A MODEL FOR CALCULATING RETURN ON EDUCATIONAL VALUE IN THE PHARMACEUTICAL INDUSTRY

JENNIFER-ANNE MOMY

A Thesis

in

The Department

of

Education

Presented in Partial Fulfillment of the Requirements

for the Degree of Master of Arts (Educational Technology) at

Concordia University

Montreal, Quebec, Canada

November 2009

Your file Votre référence
ISBN: 978-0-494-67121-4
Our file Notre référence
ISBN: 978-0-494-67121-4

ABSTRACT

A Model for Calculating Return on Educational Value in the Pharmaceutical Industry

Jennifer-Anne Momy

There is a need to further understand the value of continuing health education (CHE) and its effectiveness. Physicians report spending, on average 50 hours per year in CHE activities geared toward improving their performance and/or optimizing the outcomes of their patients (Davis, O'Brien, Freemantle, Wolf, Mazmanian, & Taylor-Vaisey, 1999). Despite this investment, studies have demonstrated a lack of effect on physicians' performance of current practice guidelines or gaps between real and ideal performance.

The findings of this study demonstrate that changes beyond knowledge transfer can occur as a result of didactic peer led group education despite barriers to application. The results of this research also illustrate the need to further investigate six key areas relating to measuring the return of CHE interventions within the pharmaceutical industry: 1) the evaluation of multiple CHE activities/interventions implemented as a concerted effort over time 2) the importance of clear identification of the types of practice changes and patient outcomes that are being targeted by CHE programs 3) the implementation of validated behavior and/or practice change instruments within CHE program assessment 4) a better understanding of the role that barriers to change play in the effectiveness of CHE programs 5) a better understanding of inter-disciplinary/inter-professional education and the specific needs associated with this type of educational

intervention with regards to program design and implementation 6) the continuous refinement of models for calculating gains or losses from educational programs in an aim to consistently demonstrate the value of CHE within provider organizations.

ACKOWLEDGEMENTS

I would like to acknowledge the following people who have all helped me and or inspired me to complete this research in different ways (and in no particular order): Richard Schmid, Dennis Dicks, Christine Westover, Kristian Stubbs, Alfred Johnson, Bette Johnson, Nydia Olivera, Peter Momy, Natasha Momy, Vanina Bello, Daniel San Juan, Julio Bello, Marcello Bello, Carla y Negro, Marie y Atanassildo, Stephen Charles Graper, Alan Kaplan, Meyer Balter, Charles Chan, Alain Robillard, Serge Gauthier, Michel Rouleau, Marc Decramer, William Dalziel, Isabelle Mongeau, Guy Lallemand, Yves Blais, Stéphanie Boucher and last but certainly not least Anne Brown.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

This research thesis includes a review and critical synthesis of literature relevant to return-on-investment (ROI) and continuing health education (CHE). Through an empirical investigation into calculating return on educational value in the pharmaceutical industry, this research contributes to the overall knowledge of return-on-education modeling in a new and under-studied market. In addition, this research presents insight into the potential of a new model for assessing value of investment into educational initiatives worthy of consideration by academics, the medical profession, industry professionals, and other key stakeholders.

Education, in its broad sense, refers to any act or experience that has a formative effect on the mind, character, or physical ability of an individual...in its technical sense education is the process by which society, through schools, colleges, universities, and other institutions, deliberately transmits its cultural heritage--its accumulated knowledge, values, and skills--from one generation to another (Kneller, 1971).

Physicians in Canada must undergo extensive formal education in order to become licensed to practice medicine. In medicine there is a need for continuing the process of education in order to maintain a high standard of patient care. Researchers in the area of CHE have focused on the determining the effectiveness of CHE methods and processes. Controversy has emerged as the source and funding of CHE activities, particularly those originating from the pharmaceutical industry, being offered to physicians has come into question.

There were 63,682 physicians in Canada in 2007 (CIHI, 2008). In order to practice medicine in Canada, a physician trained in Canada or in another country requires an acceptable undergraduate Medical Doctor (MD) degree. All Canadian medical graduates must complete an accredited postgraduate training program in order to be eligible to take the certification exams. Each province/territory is responsible for the regulation of the practice of medicine in their respective jurisdiction. Canadian certification in Family Medicine is provided through the College of Family Physicians of Canada. Certification in other specialties is provided by the Royal College of Physicians and Surgeons of Canada. Upon completion of residency training, Family Physicians must pass the College of Family Physicians of Canada Certification Exam and other Specialists must pass the Royal College of Physicians and Surgeons of Canada Certification Exam specific to their specialty. In Québec, attestation in Family medicine or certification in another specialty is provided through the Collège des médecins du Québec (IMG-Canada, 2008).

The College of Family Physicians of Canada (CFPC) is a national voluntary organization of family physicians that makes continuing medical education of its members mandatory. The College strives to improve the health of Canadians by promoting high standards of medical education and care in family practice, by contributing to public understanding of healthful living, by supporting ready access to family physician services, and by encouraging research and disseminating knowledge about family medicine (CFPC, 2008). There are approximately 20,400 members of the CFPC and members qualify for designations which signify to patients and peers that

high standards for training have been met and the member is committed to lifelong learning.

Canadian physicians rely on translation of knowledge acquired through education to effectively care for patients. Maintenance and continuously updating this knowledge is done through a formal system of continuing health education (CHE). Continuing medical education (CME) is defined as "educational activities that serve to maintain, develop, or increase the knowledge, skills, performance, and relationships a physician uses to provide services for patients, the public, or the profession" (Marinopoulos, Dorman, Ratanawongsa, Wilson, Ashar , Magaziner, Miller, Thomas, Prokopowicz, Qayyum & Bass, 2007, p.1). Sources of CHE include self-learning, professional associations, universities, and provincial healthcare bodies. Over recent decades, medical schools and teaching hospitals have become increasingly dependent on industry support of their core educational missions (AAMC, 2008). Pharmaceutical companies now support a significant amount of continuing medical education, medical conferences and meetings of professional associations (Relman, 2001).

There is a need to further understand the value of CHE and the effects of sponsorship on its effectiveness. Physicians report spending, on average (and among other activities), 50 hours per year in CME activities, ostensibly geared toward improving their performance and/or optimizing the outcomes of their patients (Davis et al., 1999). Furthermore, a great deal of time and effort is dedicated to develop, accredit, and implement CHE activities. Despite this investment, studies have demonstrated a lack of effect on physicians' performance of current practice guidelines or sizable gaps between real and ideal performance (Davis et al., 1999).

This research thesis builds on the existing body of knowledge on the effectiveness of CHE and further extending them to the Canadian context. Findings complement existing literature on return-on-investment models and it provides a good starting point for future research designed to measure the effectiveness of CHE activities. This research proposes a Return on Educational Value Model for CHE offerings that was piloted within a Canadian subsidiary of an International pharmaceutical company and provides reliable and valid information about the impact of a CHE program using the Dixon multilevel evaluation model. Finally, factors that contribute to a successful CHE activity are identified.

This report consists of 5 chapters. Included in this study are a detailed literature review, research hypotheses, methodology, analyses & results, and a discussion including implications and recommendations for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Return-on-Investment in Education

The outcomes associated with education have been researched extensively. Societal benefits of higher education have been studied by governments who have a vested interest in ensuring that the investment in educational programs is associated with positive outcomes in productivity. For example, recent research shows that the returns to investment in skills upgrading of less educated workers (in Canada) are three times as great as for investment in physical capital (CPRN, 2006).

The measurement of return-on-investment (ROI) is a financial exercise. Two common formulas include the Benefit/Cost Ratio (BCR) and ROI (Philips, 2003):

$$\text{BCR} = \frac{\text{Program Benefits}}{\text{Program Costs}}$$

$$\text{ROI (\%)} = \frac{\text{Net Program Benefits}}{\text{Program Costs}} \times 100$$

The BCR utilizes the total benefits and costs. In the ROI formula, the costs are subtracted from the total benefits to produce net benefits which are then divided by the costs.

While the exercise of measuring the ROI of a given activity is a relatively straightforward exercise, it remains challenging to identify valid and reliable evaluation metrics associated with the 'benefits' and 'costs' used in the model. Moreover, the requirement that metrics be quantifiable in the BCR model can limit the scope of measurement.

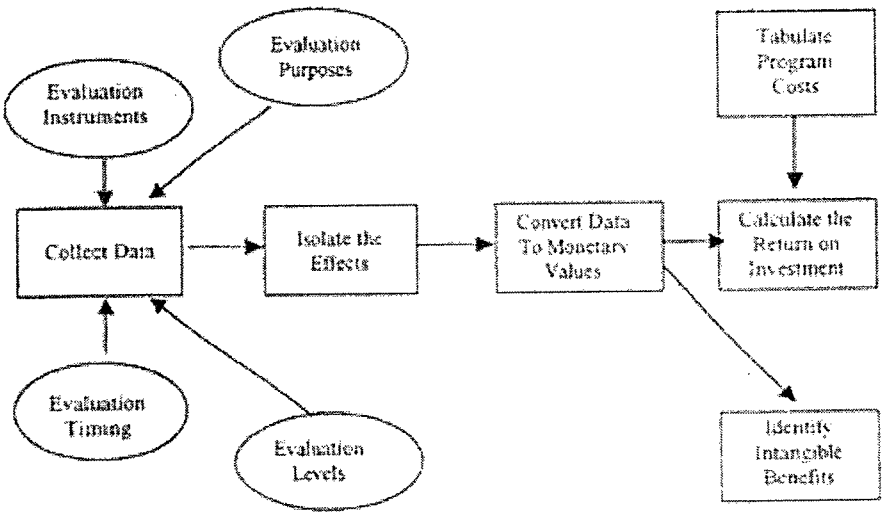


Figure 2.1: ROI Model. From Phillips, J.J. (2003). Return on Investment in Training and Performance Improvement Programs (2nd ed.) p.42. New York, NY. Butterworth-Heinemann.

Philips (2003) suggests that the calculation of return on investment of an educational activity may be simplified with the basic model illustrated above. The model implies that the process should follow a sequence based in the collection of meaningful data and the conversion of such data in to monetary values.

2.2 Effectiveness of Continuing Health Education

Thus far, very little has been done to "comprehensively and systematically synthesize evidence regarding the effectiveness of CHE and the comparative effectiveness of differing instructional designs for CHE in terms of impact on knowledge, attitudes, skills, practice behavior, and clinical practice outcomes" (Marinopoulos et al., 2007, p 1). This form of continuing education is highly variable, ranging from passive, didactic, large-group presentations to highly interactive learning methods, such as workshops, small groups, and individualized training sessions.

Examples of such educational activities include rounds, educational meetings, conferences, refresher courses, programs, seminars, lectures, workshops, and symposia (Davis et al., 1999).

The dissemination of educational materials alone (e.g. newsletters, clinical guidelines, and audiovisual materials) is used commonly as a behavior change strategy, although this approach has been shown repeatedly to be ineffective as a stand-alone intervention (Pearson, Ross-Degnan, Payson, & Soumerai, 2003; Soumerai, McLaughlin & Avorn, 1989). One-to-one educational outreach has been shown to be an effective technique to change physician behavior, and one-to-one education sessions delivered by peer leaders have been demonstrated to increase guideline adherence (Simon, 2000). Group education relies on either didactic or problem based approaches to influence behavior (Soumerai et al., 1989). Research suggests that peer led education in small practice-based groups was effective in transferring knowledge but was not effective in modifying behaviour (Lu, Ross-Degnan, Soumerai, & Pearson, 2008). As Davis et al. assert, "numerous questions remain regarding the effectiveness of formal CHE, including group size, the role of the learning and practice environment, the clinical dimensions of care, the assessment of learner needs, and barriers to change..." (Davis et al. 1999 p.873).

