nutrition at Mount Saint Vincent University in Halifax, is designing the evaluation tools we will be using as part of the requirements for her Masters work.

Development of the PEN Evaluation Questionnaire was completed in August 2007, with the assistance of an expert panel of DC members. Before the questionnaire can be used to collect data on the PEN service, it must be pilot tested to obtain feedback on the format, ease of completion and time necessary to complete. Janet and I would like to invite you to participate in pilot testing the questionnaire, which should take approximately 30 minutes of your time in total. We would like your feedback on the questionnaire whether or not you are currently a PEN subscriber.

We would appreciate it if you would let us know if you will or will not participate in the pilot test by replying to this message to [REDACTED]. If you agree to participate, you will be forwarded instructions for completing the survey and an informed consent form for your signature.

Regards,

Lynda Corby MSc, MEd, RD, FDC
Director Public Affairs
Dietitians of Canada
Email: [REDACTED]

Janet Hemming
Master Student, Mount Saint Vincent University
Email: [REDACTED]

Appendix J

Pilot Test Free and Informed Consent Form

Study Title: Development of evaluation tools for an online evidence-based knowledge translation/transfer service for dietetic practice

Researcher: Janet Hemming, MScAHN Student, Department of Applied Human Nutrition, Mount Saint Vincent University

I am a graduate student in the Department of Applied Human Nutrition at Mount Saint Vincent University. As part of my Masters of Science in Applied Human Nutrition thesis, I am conducting research under the supervision of Daphne Lordly, Associate Professor, Department of Applied Human Nutrition, Mount Saint Vincent University and in partnership with Lynda Corby, Director of Public Affairs/PEN Co-Director, Dietitians of Canada and Jayne Thirsk, PEN Co-Director, Regional Executive Director, Alberta/Territories and Professional Development and Support, Dietitians of Canada. I am inviting you to participate in my study, *Development of evaluation tools for an online evidence-based knowledge translation/transfer service for dietetic practice*. This project is being funded by the Canadian Council on Learning. The purpose of the study is to design, validate and pilot test an evaluation survey tool for Dietitians of Canada's Practice-based Evidence in Nutrition (PEN), a web-based service for dietetic practice.

This study involves participation in a pilot test of the PEN Evaluation Questionnaire. We would like you to complete the questionnaire and provide feedback on the online format, ease of completion and the time necessary to complete it. This task will take approximately 30 minutes of your time.

A benefit of your participation in the study is the opportunity to play a role in facilitating further development of the PEN service and to add to the limited body of research on knowledge translation and transfer. Your participation is completely voluntary. You may withdraw from this study at any time without penalty.

No personal information is being collected and at no time will the researcher be able to link responses with individual email addresses. After the pilot test is completed, all email addresses will be deleted and the survey will be closed. The results will be held in electronic format by Marketlink Solutions, the company that administers electronic surveys for Dietitians of Canada. Your data will be numerically identified and all electronic files containing stored data will be password protected. Only group results will be presented in future presentations or publications by the researcher. If you wish to receive information on the results of this study, please email [REDACTED]

If you have any questions about this study, please contact Janet Hemming at [REDACTED] or [REDACTED]. This research activity has met the ethical standards of the University Research Ethics Board at Mount Saint Vincent University. If you have questions

about how this study is being conducted, you may contact the Chair of the University Research Ethics Board (UREB) c/o MSVU Research and International Office, who is not directly involved in the study, at 457-6350 or via e-mail at research@msvu.ca.

By completing the PEN Evaluation Questionnaire, you are indicating that you fully understand the above information and agree to participate in this study.

Appendix K

Pilot Test Feedback Form

ID# _____

Pilot Test of PEN Evaluation Questionnaire Instructions and Feedback Form

I. INSTRUCTIONS

The following instructions will assist you in completing your task and we ask that you read through them prior to clicking on the link below which will take you to the PEN Evaluation Questionnaire:

1. Print out the PEN Evaluation Questionnaire – Pilot Test Feedback Form (on pages 3-6 of this document) and keep it close at hand while working through the questionnaire.
2. Click on the link to the questionnaire which is provided below in this document.
3. You will be prompted to enter your ID number. This number is located on the top right-hand corner of this page. Please type in this number in survey and click on the “next page” button.
4. Section 1 of the questionnaire will appear on your screen. Please record the time when you begin to complete Section 1 in the appropriate space on the feedback form.
5. Fill out Section 1 of the questionnaire and record the time when you completed this section on the feedback form.
6. After you have completed Section 1, indicate any questions that you had difficulty answering by placing a check mark in the box beside the appropriate question number(s) on the feedback form. Please provide details describing the difficulty you encountered in the comments section and ensure that your comments are as specific as possible and clearly indicate the question number for each comment. Please write clearly and legibly.
7. Follow steps 4-6 for each remaining section of the questionnaire (Sections 2-11). Please note that if you indicated that you are not a PEN subscriber in Section 1, Question 1, you will automatically skip to Section 11 when you finish Section 1 and click on the next page button. Therefore, please just complete the Section 1, Section 11 and General Feedback portions of the feedback form.
8. Once you have completed Section 11 of the questionnaire, follow the instructions to submit your response to the questionnaire.
9. Answer Questions 2a and 2b on page 6 of the feedback form. Please ensure that your comments are as specific as possible and clearly indicate the section number

and question number for each comment, if applicable. Please write clearly and legibly.

- 10. Please fax your completed feedback form to Lisa Koo at [REDACTED] as soon as possible. Please note that Lisa is not a member of the research team and she will remove any identifying information from your feedback form prior to forwarding it to the researchers in order to ensure your anonymity. You may also mail your completed feedback form to Lisa if you do not have access to a fax machine.**

**Mailing Address:
Attention: Lisa Koo
Suite 604-480 University Avenue
Toronto, ON
M5G 1V2**

When you are ready to start the questionnaire click on the following link:
http://survey.marketlinksolutions.com/frm_survey_view/PENSurvey2007/PENSurvey.asp

The Pilot Test Feedback form begins on the next page.

II. PEN EVALUATION QUESTIONNAIRE – PILOT TEST FEEDBACK FORM

1. Completion of Questionnaire Sections and Feedback

Section 1

Time started: _____
Time completed: _____

Q1* Q2 Q3 Q4 Q5 Q6
Q7

Q7a**

* If you indicate that you are not a PEN subscriber in Question 1, you will only be asked to complete Question 1 and then will automatically skip to Section 11 when you click on the next page button.