2.3 Evaluation Models in Continuing Health Education

Evaluation in continuing health education (CHE) is a traditional part of planning but is often not approached with the same level of sophistication as other parts of the teaching/learning transaction (Bennett, Easterling, Friedmann, Green, Koeppen, Mazmanian, & Waxman, 1997). Those in CHE have tended to use formative evaluation

to look at a program during its presentation for midcourse corrections and summative evaluation to assess the course on its completion. While using objectives or goals as the organizing principle for a model of evaluation is a simple concept that practitioners find helpful, other authors recommend moving beyond objectives to a variety of other organizing principles (Bennett et al., 1997).

2.3.1 Evaluation Models

A variety of evaluation models have been designed and developed in the aim to clearly measure the impact and outcomes of educational interventions. Stake (1950) and Tyler (1975) both emphasized the importance of objectives as the basic premise for evaluation. The strength of an objectives evaluation design is the explicit link between what teachers intend to provide and what learners gain (Bennett et al., 1997). Scriven (1973) proposed using formative evaluation within the planning group to provide feedback on the curriculum development and summative evaluation outside of the planning group in order to evaluate the product. Stufflebeam (1973) rejected the use of objectives and focused on decision making as the central theme in evaluation. The CIPP (context, input, process, and product) model defines and applies descriptive and judgmental information about the worth of a project as described by its goals, structure, process and product (Stufflebeam, 1973). However, these models do not help to demonstrate actual changes in behavior or practices as a result of an intervention.

2.3.2 Quantitative vs. Qualitative Evaluation Designs

Quantitative evaluation produces demonstrable, confirmable, and reproducible results. However, those in CHE have not always found quantitative evaluation to provide results that have been helpful in answering some of the most important

questions in the field about how and when physicians change behavior. The classic research design in medicine is the randomized control trial (RCT). Noted for its rigor and robust results given tightly controlled parameters, RCTs have been held up as the hallmark as strong science (Bennett et al., 1997). The fundamental challenge with this model is its appropriateness for evaluating areas that cannot be controlled. In fields such as the social sciences, qualitative designs have a rich and long history (Bennett et al., 1997).

Qualitative evaluation addresses the importance of beliefs, reflection and differences among individuals and groups (Davis et al., 2003). The dilemma is how to create a design that is rigorous, relevant and practical; provide useful information to learners, teachers and planners; and has value to the CHE community and others outside the field (Guba and Lincoln, 1981). For this reason, Greene (1994) proposed a mixed evaluation design drawing on both quantitative and qualitative evaluations.

2.3.3 Evaluation Schemas

Other authors have proposed using evaluation schemas or levels of learning. Kirkpatrick (1998) proposed four levels of learning designed primarily for on the job training: reaction, learning, behavior and results. Phillips built on the Kirkpatrick model by proposing five levels: reaction and planned action, learning, job applications, business results and return on investment. Dixon's levels of evaluation, satisfaction (perception), learning (knowledge and attitudes), performance (professional behaviors in actual clinical practice) and patient status (impact on patient status), were derived from other fields but adapted specifically for the health care field (Davis et al., 2003). Dixon's levels have been particularly helpful in moving beyond participants perceptions of a

course. Mazmanian et al. suggested a model much like Dixon's except that each stage was cumulative and progressive (Davis et al., 2003). Fox proposed a discrepancy analysis model for evaluation specific to CHE activities (Davis et al., 2003). The Fox model is characterized by three stages: 1) establish standards for acceptable patient health status 2) define physician performance and competence and 3) define and measure the discrepancy (Davis et al., 2003). Schema evaluation designs push the developer and CHE provider to think about different levels of evaluation and the need to use different instruments to measure each of these effectively.

2.4 The Canadian Continuing Health Education System

Physicians are ethically bound to maintain competence in their field as part of their professional accountability to the public (Levinson, 2008). The Canadian Medical Association's Code of Ethics says it is the responsibility of physicians "to engage in lifelong learning to maintain and improve their professional knowledge, skills and attitudes." (CMA, 2009, http://policybase.cma.ca/PolicyPDF/PD04-06.pdf.).

Continuing health education (CHE) or continuing medical education (CME) consists of educational activities which serve to maintain, develop, or increase the knowledge, skills, and professional performance and relationships that a physician uses to provide services for patients, the public, or the profession (Davis et al., 2003). It represents the final and often most poorly understood stage of physician education (Amin, 2000). This is because although CHE activities typically provide physicians with a certain number of credits towards maintaining their practice license and ensuring that this group of health care professionals keep up to date on new developments within their

profession (Tian, Atkinson, Portnoy & Gold, 2007), it is practiced in an independent and self-directed fashion with little direction and regulation by governing bodies.

This educational context requires physicians to be able to self-assess their abilities and choose learning activities that address gaps in performance. However, several recent studies have questioned whether physicians can accurately assess their own abilities (Davis, Mazmanian, Thorpe & Perrier, 2006; Silver, Campbell, Marlow, Sargeant, 2008). In fact, a recent review by Davis et al. demonstrated that physicians are not very accurate when assessing their abilities, specifically when compared to objective external measures and benchmarks (2006). Employing feedback mechanisms and or self-audits to enable physicians to identify learning gaps, provide cues to increase educational awareness and further knowledge and skills can help to improve physician's performance and enhance patient outcomes (Davis et al., 2006; Silver et al., 2008).

The field of CHE has struggled with evaluating the effectiveness of its programs events and activities. The primary issue is that although physicians report investing a significant amount of time completing CHE programs every year, studies show a considerable difference between real and ideal performance (Davis & Taylor-Vaisey, 1997). This suggests a lack of effectiveness of formal CHE. Some have argued that traditional continuing health education has been disconnected from the actual practice of medicine and has not focused on providing the most useful information in the most effective way (Ebell & Shaughnessy, 2003). While others have found some evidence that highly interactive sessions that provide the opportunity to practice and reinforce skills can result in a change in practice and on occasion health care outcomes (Davis et

al., 1999). More recently, Davis argued that changing health care outcomes requires multiple educational interventions including formal CHE activity followed up by small-group interventions as well as a concerted effort in providing effective patient education (Davis et al., 2006).

Demonstrating outcomes of CHE efforts and resources has become more and more important for CHE providers due to increased concerns about both the quality and cost of healthcare (Davis et al., 2003). In the field of CHE an outcome can be understood as the result or consequence of an educational activity or program. However, the nature of the terms "outcome," or "result," in the complexity of health care and the health education environment presents a great challenge (Gilman, Cullen & Leist, 2002). For CHE providers, accrediting organizations, as well as licensing bodies the main challenge is defining the nature of the outcomes for which they are responsible (Gilman et al., 2002). There does not seem to be clear and consistent expectations from these groups on the impact of continuing health education programs and events.

In an effort to facilitate the assessment of physician learning and practice change Dixon proposed a multilevel evaluation model specifically designed for CHE activities. Dixon described four levels of evaluation of CHE for health professionals: "satisfaction, learning, performance, and patient health status" (Davis et al., 2003, p.250). This model was adapted from Kirkpatrick's four levels evaluation model that is used in business and industry. The levels constitute an approach to assessing the effectiveness of an educational activity or program in meeting its goals for each specific level (Davis et al., 2003).

Those in the human resource and training field have also suggested that a return on investment (ROI) component to account for costs be incorporated into Dixon's multilevel evaluation model for each stage (Phillips, 2003). The challenge with this approach is that integrating an ROI benefit-cost analysis at each level assumes that every educational activity will progress through all stages. The reality is that not all CHE activities will pass through all levels (Davis et al., 2003). Therefore the Kirkpatrick-Phillips model has been challenged within the CHE field. To effectively demonstrate the outcomes of CHE efforts Davis et. al. (2003) argues that CHE evaluation should focus on identifying, measuring, and describing the value provided by a program or activity. The value of a program or activity can be similar to the four levels such as satisfaction, learning, performance, patient health, or it can account for additional benefits such as better image, increased referrals, etc. Therefore the most important first step for all CHE providers in demonstrating outcomes is first defining "value". Adopting a model which identifies the major domains of valued outcomes for CHE interventions seems useful and practical for some CHE providers (Gilman et al., 2002). This helps to either assess a single activity's outcomes or to assess a CHE provider's overall outcomes (Gilman et al., 2002). Additionally, this approach can link together the provider's organizational objectives, the assessment of the overall program as well as the specific activity assessment (Gilman et al., 2002).

2.5 The Canadian Pharmaceutical Industry

The Canadian pharmaceutical industry measured through Canadian retail and hospital purchases grew at a +6.3% (or $1.12 billion) in 2007, totaling $18.98 billion in purchases (IMS, 2007) see figure 2.2.

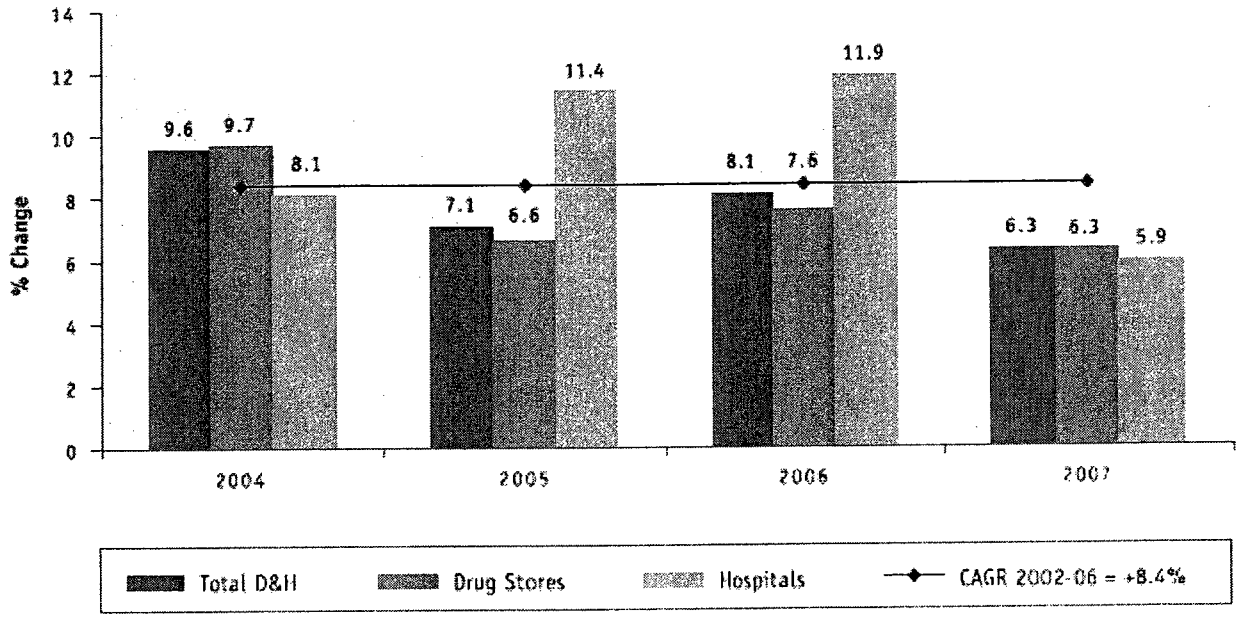


Figure 2.2: Total Canadian Pharmaceutical Industry Purchases in 2007. From IMS Health.Canadian Drug Stores and Hospital Purchases. IMS Health Canada. December 2007.