** You should only answer Question 7a if you answer "never" to Q7. After you answer this question and click on the next page button you will automatically skip to Section 11 of the questionnaire. If you do not answer "never" to Q7 you will proceed to Section 2, Q1.

Comments: _____

Section 2

Time started: _____
Time completed: _____

Q1 Q2a Q2b Q3 **Q3i** **Q3ii**

* Questions 3i and 3ii will only appear if you answer "yes" to Q3. If you answer "no" to Q3 you will proceed to Section 3, Q1.

Comments: _____

Section 3

Time started: _____
Time completed: _____

Q1a Q1b Q1c Q1d Q2

Comments: _____

Section 4

Time started: _____
Time completed: _____

Q1 Q2 Q3 Q4 Q5 Q6

Comments: _____

Section 5

Time started: _____
Time completed: _____

Q1 Q2 Q2a* Q3 Q3a**

** Question 2a will only appear if you answer "yes" to Q2. If you answer "no" to Q2 you will proceed to Q3.*

***Question 3a will only appear if you answer "yes" to Q3. If you answer "no" to Q3 you will proceed to Section 6, Q1.*

Comments: _____

Section 6

Time started: _____
Time completed: _____

Q1 Q2 Q2a* Q3

** Question 2a will only appear if you answer "yes" to Q2. If you answer "no" to Q2 you will proceed to Q3.*

Comments: _____

Section 7

Time started: _____
Time completed: _____

Q1 Q2 Q3 Q4

Comments: _____

Section 8

Time started: _____
Time completed: _____

Q1 Q2 Q3 Q4 Q5 Q6
Q7

Comments: _____

Section 9

Time started: _____
Time completed: _____

Q1 Q2 Q3

Comments: _____

Section 10

Time started: _____
Time completed: _____

Q1 Q2

Comments: _____

Section 11

Time started: _____
Time completed: _____

Q1 Q2 Q3 Q4a Q4b Q5
Q6

Comments: _____

2. General Feedback on Questionnaire

a) Did you encounter any difficulties with the online format of the questionnaire (such as the transition from one page to another, the size of the text, graphics)?

- No
- Yes – please provide details in the space below.

Comments: _____

b) Do you have any other concerns/issues with the PEN service that were not addressed in this questionnaire?

- No
- Yes – please provide details in the space below.

Comments: _____

Thank you for participating in this pilot test for the PEN evaluation. Please remember to fax your feedback form to the attention of Lisa Koo at [REDACTED] or mail it to:

Attention: Lisa Koo
Suite 604-480 University Avenue
Toronto, ON
M5G 1V2

Appendix L

PEN Evaluation Questionnaire

Section 1: PEN Subscriber

1. **Do you have access to PEN through an individual subscription or your employer?**

Yes – direct to question 2

No

a) Please indicate your reason for not subscribing to PEN (check all that apply).

- I do not think PEN will help me in my practice.
- I am waiting for PEN content to be expanded.
- I think that the cost of PEN is too high for its value to my practice.
- I am waiting for my employer to subscribe **to PEN**.
- I am not familiar with PEN.
- I am semi/retired **and for that reason do not think** that I would make good use **of PEN**.
- I do not have access to the Internet at work.**
- Other (Please specify in the comment box below).

Comment:

b) What sources of practice information do you use? Please check all that apply.

- Colleagues
- Electronic databases (such as PubMed and National Guideline Clearinghouse)
- Electronic Evidence Libraries (such as Health-Evidence.ca, Cochrane Database of Systematic Reviews and The Canadian Best Practices Portal for Health Promotion and Chronic Disease Prevention)
- General Internet searches
- Online or hard copy journals
- Clinical practice manuals
- Nutrition-related websites (such as Dietitians of Canada's website)
- Print resources (such as textbooks)
- Handouts from conferences/information sessions**
- Other (Please specify in the comment box below).

Comment:

Those who answer no will then be directed to Section 11 – Demographic information.

2. What type of **PEN** access/license do you have?

- Individual
- Group
- Site
- Don't know

3. What type of Internet access do you have?

- High speed
- Dial up
- Don't know

4. Are you a member of Dietitians of Canada?

- Yes – direct to question 5
- No

a) If no, please tell us your profession. Are you a:

- Dietitian
- Nurse
- Pharmacist
- Physician
- Student/Intern**
- Other (Please specify in the comment box below).

Comment:

5. How did you find out about PEN? **Please check all that apply.**

- Dietitians of Canada promotional material
 - Friend/colleague
 - Key words in search engine (**such as Google**)
 - Link from another website
- Please give the name of the website:**
- University/college professor**
 - Internship preceptor**
 - Other (Please specify in the comment box below).

Comment:

6. Have you participated in a **teleconferenced or in-person** PEN orientation **offered by Dietitians of Canada?**

- Yes
- No

7. How often do you use PEN?

- Daily
- Not daily, but at least once per week**
- Not weekly, but at least once per month**
- Sometimes, but less often than once per month**
- Never

a) Why not?

Comment:

Those who answer never will be directed to Section 11 – Demographic information.

Section 2: Ease of access to PEN

1. When accessing the Internet **in your practice:**

- I have exclusive use of a computer.
- I share a computer with others at my place of work.
- I need to access the Internet at a location away from my working environment.
- I do not have access to the Internet **at work.**

2. **Once you have entered the PEN website:**

a) Is the PEN site designed to make it easy to find what you are looking for?

- Yes**
- No**

Comment:

b) How often do you encounter a broken link (i.e. a hyperlink [a word or phrase that you can click on to jump to a new document or a new section within the current document] that does not work when you click on it)?

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

3. **Do you print information from the PEN website?**

No – direct to Section 3, question 1

Yes

If yes, please indicate how often you encounter any of the following difficulties (situations unrelated to hardware printer problems):

i) The document will not print at all.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

ii) The document will print, but the text is out of alignment, a portion of the text is cut off and/or graphics are missing from the document.

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

Section 3: PEN Search Strategies and tools

1. **PEN provides several options to search for information: key word search, advanced search and topic search by Table of Contents or Practice Category.**

Please check the **response** that best describes your experience in using each of these search options:

a) Key word

How often do you use this search option?

Often

- Occasionally**
- Never – direct to the next option**

Comment:

Do you find this search option to be effective?

- Yes**
- Sometimes**
- No**

Comment:

Are the search results organized in such a way that you are able to find the information you are looking for in a reasonable amount of time?

- Yes**
- No**

Comment:

b) **Advanced Search**

How often do you use this search option?

- Often**
- Occasionally**
- Never – direct to the next option**

Comment:

Do you find this search option to be effective?

- Yes**
- Sometimes**
- No**

Comment:

Are the search results organized in such a way that you are able to find the information you are looking for in a reasonable amount of time?

- Yes**
- No**

Comment:

c) Table of Contents

How often do you use this search option?

- Often**
- Occasionally**
- Never – direct to the next option**

Comment:

Do you find this search option to be effective?

- Yes**
- Sometimes**
- No**

Comment:

Are the search results organized in such a way that you are able to find the information you are looking for in a reasonable amount of time?

- Yes**
- No**

Comment:

d) Practice Category (**Population Health/Lifecycle, Health Condition/Disease, Food/Nutrients and Professional Practice**)

How often do you use this search option?

- Often**
- Occasionally**
- Never – direct to question 2**

Comment:

Do you find this search option to be effective?

- Yes**
- Sometimes**
- No**

Comment:

Are the search results organized in such a way that you are able to find the information you are looking for in a reasonable amount of time?

- Yes**
 No

Comment:

2. Are you usually able to find the information you want by using only one search option?

- Yes**
 No

Comment:

Section 4 – General PEN use

1. What are your reasons for using PEN? Please check all that apply.

- To find answers to practice questions
- To find answers to clients'/colleagues' questions
- To find teaching materials for clients/colleagues
- For professional development (e.g., to learn more about a particular topic, to review the most current evidence-based guidance on topics of interest)
- For research in preparing presentations, developing new resources and/or defining policy
- For** curriculum content development (i.e., **as an instructor** for academic courses)
- For mentoring students
- Other (Please specify in the comment box below).

Comment:

2. When faced with a practice decision, **how likely are you to use PEN?**

- Very likely**
 Somewhat likely

Not very likely

Comment:

3. How often do you need to consult a source other than PEN to answer your practice questions/**make a practice decision**?

- Always
- Usually
- Sometimes
- Seldom
- Never

Comment:

4. How often do you link through to read the reference **abstracts/articles for key practice points** when in a knowledge pathway?

- Always
- Usually
- Sometimes
- Seldom
- Never
- I was not aware that I could do this.**

Comment:

5. How often do you refer to the **evidence grade [A,B,C,D]** for key practice points in a knowledge pathway?

- Always
- Usually
- Sometimes
- Seldom
- Never
- I was not aware that I could do this.**

Comment:

6. How often do you link through and read the information about **knowledge pathway contributors**?

- Always
- Usually
- Sometimes
- Seldom

- Never
- I was not aware that I could do this.**

Comment:

Section 5: Participation in developing PEN content

1. **Have you submitted any practice questions to PEN?**

- Yes
- No
- I was not aware that I could do this.**

Comment:

2. **Have you been a reviewer for PEN content?**

- Yes

a) **Did you have sufficient guidance in this role?**

- Yes
- No

- No

Comment:

3. **Have you authored any content for PEN?**

- Yes

a) **Did you have sufficient guidance in this role?**

- Yes
- No

- No

Comment:

Section 6: Use of **PEN** tools/resources

1. How often do you share the tools/resources included in PEN with clients/colleagues/**other health professionals**?

- Daily
- Not daily, but at least once per week**
- Not weekly, but at least once per month**
- Sometimes, but less often than once per month**
- Never

Comment:

2. Is there anything that limits your use of the PEN tools/resources for your clients?

Yes

a) If yes, what limits your use of the PEN tools/resources for your clients? Please check all that apply.

- The materials are often not at an appropriate reading level.
- The materials that I am looking for are not included in PEN.
- The materials are often too basic and/or not detailed enough.**
- I do not see clients.**
- Other (Please specify in the comment box below).

Comment:

No – direct to question 3

3. What kind of tools would you like to see included in PEN that are currently missing? Please check all that apply **and write your specific suggestions in the comment box below.**

- Client handouts at a lower reading level
- Client handouts that have been adapted to other languages/cultural groups
- More detailed/advanced materials**
- More calculators
- More consumer/client handouts
- More nutritional assessment and screening tools
- Menu plans
- Nutrition care maps/algorithms
- Other (Please specify in the comment box below).

Comment:

Comment:

Section 7: Quality of PEN content

Please indicate the extent of your agreement with each of the following statements:

1. I usually receive a satisfactory answer to the practice questions that I have.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

2. The knowledge pathways typically provide sufficient detail to guide practice.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

3. The information is typically up-to-date.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

4. Overall, I am confident in the quality of the information PEN provides.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

Section 8: Importance of PEN and impact on practice

1. What sources of practice information do you regularly use? Please check all that apply.

- Colleagues
- Electronic databases (such as PubMed and National Guideline Clearinghouse)
- Electronic Evidence Libraries (such as Health-Evidence.ca, Cochrane Database of Systematic Reviews and The Canadian Best Practices Portal for Health Promotion and Chronic Disease Prevention)
- General Internet searches
- Online or hard copy journals
- Clinical practice manuals
- Nutrition-related websites (such as Dietitians of Canada's website)
- PEN
- Print resources (such as textbooks)
- Handouts from conferences/information sessions**
- Other (Please specify in the comment box below).

Comment:

Please indicate the extent of your agreement with each of the following statements:

2. PEN is a valuable tool for my practice.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

3. PEN has positively influenced the way I work.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

4. PEN enables me to take an evidence-**based** approach to my practice.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

5. **In my opinion** PEN has led to **positive health benefits** for my clients.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

6. I usually have **sufficient time at my work setting** to spend using PEN.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

7. By promoting evidence-**based** practice, PEN can enhance **dietitians' credibility** with other health professionals.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Comment:

Section 9: Overall Rating of PEN

1. **Have you recommended PEN to colleagues?**

- Yes
- No

Comment:

2. Overall, how do you rate the PEN service **as a practice guidance tool?**

- Excellent
- Very good
- Average
- Fair
- Poor

Comment:

3. **Is there anything that would make PEN more useful to you as a knowledge translation tool?**

- No
- Yes **(Please specify in the comment box below).**

Comment:

Section 10: Communication about PEN updates

1. What is your preferred method to receive updates about PEN?

- By email **updates sent to all PEN subscribers**
- By **electronic** newsletter **such as the DC “Members in Action”**
- Through the “What’s New” section on the PEN website
- Other (Please specify in the comment box below).

Comment:

2. How often would you prefer to receive updates about PEN?

- Weekly
- Monthly
- Quarterly
- As new information becomes available**
- Other (Please specify in the comment box below).