Canada's research-based pharmaceutical companies (Rx&D) is the national association representing 50 research-based pharmaceutical companies in Canada. Member companies share a single primary objective: to discover new medicines that improve the quality of health care available for every Canadian (Rx&D, 2009)

In addition to working towards discovering and developing innovative medicines, Canadian pharmaceutical companies engage in promotional activities designed to stimulate demand for marketed products. Drug promotion can be defined as all informational and persuasive activities by manufacturers and distributors, the effect of which is to induce the prescription, supply, purchase and/or use of medicinal drugs (World Health Organization, 1998).

The most common forms of pharmaceutical promotion are representative detailing, journal advertising, and sampling. In 2007 the IMS Health Canada Canadian

Promotion Audit (CPA) measured the promotional efforts of pharmaceutical manufacturers by reporting on sales calls made by company representatives to a sample of Canadian physicians and by tracking journal advertising placements and expenditures. Results of this audit demonstrated that there was approximately CDN $63,756,000 invested in journal advertising to promote prescription medications to Canadian physicians, and 3,218,000 individual details of prescription medications to individual Canadian physicians. An estimated 23,036,000 samples were distributed to physicians in Canada (IMS, 2007).

Information on the product detailing efforts of pharmaceutical representatives is collected each month from 642 office-based physicians, stratified by region and specialty, who record representative calls on a secure website or via hardcopy diaries (IMS, 2007). The information is coded and processed and then projected to provide a national estimate. To collect advertising spending information IMS conducts a monthly audit of ads placed in over 88 journals. The journals represent virtually all medical publications in Canada, including general, specialty, pharmacy, nursing hospital and dental journals. Canadian Advertising Rates Data serve as the basis for estimating ad placement expenditures.

2.6 The Canadian Pharmaceutical Industry Involvement in Continuing Health Education

In addition to Pharmaceutical company's efforts to discover new medicines and promote them to physicians, there is a considerable investment in continuing health education initiatives.

The pharmaceutical industry has long been a major sponsor of educational programs for doctors and health care professionals alike. A recent Canadian Medical Association

Journal (CMAJ) editorial which received significant media attention noted that in 2006 US$2.6 billion were spent on continuing medical education for doctors in the United States, of which US$1.45 billion came from drug or device makers (Hebert, 2008). The editorial stated corresponding figures for Canada are not available, but revealed there was "no evidence that the situation is any different here" (Hebert, 2008, p178). This particular editorial written by the CMAJ's editor-in-chief served to draw public attention and raised questions about a topic long debated within the medical profession and the pharmaceutical industry on the exact nature and impact of continuing health education (CHE) and in particular those sponsored by pharmaceutical companies.

2.7 Key Parties Affected by the Effectiveness of Pharmaceutical Sponsored Continuing Health Education

There are several parties affected by the effectiveness of pharmaceutical industry sponsored continuing health education. While it is logical to assume that all stakeholders are concerned with the successful transfer or knowledge and the subsequent optimization of patient care, there are other factors being used in assessing the effectiveness of CHE investments. In particular, concerns have been raised by critics of the impact of pharmaceutical manufacturer sponsorship on the effectiveness of CHE activities, and manufacturers themselves must reconcile the importance of adhering to educational principles with the need to deliver shareholder value in the investments being made.

Industry sponsored CHE initiatives may prove beneficial in that it allocates significant funding to developing and maintaining professional competencies in

Canadian healthcare professionals. However, the rational for investment into CHE and the subsequent financial transactions involved in delivering of CHE may offset some of the proposed benefits by potentially introducing bias into the process and thus influencing participants (Davis et al., 1999).

It is useful to briefly address some of the parties potentially affected by the effectiveness of industry sponsored CHE to bring the importance of proper measurement of effectiveness into context.

2.7.1 CHE and the Canadian Government

The Canadian Government has a significant interest in ensuring that Canadian healthcare professionals are adequately trained and are able to deliver safe and effective healthcare to patients. The Canadian government does not currently regulate the continuing education of physicians and relies on professional associations such as the College of Family Physicians of Canada to oversee CHE content offered for educational credit.

2.7.2 CHE and Patients & Public

The Canadian public including, patients who present for healthcare have a vested interest in ensuring that the Canadian medical profession offers optimal care. Canadians are frequently exposed to media attention to the role of the pharmaceutical industry in the healthcare system, and the possibility that this involvement may influence the quality of patient care by favoring sponsor medicines and services.

2.7.3 CHE and Pharmaceutical Manufacturers

The pharmaceutical industry in Canada has been a major contributor to innovative, ethically conducted, continuing education programs and health education research. At the CACHE (Canadian Association of Continuing Health Education) meetings in 2002 and 2003, of 155 abstracts that passed a rigorous peer-review process and were accepted for presentation, 63 had authors or co-authors who worked for industry (Marlow, 2004).

There is evidence that the pharmaceutical industry can influence physician prescribing through marketing and educational efforts, (Bowman 1986, 1988a; Wazana, 2000; Wolfe, 1996). Furthermore, grants or other unrestricted forms of funds made available from pharmaceutical manufacturers may focus on programs that cover an area of commercial interest.

Pharmaceutical manufacturers have an interest in ensuring the effectiveness of their continuing health education initiatives to promote advances in medicine and to deliver shareholder value. Member companies to Canada's Rx&D are required to adhere to the Code of Marketing Practices of Rx&D which in discussing industry sponsorship of CHE, states that "member companies will: support, where possible, the principles and practices of CHE [continuing health education] programs established by practitioner bodies." (Rx&D, 2009 http://www.canadapharma.org/About_RxD/Overview/index_e.html)

Critics of pharmaceutical manufactures' role in CHE have suggested that "If drug companies' primary motivation for contributing to CME is to advance physicians' knowledge, then they should heartily embrace a system whereby they place their money into a blind trust from which independent parties organizing CME events would be able to draw" (Lexchin, 2007 p161.).

2.7.4 CHE and Public & Private Health Reimbursement Bodies

Public & Private Health Reimbursement Bodies are largely responsible for payment of medical services and treatments offered to Canadians. Payers must estimate the costs associated with delivering a desired level of care based on a variety of factors including population demographics, epidemiology, and cost & availability of resources including healthcare professionals and medicines. The role of education in managing the demand for limited healthcare resources is an important consideration for reimbursement bodies and consequently industry involvement in continuing health education is a potential concern, particularly where initiatives undertaken by industry are inconsistent with payer initiated programs

2.7.5 CHE and Physicians

The costs of CHE are significant. Typically, participating Physicians must not only pay for the course and the costs of attending, but must continue to pay office overhead and lose income during their absences. In Canada, unlike other professionals, physicians are not able to defer costs to patients in the form of higher fees. It has been speculated that if restrictions on financing CHE are introduced that tuition fees for

quality educational offerings will increase, adding to the burden on physicians (Marlow, 2004).

Industry support for CHE affects academic providers of CHE. A recent editorial in the Journal of Continuing Education in the Health Professions (Mazmanian, 2009, vol. 28(3), p.134) indicated that a recent estimate suggests 4,013 dollars was spent per physician in 2007 on CHE activities designated for American Medical Association Category 1 credit. Universities often receive substantial industry support for their CHE activities: in 2005, CHE activities originating in US schools of medicine received 60% of their total income from industry, up from 43% 5 years earlier (ACCME, 2007).

Full disclosure is the latest response to concern about financial conflicts of interest and the propriety of various associations between medicine and industry. Advantages of industry funding, such as the support of drug and device development and pivotal clinical trials, must be balanced against the disadvantages, such as the potential for influencing prescribing and use of medical devices and supplies, increasing the costs of care, fostering a mindset of entitlement among doctors, and undermining the independence and integrity of the profession (Steinbrook, 2008).

For example, when the Cleveland Clinic and some of its leading physicians were criticized for their financial associations with industry and the limited disclosure of these relationships to patients and the public specific actions were taken to rectify this situation. In response, the medical center strengthened its policies and oversight with regard to conflicts of interest and required that all industry relationships be submitted for approval. Since December 2008, it has also disclosed on its Web site

(www.clevelandclinic.org) some of the industry ties of its 2000 physicians and researchers and their immediate families (Abelson, 2008).

Other measures to limit the potential for bias in education resulting from industry sponsorship have been proposed including sensitizing individual doctors to minimize their exposure to potentially biased information by avoiding programs that are heavily subsidized by one company (Steinman, 2007).

2.8 The Need for a Model for Calculating Return on Educational Value in the Pharmaceutical Industry

The need for continuing health education coupled with the recent media attention, significant investment required and competing interests of stakeholder's warrants further investigation into a model to measure the value of these activities. The field of CHE represents the final and often most poorly understood stage of physician education (Amin, 2000). The educational context requires physicians to be able to self-assess their abilities and choose learning activities that address gaps in performance. While there exist a variety of continuing education methods the didactic method continues to be the most popular means of delivering industry sponsored CHE. The reasons for the persistence of didactic CME include the ease of designing and providing such activities, the substantial pharmaceutical sponsorship that promotes the transfer of information about new medications, and the dependence on traditional undergraduate models of education that are easy-to-mount and revenue generating (Davis et al., 1999).

CHAPTER 3

MATERIALS AND METHODS

3.1 Objectives

The objective of this study is to develop and assess a model that will help determine the Return on Educational Value for CHE within the pharmaceutical industry context.

This work is addressed to CHE providers and generally to people who are introducing outcome measures into CHE programs and/or activities. For this reason, the aim of this study is to a) develop and pilot a Return on Educational Value Model for CHE offerings within a Canadian subsidiary of an International pharmaceutical company, b) provide reliable and valid information about the impact of a specific CHE program using the Dixon multilevel evaluation model (satisfaction, learning, performance and patient health) and c) identify factors that contribute to a successful CHE activity.

3.2 Sample and site

This research focused on Health Care Professionals (Specialists, Family Physicians, Nurses, Pharmacists & Case workers) who attended a specific educational activity in the HIV therapeutic field. Some Health Care Professionals worked in a private clinic setting and others in a hospital setting, while some worked in both settings. Some subjects worked in a team setting while others worked in an independent private practice. Subjects had different levels of experience and expertise in their role.

Subjects worked in different geographic areas as well as types of locations (i.e. urban, rural).

The educational activities took place at various sites and cities throughout Canada. Some activities took place in the subjects' own professional setting (i.e. in a clinic or at hospital lunch time rounds) while others took place in a hotel conference room or a private room in a restaurant.

3.3 Access and permissions

Consent forms provided a brief description of the study and emphasized the confidentiality of participant responses. In addition, prior to completing the questionnaires, all participants were verbally assured full confidentiality. Questionnaires were identified by number codes rather than participant names (when names were provided). The researcher maintained a list of participants' names (when provided) and corresponding code numbers for the purpose of identifying participants for follow-up interviews. Participants were not remunerated for completing questionnaires or participating on the research project. All participants' identities remained anonymous throughout the research project (see appendix 1). In clinical settings, access to the various sites was obtained in advance of any program being implemented.

3.4 The Model

A model was developed which identified the major domains of valued outcomes for the subsidiary of an international pharmaceutical company in order to measure the impact of CHE programs on specific value targets. The value targets were defined based

on three core principles consistent with the organization's overall value proposition as well as the Dixon four levels of CHE for health professionals (including satisfaction, learning, performance and patient health status). These value targets were as follows: 1) Educational Value, 2) Sponsor Representative Interaction with Client, 3) and Perceived Program Value and Impact on Practice and Patient Health. The aim of adopting a model which identifies the major domains of valued outcomes for CHE interventions was to help focus efforts on assessing the CHE provider's overall outcomes (Gilman, 2002) and to link together the provider's organizational objectives, the assessment of the overall program as well as the specific activity assessment (Gilman, 2002). Additionally, it was intended to provide the organization with information on where CHE is contributing to their overall customer value proposition.