Comment:

Section 11: Demographic information

1. Please indicate the DC region in which you are located:

- BC Region
- Alberta/Territories Region
- Saskatchewan/Manitoba/NW Ontario Region
- Central/Southern Ontario Region
- Quebec/North Eastern/Eastern Ontario Region
- Atlantic Region
- Don't know

2. Age

- Under 25 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 years and over

3. Highest Level of Education Attained

- Some university
 - Bachelor's degree
 - Working on master's degree**
 - Master's degree
 - Working on doctoral degree**
 - Doctoral degree**
 - Other (Please specify in the comment box below).**
- Comment:**

4. Employment

a) Work Status

- Full time
- Part time
- Casual**
- On leave**
- Unemployed
- Retired**
- Student**

b) Employment setting. Please choose the most appropriate category.

- Clinical
- Community (**i.e. schools, fitness centres, grocery stores**)
- Administrative
- Public Health
- Food Service/Hospitality**
- Private Practice
- Research/**Academic**
- Internship Practicum**
- Not working in dietetics
- Not applicable**
- Other (Please specify in the comment box below).

Comment:

5. Years in Practice

- Fewer than 2 years
- 2-5 years
- Between 5-10 years**
- More than 10 years

6. **How would you rate your computer skills?**

- Beginner
- Intermediate
- Advanced

SUBMIT

Your survey response has been received. Thank you for sharing your time and insights.

Appendix M

Delphi Panel Invitation

April , 2007

Dear

I'm contacting you on behalf of Dietitians of Canada (DC) and Mount Saint Vincent University because of your interest and expertise in knowledge translation and transfer. Approximately 18 months ago, DC launched an on-line decision support tool for the dietetic profession called Practice-based Evidence in Nutrition [PEN]. The service is designed to provide evidence-informed practice guidance to dietitians regarding questions that arise in everyday practice.

DC has received funding from the Canadian Council on Learning to support an evaluation, in 2007 and 2008, of the impact that PEN has had as a knowledge translation and transfer tool on dietetic practice. Janet Hemming, a Masters student from the Department of Applied Human Nutrition at Mount Saint Vincent University in Halifax, will be designing the evaluation tools we will be using as part of the requirements for her Masters work.

Janet and I would like to invite you to participate in an expert Delphi panel conducted by email during the months of May and June 2007, to formulate appropriate interview questions that will enable us to assess if/how the PEN service has impacted dietitians' practice. We particularly want to engage the Delphi panel in the development of the questions that will elicit feedback on actual change in practice and/or policy development since there is little reported in the literature on this facet of knowledge translation/transfer.

The Delphi process will consist of 3-5 rounds of input and review and should take approximately 6-8 hours of your time in total. Prior to commencement of the Delphi process, we would like to arrange a one hour teleconference to provide you with a virtual tour of the PEN service to give you a better understanding of its content and functionality. We will follow up the tour with a discussion of the Delphi panel process and expected outcomes.

Here are a few more details about the PEN service and its development to give you a better understanding of the service.

Content experts are recruited to review the relevant literature for each question, synthesize the results and provide graded bottom-line advice or key practice points. Links to the relevant literature and to tested client tools are also integrated into what we call "knowledge pathways". This design allows a busy practitioner to quickly answer a specific practice question and/or locate a client resource and then go back and review the evidence when time permits. We currently have over 65 knowledge pathways included in the PEN service and we are constantly growing the depth and breadth of PEN, while keeping the existing content up to date.

Some examples of how PEN supports dietetic practice include:

- PEN allows dietitians to prepare for practice situations in minimal time. For example, a dietitian can quickly and easily design an effective hypertension prevention counseling

session by accessing the hypertension knowledge pathway, which contains a complete summary of practice points to consider as well as helpful client handouts.

- PEN provides information on “best practices” approaches. For example, a dietitian has been asked to review the organization’s client education tools to see if they are in line with “best practices” in resource development. PEN provides fast and efficient access to evidence-based recommendations and direct links to evaluation tools through the Nutrition Education Print Resource Development knowledge pathway.

Please visit www.dieteticsatwork.com/pen to view our PEN demo, which gives further examples of how PEN can be used to support dietetic practice.

We would appreciate it if you would respond to [REDACTED] indicating your interest in participating in the Delphi panel. If you agree to participate, you will be forwarded an informed consent form for your signature. Once informed consent is received from all panel participants, we will identify a teleconference date that fits everyone’s schedule.

Regards,

Lynda Corby MSc, MEd, RD, FDC
Director Public Affairs
Dietitians of Canada

Email: [REDACTED]

Janet Hemming
Master Student, Mount Saint Vincent University
Email: [REDACTED]

Appendix N

Delphi Panel Free and Informed Consent Form

Study Title: Development of evaluation tools for an online evidence-based knowledge translation/transfer service for dietetic practice

Researcher: Janet Hemming, MScAHN Student, Department of Applied Human Nutrition, Mount Saint Vincent University

I am a graduate student in the Department of Applied Human Nutrition at Mount Saint Vincent University. As part of my Masters of Science in Applied Human Nutrition thesis, I am conducting research under the supervision of Daphne Lordly, Associate Professor, Department of Applied Human Nutrition, Mount Saint Vincent University and in partnership with Lynda Corby, Director of Public Affairs/PEN Co-Director, Dietitians of Canada and Jayne Thirsk, Regional Executive Director, Alberta, Yukon and Professional Development and Support, Dietitians of Canada. I am inviting you to participate in my study, *Development of evaluation tools for an online evidence-based knowledge translation/transfer service for dietetic practice*. This project is being funded by the Canadian Council on Learning. The purpose of the study is to design interview questions to assess if/how Dietitians of Canada's Practice-based Evidence in Nutrition (PEN) has impacted dietitians' practice.

This study involves participation in an expert panel conducted to formulate appropriate interview questions. You have been selected to participate based on your interest and expertise in the field of knowledge translation/transfer. You will be asked to participate in a teleconference, which will include a virtual tour of PEN, and three-five input and review sessions via email to assist in the definition of appropriate interview questions. Participation in the study will require approximately 6-8 hours of your time. Dietitians of Canada will use the completed interview questions to aid in evaluation of the PEN service. Upon completion of the research, you will be provided with a written summary of the results, should you wish to have it.

A benefit of your participation in the study is the opportunity to play a role in facilitating further development of the PEN service. Your participation is completely voluntary. You may withdraw from this study at any time without penalty.

Privacy and confidentiality will be maintained throughout the research process. Any information you provide (including summaries made from discussions or other materials) will be edited by the researcher to remove any identifying information and will be stored in a locked cabinet in the faculty supervisor's office when not in use. Additionally, all electronic files containing stored data will be password protected. After completion of the project, all identifying documents (such as consent forms) will be destroyed by the researcher in a secure manner. Any publications or presentations based upon this research will not contain your name or other identifying information without your permission.

If you have any questions about this study, please contact Janet Hemming at [REDACTED] or [REDACTED]. This research activity has met the ethical standards of the University Research Ethics Board at Mount Saint Vincent University. If you have questions about how this study is being conducted, you may contact the Chair of the University Research Ethics Board (UREB) c/o MSVU Research and International Office, who is not directly involved in the study, at 457-6350 or via e-mail at research@msvu.ca.

By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study.

Participant's signature

Date

Researcher's signature

Date

Appendix O

Delphi Round 1 Questionnaire

Overall project goal:

To develop a set of approximately six interview questions for the collection of qualitative data to evaluate PEN as a medium for KTT and *its impact on professional practice*. A modified Delphi process will be used to define the questions via email; 3-5 “rounds” of input will be sought from the panel in order to obtain agreement on the final set of interview questions. The interview questions will augment quantitative information obtained through a web-based survey tool.

Purpose of Round 1:

To develop a “master list” of desired outcomes *focusing on the impact of the PEN service on dietetic practice* with corresponding indicators¹ and interview questions that will aid in evaluating whether, and to what extent, these outcomes have been achieved. Dietitians of Canada has developed a PEN Evaluation Framework that outlines the desired short and long term outcomes that we believe should be assessed when evaluating the overall PEN service. The following list of outcomes is derived from this framework, as well as existing published literature.

Your tasks:

- To identify outcomes related to the impact of PEN on dietetic practice that are best assessed through qualitative means.
- To reflect upon the list of outcomes provided and to give written comments identifying indicators and corresponding interview questions (using the attached form).
- To add any outcomes (and corresponding indicators and questions) that you feel should be included in the outcomes and/or interview questions.

For your reference, a copy of the article *Lost in Knowledge Translation: Time for a Map?* by Ian D. Graham et al. is enclosed, along with the PEN Evaluation Logic Model, a copy of the web-based quantitative survey tool and a table which outlines the theoretical framework constructs and associated web-based survey questions.

¹An **indicator** is defined as a specific, observable, and measurable characteristic or change that shows the progress a program is making toward achieving a specified outcome. Source: Centers for Disease Control and Prevention. *Designing and Implementing an Effective Tobacco Counter-Marketing Campaign*. 2003. Available from: http://www.cdc.gov/tobacco/media_communications/countermarketing/campaign/00_pdf/Tobacco_CM_Manual.pdf. Accessed 18 May 07.

**Practice-based Evidence in Nutrition (PEN) Evaluation
Indicators and Corresponding Questions to Measure Desired Outcomes for the PEN Service**

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
Knowledge transfer – initial stages		
<ul style="list-style-type: none"> • PEN is a source of knowledge of evidence-based dietetic practice 		
<ul style="list-style-type: none"> • Valid, important, applicable evidence-based dietetic information is available (quality of content) 		
Knowledge transfer – impact on practice – “<i>Intended users implement knowledge</i>”		
<ul style="list-style-type: none"> • Individual practitioners base aspects of their practice on the evidence from PEN 		
<ul style="list-style-type: none"> • PEN is used to validate, legitimize or defend a position already taken 		

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
<ul style="list-style-type: none"> PEN is used in the development of dietetic-related health policies 		
<ul style="list-style-type: none"> Recognition of the benefits/usefulness of PEN 		
<ul style="list-style-type: none"> PEN is seen as “best process” for practice guidance 		
Impact on dietetic profession		
<ul style="list-style-type: none"> Dietitians are evidence-based practitioners 		
<ul style="list-style-type: none"> Heightened profile of the profession as a leader and expert in the health field 		

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
Impact on health of population		
<ul style="list-style-type: none"> • Specific health outcomes are evident for individual clients 		
Technology		
<ul style="list-style-type: none"> • Users find PEN to be responsive and interactive 		
Factors influencing PEN adoption and sustained use		
<ul style="list-style-type: none"> • Barriers and facilitators to PEN adoption are identified 		

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
<ul style="list-style-type: none"> Barriers and facilitators to sustained PEN use are identified 		
Additional outcomes, indicators and questions		

Appendix P

Delphi Round 2 Questionnaire

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
1. PEN is a source of evidence-based dietetic practice (valid, important, applicable evidence-based dietetic information is available)	a) Within the top 3 “go to” places for information	i) When you are looking for high quality research evidence, where do you go first? And if you do not find what you are looking for, where would you go next? And 3 rd ?
	b) Frequency and variety of ways PEN is used	i) How often do you use PEN? ii) In which ways do you use PEN? Please give specific examples. iii) What do you think are the key benefits/usefulness of PEN – personally, organizationally?
	c) Potential users are aware PEN exists. Potential users perceive PEN as a credible source of knowledge	i) Are you aware of PEN? Please describe what it is and discuss your perception of the site’s credibility and usefulness for practice.
	d) Belief that PEN is evidence based, rigorously produced, of high quality	i) Do you know how the pathways are developed? Rigorous process? By respected colleagues? Peer reviewed? What would be a comparable resource that you know about, or used before, etc? ii) How does the evidence in PEN compare with other sources that you use?
	e) Use of PEN as first choice. Use of other resources –frequency and reasons of use.	i) Does PEN provide you with comprehensive information that you need? ii) Do you need to go to sources other than PEN? Which ones and why?
2. PEN is a standard for dietetic	a) PEN used for curriculum development	i) Do you use PEN to develop curriculum?

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
education	b) PEN used to educate students	i) Do you use PEN as an educational tool for student education? If yes, give examples.
3. PEN is a standard for professional development	a) PEN is used as a tool for professional development	i) Do you use PEN for your professional development? If yes, how? If no, why not?
4. Overall attitude towards evidence-based practice – if they don't believe in it they will not use PEN in practice no matter how good it is.	a) Belief that evidence-based practice is important to practice and in one's own practice.	<p>i) Do you think some of your practice/decisions could be improved with results from new research? Do you think you are up-to-date, how do you keep up-to-date? Have you changed the way you practice over the years? (e.g. more evidence-based practice?)</p> <p>ii) What is your understanding of evidence-based practice (evidence to inform decision making)</p>
5. Individual practitioners base aspects of their practice on the evidence from PEN	a) Does PEN improve access to information?	<p>i) For what kinds of problems might you look for evidence online or in the literature?</p> <p>ii) What is the typical way you might look for information prior to PEN?</p> <p>iii) Has PEN been useful in answering your questions? How?</p> <p>iv) Is PEN an improvement over other methods of presenting information?</p> <p>v) Are there any important gaps or types of questions that are not answered by PEN?</p>