Each value target or evaluation component of the model was assessed using specifically designed pre and post-tests which are discussed in the Instruments and their reliability and validity section.

Additionally, a scorecard was developed and incorporated into the model in order to provide an overall program rating. The scorecard sections (Educational Value, Sponsor Representative Interaction with Client, and Perceived Program Value and Impact on Practice and Patient Health) were all evaluated using short user-friendly questionnaires and guided interview. Variables from the questionnaires and interview guide were weighted to according to the provider's corporate strategic priorities. The scorecard provides an aggregate score compiled to provide a percent score indicating the

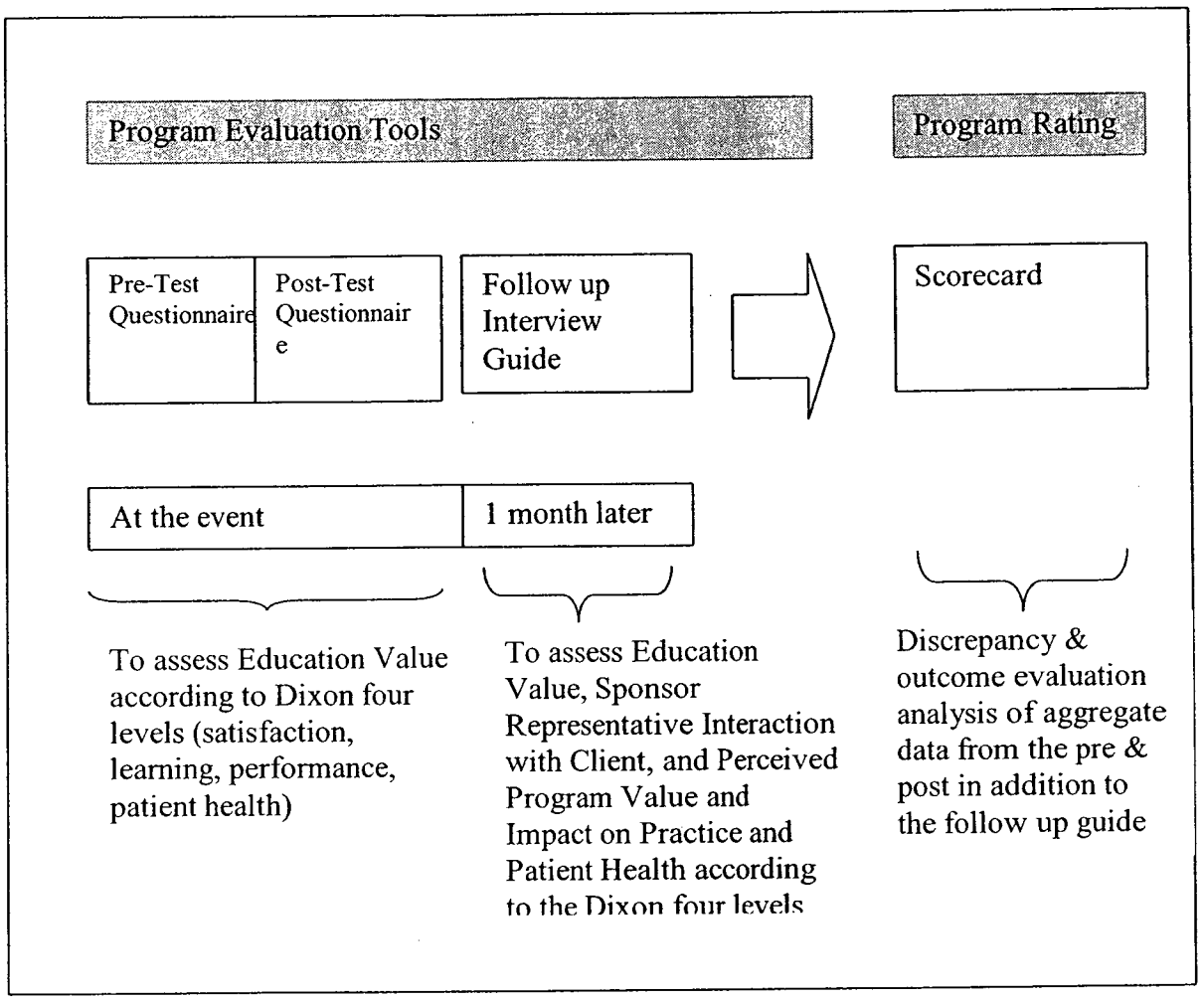
success of the program according to these priorities. The scorecard is simply a concise set of measures and metrics that relate to the overall performance.

The table below summarizes each area that was assessed:

Table 3.1: Evaluation Components and Means of Assessment

<table>
<tr><th>Evaluation Component</th><th>Means of Assessment</th><th>Person Responsible</th></tr>
<tr><td>1. Education Value</td><td>Pre- / Post-CHE Event Questionnaire</td><td>Self-evaluation by healthcare providers immediately following educational event</td></tr>
<tr><td>2. Sponsor representative Interaction with Client</td><td rowspan="2">Guided discussion with healthcare provider post-event
Follow-up Guide</td><td rowspan="2">Sponsor representative</td></tr>
<tr><td>3. Perceived Program Value and Impact on Practice and Patient Health</td></tr>
<tr><td>Return on Educational Value (ROEV) Scorecard</td><td colspan="2">Variables will be weighted according to CHE corporate strategic priorities. An aggregate score will be compiled to provide a percent score indicating the success of the program based on these priorities.</td></tr>
</table>

Figure 3.1: Theoretical Framework



The details regarding the tools and techniques employed, method or procedure adopted for collecting data and the statistical techniques employed for the analysis of data are given below.

3.5 The program

The CHE program serving as an educational intervention was focused on the area of HIV. The learning objectives were as follows:

At the end of the program, participants will be able to:

- Understand the course of disease progression with CCR5 vs. CXCR4 tropic viruses
- Review the latest evidence on new therapies for treatment-experienced patients in HIV
- Describe the place of CCR5 antagonists in HIV management
- Apply clinical trial results to the management of treatment-experienced patients in their practice

The program was case-based and centered on finding ways through new novel therapies, to achieve maximal response in patients having previously received antiretroviral therapy for HIV. The program proposed participants test for different categories of resistance/cross-resistance and identify specific mutations in order to choose appropriate treatments. The educational module discussed the place for the various treatments according to guidelines and specific objectives of treatment. The tests required in order to select and administer therapies were explained at length as they were necessary to selecting any new therapies.

3.6 Method adopted

A pre-experimental research design was used for this study. A pre-test, post-test, and structured follow up interview design were developed and implemented. The details regarding the method / procedure adopted for collecting the data are given below under appropriate sub-headings.

3.7 Instruments and their reliability and validity

The following three instruments were developed to collect the necessary data and measure outcomes in this research project:

(1) Pre-test CHE Event Questionnaire (appendix 1)

(2) Post-Test CHE Event Questionnaire (appendix 2)

(3) Follow up Interview Guide (appendix 3)

Validated data collection instruments and materials were not available in the literature for this study's purposes and therefore they needed to be created. Both the Kirkpatrick (1998) four levels for evaluating training programs and the Dixon (1978) four levels and suggested strategies for evaluating continuing health education were used as a basis for questionnaire design. All instruments were pilot tested with a small group of the sponsor representatives before being implemented. This group had a good understanding of the target audience's needs and provided feedback on the questionnaires as a result. Appropriate preventative measures to account for any response bias by participants were taken. Steps were also taken to ensure that the questionnaires designed were simple, brief, and user-friendly with clear written and verbal instructions for all participants.

The details regarding the tools are given below.

(1) Pre-test CHE Event Questionnaire

The pre-test was designed to measure what the participants expect to gain by participating in the CHE activity as it relates to the educational program's learning objectives (importance of content), relevance to practice (knowledge and learning), perceived impact on practice (performance/ application of knowledge) as well as the program organization (factors which attracted participants to the program) before the event. The pre-test consisted of fourteen structured and closed ended questions using the likert 5-point scale to assess learning objectives from 1 (Very important) to 5 (Not important), relevance to practice and program organization from 1 (Strongly Disagree) to 5 (Strongly Agree) and perceived impact on practice from 1 (Very Much) to 5 (Not at all) on participants' clinical practice (see appendix 2). In addition, the pre-test included participant information and participant characteristic questions which were optional sections for participants to complete. The pre-test was administered directly before each CHE event with clearly written and verbal instructions from the program facilitator.

(2) The Post-test CHE Event Questionnaire

The post-test was designed to measure the participants experience in participating in the educational event with much the same sets of questions in the pre-test CHE Event Questionnaire (learning objectives, relevance to practice, perceived impact on practice, program organization) with the exception of an additional section on identifying barriers to implementing what participants have learned. The barriers to

application section was incorporated directly into the post-test in order to identify any potential threats to the impact of the CHE event up front and offer up any potential explanations. The post-test consisted of twenty-five structured and closed ended questions using the likert 5-point scale to assess learning objectives from 1 (Very important) to 5 (Not important), relevance to practice and program organization from 1 (Strongly Disagree) to 5 (Strongly Agree) and perceived impact on practice from 1 (Very Much) to 5 (Not at all) (see appendix 2) and one open question where participants were prompted to list any other barriers to implementing key elements from the program into their everyday practice that were not addressed in the questionnaire. The post-test was administered directly after each CHE event with clearly written and verbal instructions from the program facilitator.

(3) The Follow-up Interview Guide

The follow up interview guide was designed as a structured questionnaire for sponsor representatives to follow up with participants one month post CHE event to collect feedback on the event and assess the impact of the CHE program as it relates to the participants' reaction to the program (3 questions), perception of knowledge gain (1 question), views on relevance to practice (2 questions), intended and actual practice change (6 questions), perception of impact on patient outcomes (1 question), perceived value of the program (1 question), as well as any change in sponsor representative interaction with client (2 questions). The follow up guide consisted of sixteen closed ended questions using the likert 5-point scale to rate individual responses from 1 (Not at all) to 5 (Very much) (see appendix 3). It included two additional open ended questions

relating to any further assistance the sponsor representative could provide as an outcome of the program and identifying the specific barriers that prevent the health care professional from implementing what was learned. Both open ended questions were included in order to help sponsor representatives clarify and further understand customer needs. The follow up interview guide questions were also prioritized into three categories: *Must ask*, *Should ask*, and *Could ask if have time or interest*. This was incorporated into the guide (after pilot testing the questionnaire) as a preventative measure to help representatives focus on core areas requiring responses for the purpose of the study should participants have limited time to spend in the follow up interview.

3.8 Procedures of data collection

For this research project convenience sampling was used. Participants attending accredited CHE events for a specific program in the HIV field were notified about the associated research project by the program facilitator and asked to participate (prior to each event a Sponsor Representative ensured that facilitators were properly briefed on all materials associated with the research project). For those who accepted to participate, the facilitator asked them to complete a pre-test and post-test for the educational program at the beginning of the program (see appendix 2). The facilitator also notified participants that a follow up structured interview one month later administered by the sponsoring company representative would also occur upon their acceptance. The facilitator highlighted the consent form which also had to be filled out in order to take part in the research. Participants were notified that "the questionnaires are part of a research project, for which details are covered in the manuals and that the pre-test and post-test questionnaires are completely voluntary, anonymous and at each participants

discretion to fill out, as is the follow up interview one month later". All participants were asked to participate on a voluntary basis and consent forms were provided and collected along with the pre-post questionnaires (see appendix 1).