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
	b) Research utilization c) Proportion of an individual's practice supported by PEN Pathways/practice guidelines	vi) How could PEN be improved? i) Can you give me a recent example of a time when you recognized that you needed to find some high quality evidence for your practice? Did you use PEN? If so, how did the information in PEN influence your practice decision? i) What proportion of your practice is supported by PEN pathways/practice guidelines? ii) Give examples of aspects of your practice that are supported by PEN pathways/practice guidelines.
	d)	i) Has PEN changed or informed your practice? (could have general idea that dietitian thinks in a more evidence-based way as opposed to individual examples)
6. PEN is used to validate, legitimize or defend a position already taken	a) PEN is used to verify a position taken	i) Do you use PEN pathways/practice guidelines to verify a position already taken? If yes, give examples. If no, why not?
7. PEN is used in the development of dietetic-related health policies	a) Dietetic-related health policies developed as a result of PEN b) Examples of policies informed by evidence in PEN.	i) Are you aware of any dietetic-related health policies that have been developed or changed as a result of PEN? If yes, give examples. i) Please describe a decision around a recently developed dietetic-related policy and how the evidence in PEN informed this decision.
8. PEN is seen as "best process" for practice guidance	a) Perception of PEN as "best process" for practice guidance	i) Do you see PEN as the "best process" for practice guidance? Why or why not?
9. PEN supports dietitians to be evidence-based practitioners	a) Use and consistency of practice guidelines and resources across the country. Perception that PEN has	i) In your area of practice, are practice guidelines and resources being used consistently across the country? If not- why

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
	influenced this use and consistency across the country.	not? If yes... Do you believe that PEN is having an influence on this? Why or why not?
	b)	i) Please describe how an evidence-informed dietitian would practice in comparison to one that was not.
10. PEN is contributing to a heightened profile of the profession as a leader and expert in the health field	a) Perception of profession as a leader and expert in the health field. Perception that PEN is having an influence on this.	i) Do you believe there is a heightened profile of the profession as a leader and expert in the health field? If yes...Do you believe that PEN is having an influence on this heightened profile?
11. PEN use has resulted in specific health outcomes for individual clients	a) Practitioners report on observed changes in clients' health.	i) Can you describe specific client health outcomes or changes resulting from your use of PEN practice guidelines and resources?
	b) What improvement in health outcomes would be expected as a result of dietitians being more evidence-informed?	i) What impact would the incorporation of evidence into dietetic practice have on clients, populations, etc?
12. Users find PEN to be responsive and interactive	a) Site is engaging, responsive, interactive	i) Tell me about the last time you used PEN – apart from content – what was it like to use (ease, responsive, interactive)?
	b) Reported ease of access and use	i) Do you find PEN is a quick way to get the information and resources you need? Why or why not? ii) Is PEN sufficiently interactive to meet your needs? Why or why not?
	c)	i) Any suggestions to improve the technology part of the process of using PEN?
13. Barriers and facilitators to PEN adoption are identified	a) Barriers and facilitators to PEN use within work context	i) What factors within your work context make it difficult for you to use PEN? Which ones facilitate its use?

OUTCOMES	INDICATORS	INTERVIEW QUESTIONS
	b) Structural environment is conducive to accessing the tool.	i) How easy is it for you to access the PEN tool at your institution? When are you able to access it? ii) Who makes decisions about staff access to resources, etc.?
	c) An environment which encourages evidence-based practice (e.g. access to information resources, learning environment, research environment)	i) Do you have access to other information/research resources at your place of work? Do people access them frequently? Do you? Is evidence based practice discussed at your institution?
	d) Time pressures – no time to consult when with clients or before speaking with clients	i) When would be the best time for you to use PEN (e.g. at end of day, to prepare for day, during consultations, after consultations)? Why?
14. Barriers and facilitators to sustained PEN use are identified	a) Barriers and facilitators to sustained use of PEN	i) How will you use PEN in the future? What will assist or hinder your sustained use of PEN in the long term?
15. Dietetic practitioners and stakeholders are involved in the development of PEN (in building new knowledge and evidence)	a) Extent and type of involvement from dietetic practitioners and stakeholders in the development of PEN	i) Are you or have you been involved in identifying questions or developing PEN pathways and resources? Why or why not?
16. Other disciplines are involved in the development of PEN	a) Extent and type of involvement by other disciplines in the development of PEN	i) Are you aware of other disciplines involved in the development of PEN? ii) What other disciplines should be involved in the development of PEN?
17. PEN is a significant tool for inter-professional education and training	a) Extent of use of PEN in inter-professional education and training	i) Is PEN being used for inter-professional training? If yes, how? If no, why not?
18. PEN has an impact on the practice of other disciplines	a) Extent of use of PEN practice guidelines and resources by other professionals	i) Do you see PEN practice guidelines and resources being used by other professionals? If yes, how? If not, why not?

Appendix Q

Delphi Round 2 Instructions and Reporting Form

Overview of the project:

The purpose of the PEN research project is to develop two evaluation tools for the PEN service: a survey tool and a set of interview questions. The survey tool will be used to collect *quantitative* data to evaluate the mechanics of the PEN service and its usefulness as an on-line decision support tool. The interview questions will be used to collect *qualitative* data to assess the effectiveness of PEN as a medium for KTT and its impact on professional practice.

NOTE: Although some panelists offered comments in Round 1 related to the research methodology, recommending that the development of the interview questions be informed by the response to the online survey, this change is not possible since the methodology has already been established and approved by the project funding agency and the masters student's thesis committee.

Round 2 Materials

Attached is the "master list" of outcomes and corresponding indicators and questions resulting from the Round 1 feedback. Please note that the order of items on the list does not reflect their order of importance.

It was necessary to streamline the large volume of data to facilitate the next round of input so a small number of related outcomes and similar questions have been combined, and a few outcomes have been renamed to make their implied connection to PEN explicit. Except for these minor changes and the correction of obvious typographical errors, the indicators and questions remain as they were submitted by panelists.

Tasks for Round 2:

When preparing your Round 2 feedback, we ask that you keep in the mind the goal of the interviews, which is:

To assess how PEN has influenced dietetic practice, specifically if knowledge translation has taken place as a result of PEN use

Task 1

- To reflect upon the outcomes on the attached master list and to choose a maximum of 10 outcomes that you believe directly relate to the interview goal.

Task 2

- To select the best indicator for each outcome you have chosen. Please note that three questions were submitted in the last round without corresponding indicators (one each for outcomes 5, 9 and 12). These questions have been assigned an indicator number and if panelists choose one of these questions as part of Task 3 below, they should fill in an appropriate indicator in the space provided.

Example: If outcome 1 is one of the 10 choices, the panelist should then decide which one of the five indicators listed would best capture the desired information (such as indicator b – frequency and variety of ways PEN is used).

Task 3

- To identify one main question from those listed in the set that could be used to gather information about the chosen indicator. Panel members may modify the existing question if they feel it is necessary to obtain useful data.

Example: If indicator b is chosen for outcome 1, the panelist should then decide which of the questions listed should be the main question to measure this indicator (such as question i for indicator b – How often do you use PEN?) Participants should then make any desired modifications to the existing question.

Task 4

- Please email your feedback to hembell@ns.sympatico.ca by August 6, 2007.

Please record your feedback on the Delphi Panel – Round 2 Feedback Form, which follows.

**Evaluation of Practice-based Evidence in Nutrition (PEN)
Delphi Round 2 Feedback Form**

1. a) Outcome
- b) Indicator
- c) Question

Modifications to existing question (if applicable):

2. a) Outcome
- b) Indicator
- c) Question

Modifications to existing question (if applicable):

3. a) Outcome
- b) Indicator
- c) Question

Modifications to existing question (if applicable):

4. a) Outcome
- b) Indicator
- c) Question

Modifications to existing question (if applicable):

5. a) Outcome
- b) Indicator
- c) Question

Modifications to existing question (if applicable):

6. a) Outcome

b) Indicator

c) Question

Modifications to existing question (if applicable):

7. a) Outcome

b) Indicator

c) Question

Modifications to existing question (if applicable):

8. a) Outcome

b) Indicator

c) Question

Modifications to existing question (if applicable):

9. a) Outcome

b) Indicator

c) Question

Modifications to existing question (if applicable):

10. a) Outcome

b) Indicator

c) Question

Modifications to existing question (if applicable):

Thank you for sharing your time and insights.

Appendix R



Delphi Round 3 Questionnaire

The feedback from Round 2 has been interpreted and synthesized and we have developed our final interview guide (copy attached). You will note that the outcome/indicator/question sets have been categorized, and that there is a separate category for grounding/context questions. We have also indicated the level of support for individual outcomes: consensus (chosen by at least 6 of the 7 panel members), moderate support (chosen by 3-5 panel members) and low support (chosen by fewer than 3 panel members). All outcomes with low support were dropped from the final interview guide, with the exception of the two outcomes related to the use of PEN by those outside the dietetic profession. Although we might not get a positive response when baseline data are collected this year, we felt it was important to include these questions to allow us to see if there is a change in response when the interviews are repeated next year.

Tasks for Round 3:

Task 1

- To give any final comments related to the questions and to suggest any revisions you think are necessary to ensure the questions will capture information related to the outcome(s) they are associated with. Please make your comments/changes on the attached interview guide using the "track changes" option in Microsoft Word.

Task 2

- Please email your feedback to hembell@ns.sympatico.ca **by October 12, 2007**.

**Practice-based Evidence in Nutrition (PEN) Evaluation
Interview Guide**

CATEGORY I: GROUNDING/CONTEXT QUESTIONS

1. What is the expectation on you to keep current in your practice? Whose expectation is that – yours, your employer’s, your client’s? How is keeping current supported in your work place?
2. What is your understanding of evidence-based practice (evidence to **inform** decision making)? How would an evidence-informed dietitian practice in comparison to one that is not?

CATEGORY II: OUTCOMES RELATED TO THE USE OF PEN BY DIETETIC PROFESSIONALS

Outcome	Indicator	Interview Question
1. Individual practitioners base aspects of their practice on the evidence from PEN - CONSENSUS	b) Research utilization	i) When was the last time you used PEN to find some high quality evidence for your practice? Tell me about the situation. Did the information influence your practice decision? How? ii) What do you think are the key benefits of PEN (personally, organizationally) over other data bases or information sources?
2. PEN is a source of valid, important and applicable evidence-based dietetic information - CONSENSUS	a) Frequency and variety of ways PEN is used	i) On average, how often do you use PEN? Can you describe the ways you use PEN? (Probe: for dietetic education, for professional development, to answer your own practice questions, to answer questions from clients, to develop policy). For each way that PEN is used probe for specific examples.
3. PEN is a standard for dietetic education - MODERATE SUPPORT	a) PEN is used to educate students	
4. PEN is a standard for professional development - MODERATE SUPPORT	a) PEN is used as a tool for professional development	
5. PEN is used in the development of dietetic-related health policies - MODERATE SUPPORT	a) Examples of policies informed by evidence in PEN	
6. PEN has resulted in specific health outcomes for individual clients - MODERATE SUPPORT	a) Practitioners report on observed changes in clients’ health.	

CATEGORY III: OUTCOMES RELATED TO THE USE OF PEN BY THOSE OUTSIDE THE DIETETIC PROFESSION

Outcome	Indicator	Interview Question
7. PEN is a significant tool for inter-professional education and training - LOW SUPPORT	a) Extent of use of PEN in inter-professional education and training	i) Are you aware of whether PEN has influenced the practice of professionals outside the dietetic profession? Please give examples. (Probe: inter-professional training, sharing practice guidance from PEN with a colleague).
8. PEN has an impact on the practice of other disciplines - LOW SUPPORT	a) Extent of use of PEN practice guidelines and resources by other professionals	

CATEGORY IV: OUTCOMES RELATED TO THE PERCEPTION OF THE QUALITY/USEFULNESS OF PEN

Outcome	Indicator	Interview Question
9. PEN supports dietitians to be evidence-based practitioners - MODERATE SUPPORT	a) Use and consistency of practice guidelines and resources across the country and perception that PEN is having an influence on this.	i) Do you consider PEN to be a tool that positions dietitians as leaders and experts in the health care field? Why or why not? Can you give some examples? (Probe: PEN's influence on practice guidelines, PEN becoming the standard tool for guidance in nutritional care for dietitians and others).
10. PEN is contributing to a heightened profile of the profession as a leader and expert in the health field - MODERATE SUPPORT	a) Perception of profession as a leader and expert in the health field and perception that PEN is having an influence on this.	