Once questionnaires were completed on site, a company representative followed up with participants on an individual basis one month later to conduct a structured interview. The structured interview was designed to capture specific information regarding the participants overall feedback on the program along with implications on any changes in practice and potential changes in customer interactions. The interview process was guided by closed questions with one or two opportunities to provide open feedback. Interviews were conducted by the sponsor company representatives. The interview was conducted one on one, in a private setting and the participant was verbally assured that all responses were voluntary, confidential and kept completely anonymous. All company representatives received opportunity for one or more (as many as they felt necessary to feel comfortable) briefings on all processes and instruments related to this research project as well as exactly how to conduct the structured interview and what information had to be communicated regarding confidentiality. A list of verbal probes to help guide the interview were provided to the representative directly on the questionnaires. Questions were also identified according to their importance for the interview process on the interview guide in order to ensure a minimum number of "must ask" questions were answered (see appendix 3). Representatives collected and sent all completed pre/ post questionnaires and follow up interview guides in to the Therapeutic CHE Manager who was responsible for all data collection and analysis related to this project.

3.9 Analysis of the data

This research consisted of a single sample pre-experimental design. Data collected included participant quantitative (pre-test & post-test) and qualitative (follow up interview) measures. Quantitative data was collected in order to enable a single-group pre-test post-test analysis of differences. Qualitative data collected was expected to provide some insight into differences between the pre-test & post-test results as well as expand on the higher levels of the Dixon model and answer questions related to any behavior change by using a semi-structured interview consisting of both open and closed ended questions. At baseline, pre-test measures included some demographic characteristics of participants. The post-test interview and additional qualitative measures administered post-test were used to support the internal validity inferred in differences in the pretest and post-test scores.

To compare the results for each question of the post-test to those of the pre-test the Wilcox Sign test was selected. The data are ratings (ordinal data) and may not be reasonably supposed to have a normal distribution therefore a non-parametric test was appropriate. The Wilcox Sign test or Wilcoxon Signed-Rank test is a non-parametric statistical comparison of the average of two dependent samples (StatSoft, 2009). It is considered when samples are small and/ or the distributional assumptions necessary for the *t-test* come into question.

The Wilcox Sign test is a test of dependency. All dependence tests assume that the variables in the analysis can be split into independent and dependent variables. A dependence test that compares the averages of an independent and a dependent variable

assumes that differences in the average of the dependent variable are caused by the independent variable (StatSoft, 2009).

The null hypothesis in this research concerns the identity of the two population distributions and if the two population distributions are of even moderately similar shape and variability.(StatSoft, 2009). A non-directional alternative hypothesis was selected for this research as the investigator simply wanted to know if there is "a difference" between the two scores in the pre and post test questions – and a difference in either direction is of equal interest (StatSoft, 2009).

The mean, mode, median and standard deviation were also used to analyze the scores for each question and histograms were used to represent mean scores for each question of each section. The mean was also used to calculate average scores for each question on the post program follow up interview along with any qualitative data provided by the interviewers.

CHAPTER 4

RESULTS AND ANALYSIS

4.1 Descriptive analysis of all data

The descriptive details regarding all data are given below.

4.1.1 Sample and Participant information

This research focused on a variety of different types of health care professionals working in the field of HIV. Included in the sample were Specialists, Family Physicians, Nurses, Pharmacists & Case workers. Convenience sampling was used for all health care professionals participating in a continuing health education program sponsored by a Canadian subsidiary of an international pharmaceutical company. In total 173 Health Care Professionals participated in this research project through approximately 20 educational sessions run across Canada. Some activities took place in the subjects own professional setting (i.e. in a clinic or at hospital lunch time rounds) while others took place in a hotel conference room or a private room in a restaurant. A total of 173 participants completed the pre-test and post-test questionnaire and a total of 34 of the same participants completed the follow up interview. Five additional interviews were conducted however the structured interview process was not followed and the answers were incomplete. Therefore these interviews were omitted from the results of this research. Demographic information was optional for participants to supply and consequently none of the participants completed this portion of the pre-test questionnaire.

Table 4.1: Sample Size

Total number of participants	173
Pre-Test Questionnaire	173
Post-Test Questionnaire	173
Follow up Interview	34

Table 4.2: Pre-Test & Post-Test Frequencies

Frequency by Question

	1		2		3		4		5	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
1	128	136	158	137	145	127	137	112	1	0
2	34	27	12	32	24	43	33	59	0	2
3	9	10	3	1	2	2	1	1	1	7
4	2	0	0	3	2	1	2	1	43	48
5	0	0	0	0	0	0	0	0	128	116
	6		**7**		**8**		**9**		**10**	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
1	152	124	0	2	0	1	117	101	113	87
2	19	45	0	7	1	3	35	49	21	38
3	1	4	7	10	14	26	18	18	28	47
4	1	0	40	74	32	104	0	4	9	0
5	0	0	126	80	126	37	3	1	2	1
	11		**12**		**13**		**14**		**15**	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
1	104	54	N/A	52	N/A	44	N/A	58	N/A	24
2	40	104		15		26		23		73
3	24	10		97		40		79		57
4	0	0		2		58		3		14
5	3	1		2		0		5		0
	16		**17**		**18**		**19**		**20**	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
1	N/A	47	N/A	0	0	0	0	0	2	1
2		33		0	1	2	1	0	0	0
3		82		0	10	6	13	5	7	2
4		5		0	29	52	23	49	5	10
5		1		0	133	113	136	119	159	160

Frequency by Question

	21		22		23		24		25	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
1	N/A	1	N/A	1	N/A	0	N/A	1	N/A	2
2		0		0		2		0		0
3		21		1		0		1		8
4		44		53		17		11		15
5		107		118		154		160		148

Questions	
1	Importance of Learning Objective 1
2	Importance of Learning Objective 2
3	Importance of Learning Objective 3
4	Importance of Learning Objective 4
5	The topic of this program is highly relevant to my clinical practice
6	The topic of this program is unrelated to my practice
7	The knowledge I gained in attending this program will improve my clinical practice
8	I have patients who will benefit from my increased knowledge about this topic
9	To what extent do you think you will apply what you will learn in this session to the treatment of your patients in your clinical practice
10	Have you considered how you will implement changes in your treatment of patients following this program
11	How confident are you that you will apply what you will learn in this program to the treatment of your patients
12	Lack of experts to consult with in applying new knowledge with my patients
13	Lack of accessibility to follow up materials to reinforce my changing my practice
14	Lack of necessary equipment to apply new knowledge gained
15	Lack of time to implement new practices
16	Lack of financial resources to implement new practices
17	Other barriers
18	Setting was appropriate for learning
19	Length of program was appropriate
20	Speaker was knowledgeable and was familiar with the content
21	Teaching materials, e.g. slides, handouts, were useful and appropriate
22	Program content was credible and unbiased
23	Information was presented clearly
24	Speaker was knowledgeable and was familiar with the content
25	Adequate opportunity was provided for interaction and questions with the speaker and with other participants

4.1.2 Pre-Test Questionnaire Descriptive Statistics

The pre-test questionnaire consisted of fourteen structured and closed ended questions relating to the educational program's a) learning objectives (importance of content), b) relevance to practice (knowledge and learning), c) perceived impact on practice (performance/ application of knowledge in clinical practice with patients) as well as d) the program organization. To measure participants' responses the likert 5-point scale to assess from learning objectives from 1 (Very important) to 5 (Not important), relevance to practice and program organization from 1 (Strongly Disagree) to 5 (Strongly Agree) and perceived impact on practice from 1 (Very Much) to 5 (Not at all) was used. A reverse scale was used for the perceived impact on practice in the pre-test and the post-test questionnaires to check for response bias by participants.

Overall, the results from the pre-test questionnaire showed that participants rated the program's learning objectives and topic as very important and very relevant to their practices. Participants intended to apply what they learned in the program and were confident that they would apply what they learned in the program to the treatment of their patients. They were more or less sure however how they would implement changes in their treatment of patients. Participants also strongly agreed that the setting and length of the program were appropriate and the facilitator and/or key speaker was credible as factors attracting them to the program. No trace of response bias was found in the data through the reverse scaling of the pre and post questionnaires.

The following table provides the mean scores, standard deviations, medians and modes for each question in the pre-test questionnaire.

Table 4.3 Pre-Test Questionnaire Scores

Pre-Test Questionnaire	Mean Score	Standard Deviation	Median	Mode
Objective 1	1.31	0.6	1	1
Objective 2	1.11	0.36	1	1
Objective 3	1.20	0.51	1	1
Objective 4	1.25	0.53	1	1
The topic of this program is highly relevant to my clinical practice	4.72	0.58	5	5
The topic of this program is unrelated to my practice	1.15	0.42	1	1
The knowledge I gained in attending this program will improve my clinical practice	4.68	0.55	5	5
Relevance to practice - I have patients who will benefit from my increased knowledge about this topic	4.63	0.66	5	5
To what extent do you think you will apply what you will learn in this session to the treatment of your patients in your clinical practice	1.49	0.83	1	1
Have you considered how you will implement changes in your treatment of patient following this program	1.67	1.01	1	1
How confident are you that you will apply what you will learn in this program to the treatment of your patients	1.59	0.86	1	1
Setting would be appropriate for learning	4.69	0.61	5	5
Length of program would be appropriate	4.69	0.64	5	5
Facilitator/key speaker(s) is credible	4.84	0.60	5	5

a) Importance of Learning objectives

The learning objectives for this program were as follows: 1) Understand the course of disease progression 2) Review the latest evidence on new therapies for patients in HIV 3) Describe the place for certain treatments in HIV management and 4) Apply clinical trial results to the management of patients. On a scale of 1 (Very important) to 5 (Not important) overall participants overwhelmingly rated the learning objectives in the pre-test as all being very important for their practice. The following graph illustrates the distribution of scores in the pre-test for all four learning objectives combined.

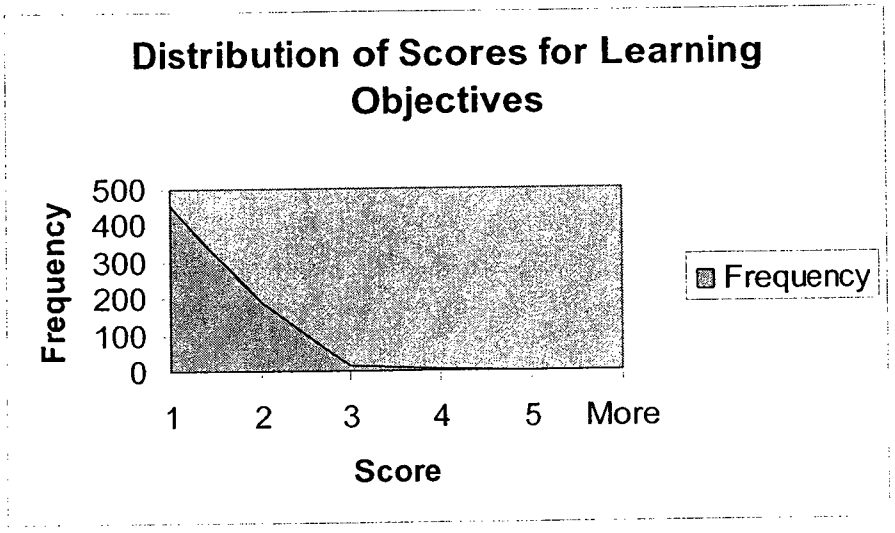


Figure 4.1: Distribution of Scores for Learning Objectives

In taking a closer look at the different learning objectives, the results show that objective 2 and objective 3 were rated higher than objective 1 and objective 4. This means that participants were most interested in reviewing the latest evidence on new therapies for patients in HIV and describing the place for certain treatments in HIV management.