CATEGORY V: BARRIERS AND FACILITATORS TO PEN USE

Outcome	Indicator	Interview Question
11. Barriers and facilitators to PEN adoption are identified - MODERATE SUPPORT	a) Barriers and facilitators to PEN use within work environment	i) Can you describe the barriers and facilitators to PEN use in your environment? (Probe: barriers and facilitators to sustained long term use).
12. Barriers and facilitators to sustained PEN use are identified - MODERATE SUPPORT	a) Barriers and facilitators to sustained use of PEN	

Appendix S

PEN Evaluation Interview Guide

This interview is one part of a two-part process for evaluating Dietitians of Canada's Practice-based Evidence in Nutrition [PEN] service. Interviews with key informants will provide an in-depth qualitative picture of PEN and our online survey of a larger sample of PEN subscribers and non-subscribers will collect more quantitative feedback.

The interview will take approximately 1 hour. With your permission, I will be tape recording your responses. The purpose of the tape recording is to help ensure that I've captured your comments accurately. Once I have completed the interview, I will be synthesizing feedback according to themes. None of your comments will be attributed to you, nor will you be identified on any publication of this evaluation.

I'd like to begin the interview by asking you some demographic questions so that we can characterize the group involved in the interviews.

CATEGORY I: DEMOGRAPHIC QUESTIONS

DC region where the participant is located ****The interviewer fills out this information – the question is not asked to the participant****

- BC Region
- Alberta/Territories Region
- Saskatchewan/Manitoba/NW Ontario Region
- Central/Southern Ontario Region
- Quebec/North Eastern/Eastern Ontario Region
- Atlantic Region

1. Which category best describes your work status?

- Full time
- Part time
- Occasional
- On leave
- Unemployed

- Retired
- Student

2. Which category best describes your work setting?

- Clinical
- Community (i.e. schools, fitness centres, grocery stores)
- Administrative
- Public Health
- Food Service/Hospitality
- Private Practice
- Research/Academic
- Internship Practicum
- Not working in dietetics
- Not applicable
- Other: _____

3. How many years have you been in practice?

- Fewer than 2 years
- 2-5 years
- Between 5-10 years
- More than 10 years

4. What is the highest level of education you have attained?

- Some university
- Bachelor's degree
- Working on master's degree
- Master's degree
- Working on doctoral degree
- Doctoral degree
- Other: _____

5. Which age range applies to you?

- Under 25 years
- 25-34 years
- 35-44 years
- 45-54 years
- 55-64 years
- 65 years and over

6. How would you rate your computer skills?

- Beginner
- Intermediate
- Advanced

CATEGORY II: GROUNDING/CONTEXT QUESTIONS

1. Please tell me what you know about PEN and its purpose. What is your understanding of how PEN content is developed?
2. What is the expectation on you to keep current in your practice? Whose expectation is that – yours, your employer’s, your client’s? How is keeping current supported in your work place? (Probe if necessary: new research evidence discussed at work, access to research evidence and resources, dedicated time for research)
3. What is your understanding of evidence-based practice? How would a dietitian’s practice differ if it is informed by evidence than if it is not? (Probe if missing key points from the working definition of evidence-based practice – i.e. the use of the best research evidence, in combination with clinical expertise and client values, to guide practice decisions).

CATEGORY III: OUTCOMES RELATED TO THE USE OF PEN BY DIETETIC PROFESSIONALS

Outcome	Indicator	Interview Question
1. Individual practitioners base aspects of their practice on the evidence from PEN - CONSENSUS	b) Research utilization	i) Think about the last time you used PEN. Please describe the situation. Did the information that you found influence your practice decision? How? Does this experience reflect your usual experience with PEN? ii) What do you think are the key benefits of PEN (personally, organizationally) over other data bases or information sources? (Probe if necessary: credibility of PEN).
2. PEN is a source of valid, important and applicable evidence-based dietetic information - CONSENSUS	a) Frequency and variety of ways PEN is used	i) On average, how often do you use PEN? Can you describe the ways you use PEN? (Probe: for dietetic education, for professional development, to answer your own practice questions, to answer questions from clients, to develop policy). For each way that PEN is used probe for specific examples.
3. PEN is a standard for dietetic education - MODERATE SUPPORT	a) PEN is used to educate students	
4. PEN is a standard for professional development - MODERATE SUPPORT	a) PEN is used as a tool for professional development	
5. PEN is used in the development of dietetic-related health policies - MODERATE SUPPORT	a) Examples of policies informed by evidence in PEN	
6. PEN has resulted in specific health outcomes for individual clients - MODERATE SUPPORT	a) Practitioners report on observed changes in clients' health.	

CATEGORY IV: OUTCOMES RELATED TO THE USE OF PEN BY THOSE OUTSIDE THE DIETETIC PROFESSION

Outcome	Indicator	Interview Question
7. PEN is a significant tool for inter-professional education and training - LOW SUPPORT	a) Extent of use of PEN in inter-professional education and training	i) Are you aware of whether PEN has influenced the practice of professionals outside the dietetic profession? Please give examples. (Probe: inter-professional training, sharing practice guidance from PEN with a colleague).
8. PEN has an impact on the practice of other disciplines - LOW SUPPORT	a) Extent of use of PEN practice guidelines and resources by other professionals	

CATEGORY V: OUTCOMES RELATED TO THE PERCEPTION OF THE QUALITY/USEFULNESS OF PEN

Outcome	Indicator	Interview Question
9. PEN supports dietitians to be evidence-based practitioners - MODERATE SUPPORT	a) Use and consistency of practice guidelines and resources across the country and perception that PEN is having an influence on this.	i) Do you consider PEN to be a tool that positions dietitians as leaders and experts in the health care field? Why or why not? (Probe if have a positive impression of PEN: PEN's influence on practice guidelines, PEN becoming the standard tool for guidance in nutritional care for dietitians and others). Can you give some examples?
10. PEN is contributing to a heightened profile of the profession as a leader and expert in the health field - MODERATE SUPPORT	a) Perception of profession as a leader and expert in the health field and perception that PEN is having an influence on this.	

CATEGORY VI: BARRIERS AND FACILITATORS TO PEN USE

Outcome	Indicator	Interview Question
11. Barriers and facilitators to PEN adoption are identified - MODERATE SUPPORT	a) Barriers and facilitators to PEN use within work environment	i) Can you describe any barriers and facilitators to PEN use in your environment?
12. Barriers and facilitators to sustained PEN use are identified - MODERATE SUPPORT	a) Barriers and facilitators to sustained use of PEN	ii) What would assist or hinder your sustained use of PEN in the long term?

CATEGORY VII: CONCLUDING QUESTION

Is there anything else related to PEN that I haven't touched on that you'd like to tell me?