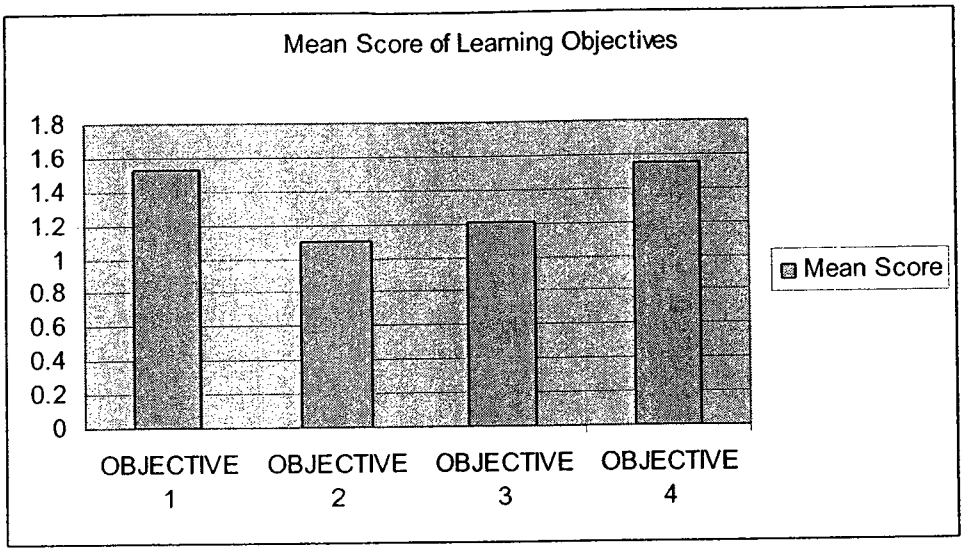


Figure 4.2: Mean Score of Learning Objectives

b) Relevance to Practice

The results of the pre-test on the relevance of the program to the participants' practices were measured from 1 (Strongly Disagree) to 5 (Strongly Agree). The findings demonstrate that participants strongly agreed that that the topic was highly relevant to their practices and that the knowledge gained would improve their practices. Participants also agreed that ultimately this knowledge would benefit their patients. The following graph illustrates the pre-test mean scores of the program's relevance to participants' clinical practices.

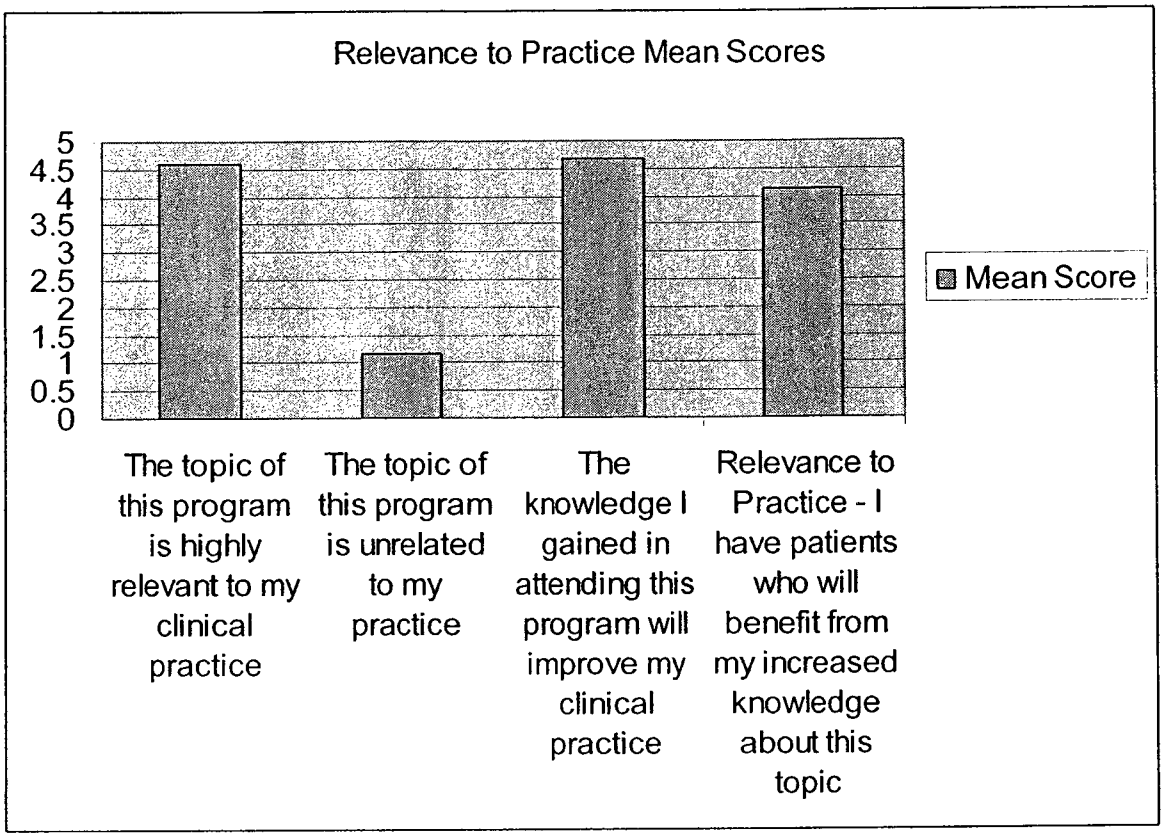


Figure 4.3: Relevance to Practice Mean Scores

The answers in the pre-test relevance to practice section also confirmed the reliability of the participants' answers as the second question in this section was reversed from the first question to confirm that the topic was relevant to the participants' practices.

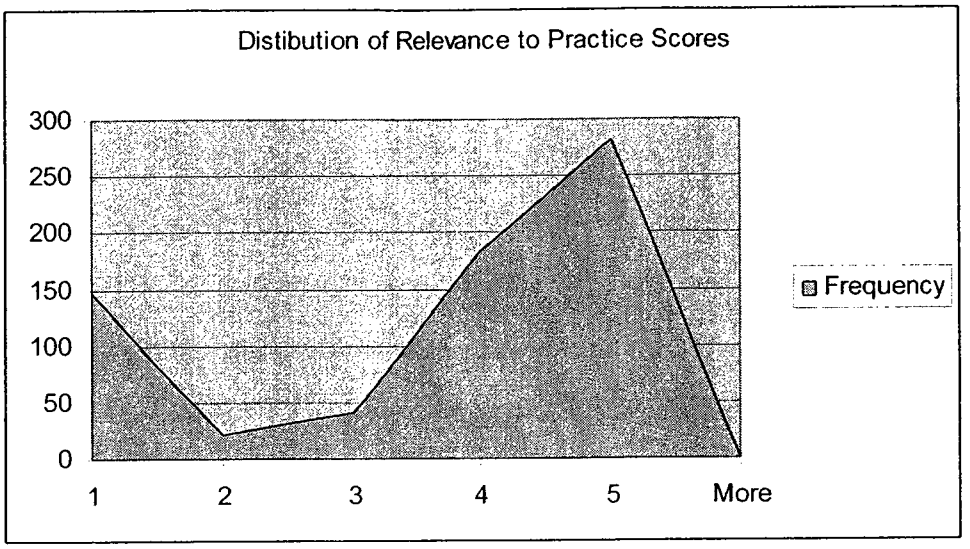


Figure 4.4: Distribution of Relevance to Practice Scores

c) Perceived impact on practice

The perceived impact on practice was measured the extent to which participants intended to apply knowledge from 1 (Very much) to 5 (Not at all). Overall the pre-test scores demonstrate that participants intended to apply knowledge in their practices and with their patients. However the distribution of scores highlights an uneven curve.

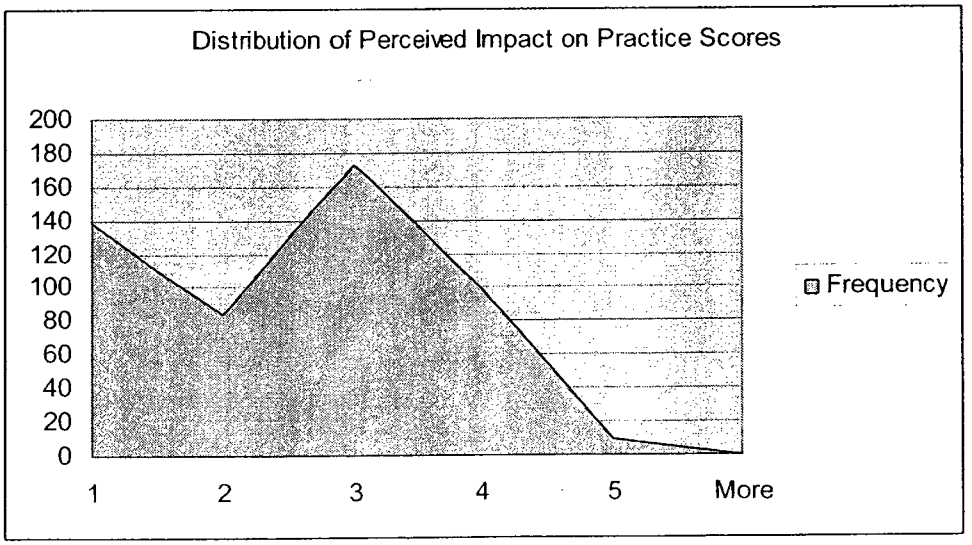


Figure 4.5: Distribution on Perceived Impact of Practice Scores

The results of the pre-test perceived impact on practice showed that while participants were very confident that they would apply what they learned in the treatment of patients in their practices, they had more or less considered how they would implement any changes in their treatment of patients following the program. The following graph shows the mean scores for each pre-test question related to impact on practice.

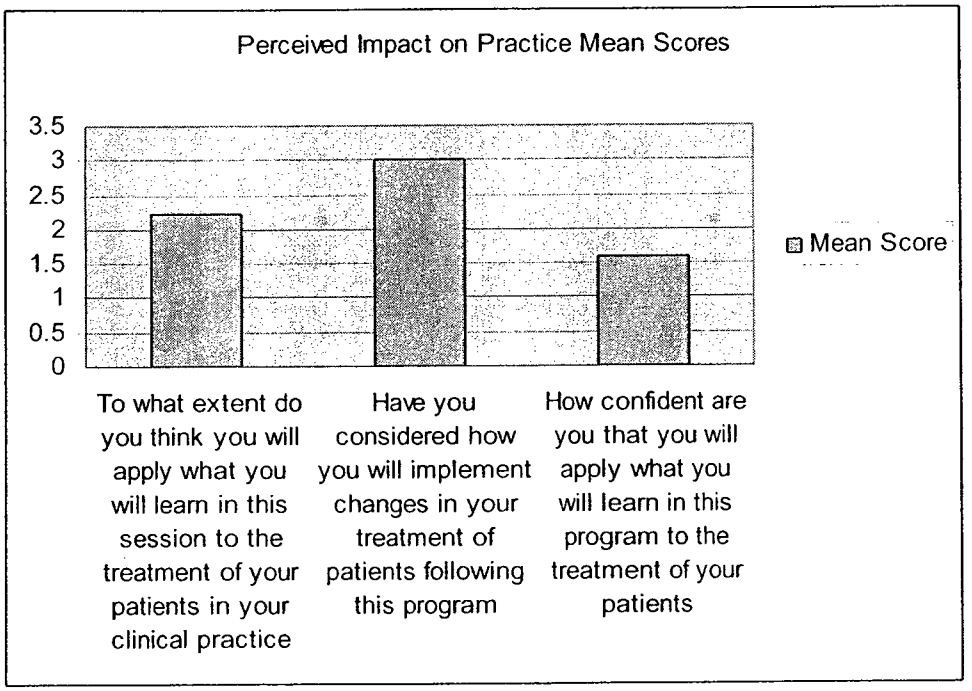


Figure 4.6: Perceived Impact on Practice Mean Scores

d) Program organization

The program organization section of the pre-test questionnaire was measured from 1 (Strongly disagree) to 5 (Strongly agree) of factors that attracted participants to the program. Overall participants strongly agreed that the setting, length of program were appropriate and the facilitator and or key speaker was credible. The following

graph demonstrates the overall satisfaction with the program organization on all the aspects on the pre-test.

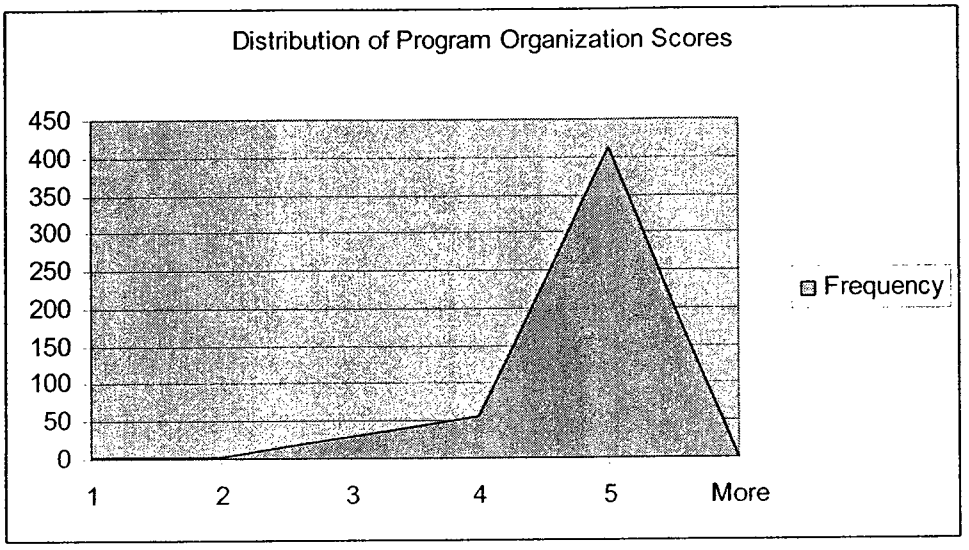


Figure 4.7: Distribution of Program Organization Scores

A closer look at the results shows that while all factors measured were highly important in attracting participants to the program, the speaker was the most important factor.

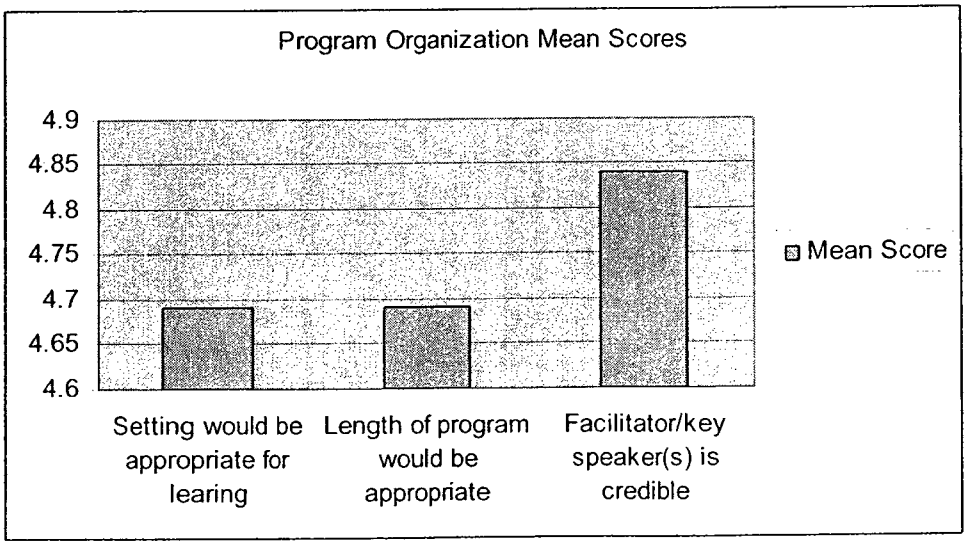


Figure 4.8: Program Organization Mean Scores

Overall, the results from the pre-test questionnaire showed that participants rated the program's learning objectives and topic as very important and very relevant to their practices. Some learning objectives in the pre-test were more important than others to their clinical practice. Participants also intended to apply what they learned in the program in their practices and were very confident that they would do so, although they were more or less sure how they would implement changes in the treatment of their patients. All factors measured in the program organization proved important in attracting participants to the event. The facilitator and/or key speaker however was rated as the most important feature of all.

4.1.3 Post-Test Questionnaire Descriptive Statistics

The post-test consisted of twenty-five structured and mostly closed ended questions using the likert 5-point scale designed to measure the participants experience in participating in the educational event with much the same sets of questions in the pre-test CHE Event Questionnaire. Eighteen questions were related to learning objectives which were rated from 1 (Very important) to 5 (Not important), relevance to practice and program organization which were rated from 1 (Strongly Disagree) to 5 (Strongly Agree) and perceived impact on practice which were rated from 1 (Very Much) to 5 (Not at all).(see appendix 2). Five additional questions related to the barriers or obstacles participants might encounter in putting new knowledge into practice and an additional open question where participants were prompted to list any other barriers to implementing key elements from the program into their everyday practice that were not addressed in the questionnaire. The post-test was administered directly after each CHE event with clearly written and verbal instructions from the program facilitator.

Overall, the results from the post-test questionnaire showed that participants rated the program's learning objectives and topic as very important and very relevant to their practices. Participants intended to apply what they learned in the program and were confident that they would apply what they learned in the program to the treatment of their patients. They were more or less sure however how they would implement changes in their treatment of patients. Participants also strongly agreed that the setting and length of the program were appropriate and the facilitator and/or key speaker was credible as factors attracting them to the program.

The following table provides the mean scores, standard deviations, medians and modes for each question in the post-test questionnaire.

Table 4.4: Post-Test Questionnaire Scores

Post-Test Questionnaire	Mean Score	Standard Deviation	Median	Mode
Importance of Learning Objective 1	1.28	0.57	1	1
Importance of Learning Objective 2	1.25	0.56	1	1
Importance of Learning Objective 3	1.30	0.52	1	1
Importance of Learning Objective 4	1.38	0.52	1	1
The topic of this program is highly relevant to my clinical practice	4.56	0.70	5	5
The topic of this program is unrelated to my practice	1.33	0.55	1	1
The knowledge I gained in attending this program will improve my clinical practice	4.27	0.84	4	5
I have patients who will benefit from my increased knowledge about this topic	3.99	0.70	4	4
To what extent do you think you will apply what you will learn in this session to the treatment of your patients in your clinical practice	1.58	0.78	1	1
Have you considered how you will implement changes in your treatment of patients following this program	2.08	0.69	2	2
How confident are you that you will apply what you will learn in this program to the treatment of your patients	1.74	0.56	2	2
Lack of experts to consult with in applying new knowledge with my patients	2.33	0.97	3	3
Lack of accessibility to follow up materials to reinforce my changing my practice	2.67	1.20	3	4
Lack of necessary equipment to apply new knowledge gained	2.25	1.05	3	3
Lack of time to implement new practices	2.36	0.83	2	2
Lack of financial resources to implement new practices	2.28	0.93	3	3
Setting was appropriate for learning	4.58	0.62	5	5

Post-Test Questionnaire	Mean Score	Standard Deviation	Median	Mode
Length of program was appropriate	4.65	0.54	5	5
Speaker was knowledgeable and was familiar with the content	4.90	0.42	5	5
Adequate opportunity was provided for interaction and questions with the speaker and with other participants	4.77	0.65	5	5
Teaching materials, e.g. slides, handouts, were useful and appropriate	4.46	0.76	5	5
Program content was credible and unbiased	4.65	0.56	5	5
Information was presented clearly	4.86	0.44	5	5
Speaker was knowledgeable and was familiar with the content	4.90	0.42	5	5
Adequate opportunity was provided for interaction and questions with the speaker and with other participants	4.77	0.65	5	5

b) Importance of Learning objectives

The learning objectives for this program were as follows: 1) Understand the course of disease progression 2) Review the latest evidence on new therapies for patients in HIV 3) Describe the place for certain treatments in HIV management and 4) Apply clinical trial results to the management of patients. On a scale of 1 (Very important) to 5 (Not important) overall participants overwhelmingly rated the learning objectives in the post-test as all being very important for their practice. The following

graph illustrates the distribution of scores in the post-test for all four learning objectives combined.

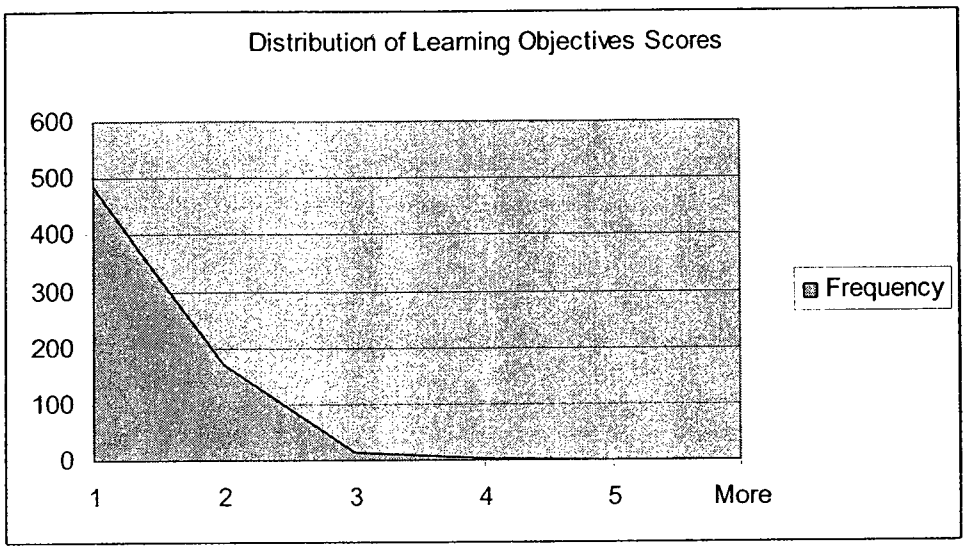


Figure 4.9: Distribution of Learning Objectives Scores

In taking a closer look at the different learning objectives, the mean scores results show that objective 2 was rated as most important to participants' practices in the post-test followed by learning objective 3, 1 and 4 respectively. This means that participants post-event were most interested in reviewing the latest evidence on new therapies for patients in HIV followed by describing the place for certain treatments in HIV management, understanding the course of disease progression and applying clinical trial results to the management of patients respectively.

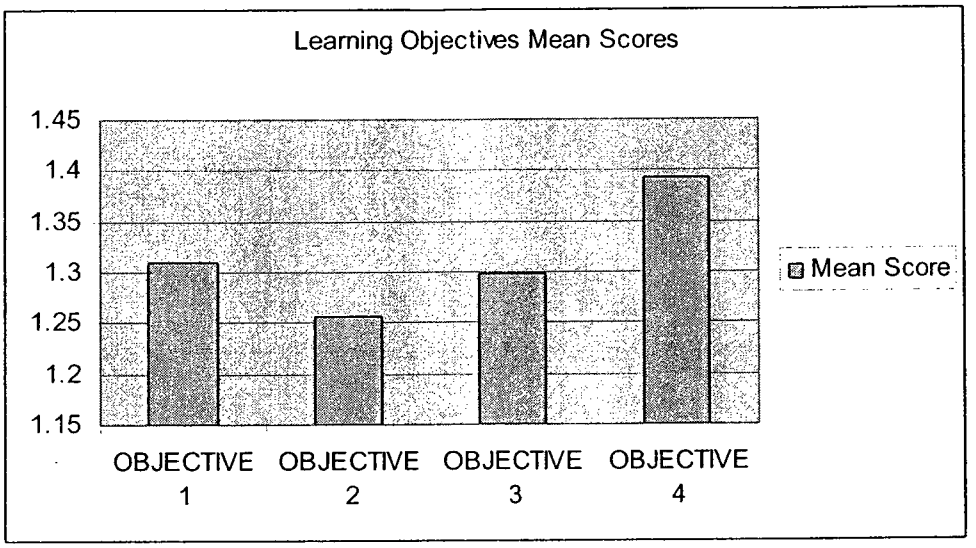


Figure 4.10: Learning Objectives Mean Scores

b) Relevance to practice

The results of the post-test on the relevance of the program to the participants' practices were measured from 1 (Strongly Disagree) to 5 (Strongly Agree). The findings demonstrate that participants strongly agreed that that the topic was highly relevant to their practices and that the knowledge gained would improve their practices. Participants also agreed that ultimately this knowledge would benefit their patients. The following graph illustrates the post-test mean scores of the program's relevance to participants' clinical practices.

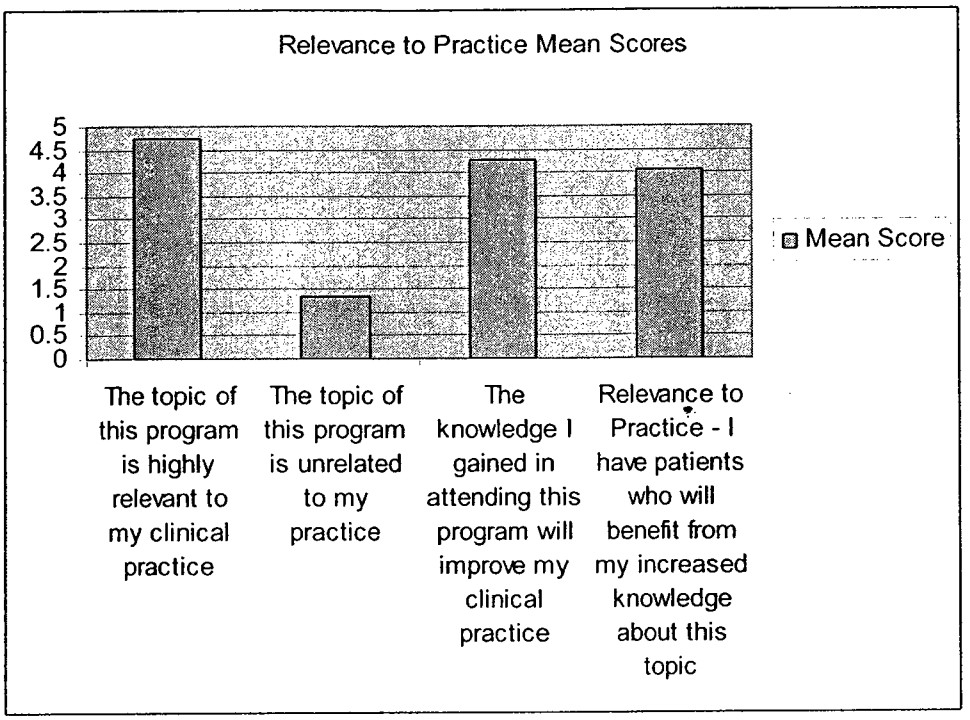


Figure 4.11: Relevance to Practice Mean Scores

The answers in the post-test relevance to practice section confirmed the reliability of the participants' answers as the second question in this section was reversed from the first question to confirm that the topic was relevant to the participants' practices.

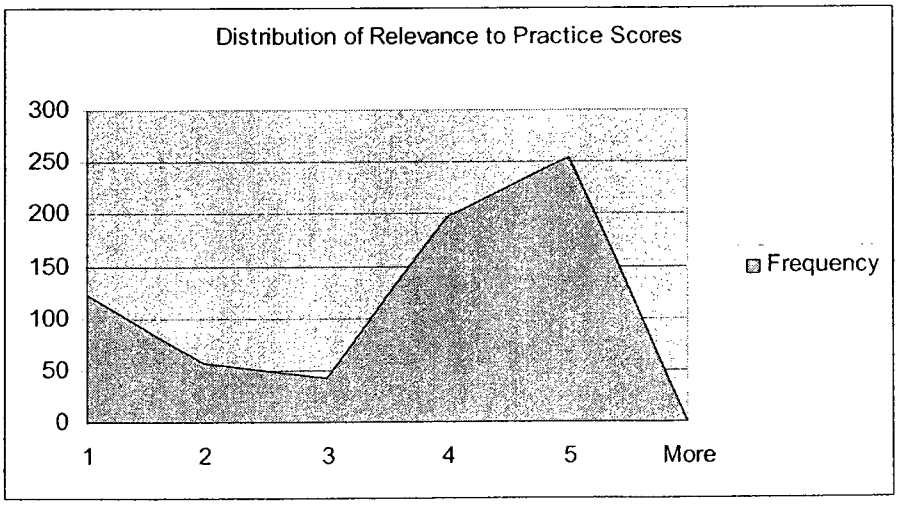


Figure 4.12: Distribution of Relevance to Practice Scores

c) Perceived impact on practice

The perceived impact on practice was measured the extent to which participants intended to apply knowledge from 1 (Very much) to 5 (Not at all). Overall the post-test scores demonstrate that participants intended to apply knowledge in their practices and with their patients. The distribution of the scores was skewed towards the participants *Very Much* intending to apply new knowledge in their practices.

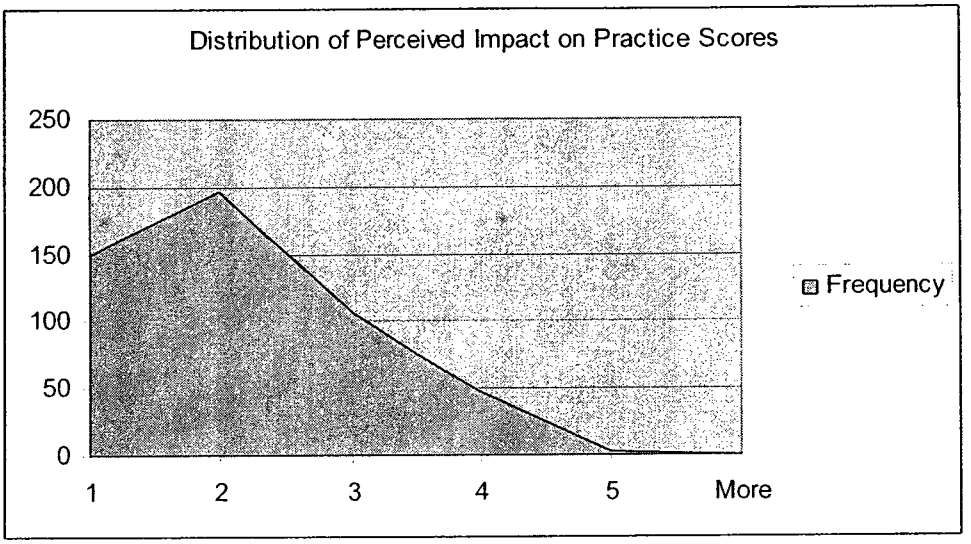


Figure 4.13: Distribution of Perceived Impact on Practice Scores

However, the results of the post-test mean scores of perceived impact on practice showed that while participants post-event were confident that they would apply what they learned in the treatment of patients in their practices, they still had more or less considered how they would implement any changes in their treatment of patients following the program. The following graph shows the mean scores for each post-test question related to impact on practice.

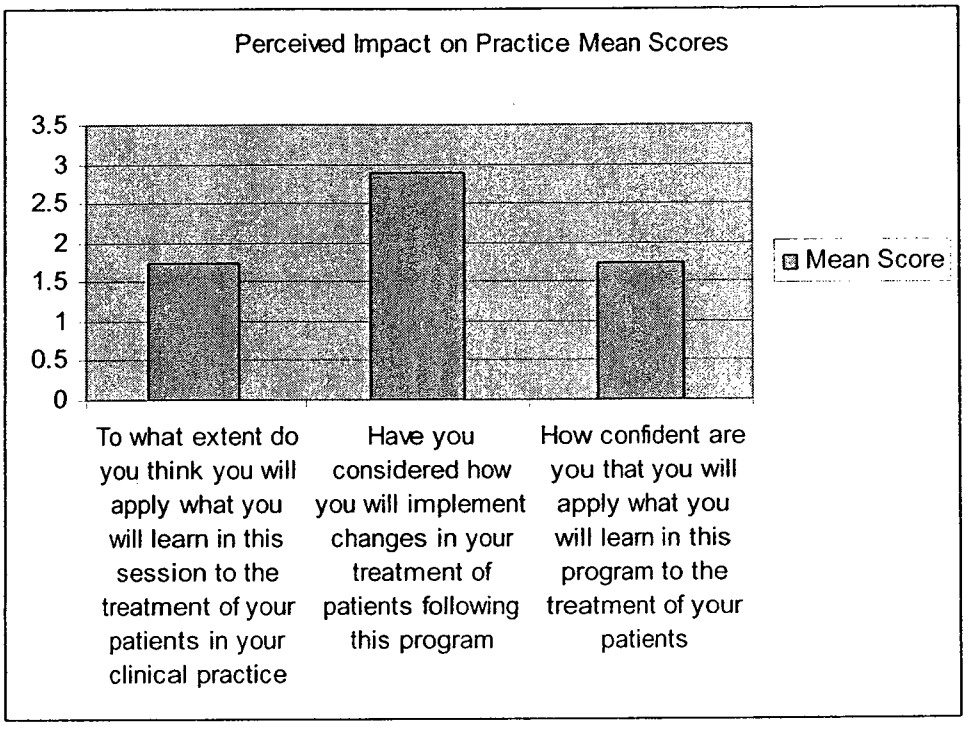


Figure 4.14: Perceived Impact on Practice Mean Scores

d) Program organization

The program organization section of the post-test questionnaire was measured from 1 (Strongly disagree) to 5 (Strongly agree) as factors that attracted participants to the program). Overall participants strongly agreed that the setting, length of program were appropriate and the facilitator and or key speaker was credible. The following graph demonstrates the overall distribution of scores relating to the participants' satisfaction with the program organization on all the aspects measured in both the pre-test and the post-test.

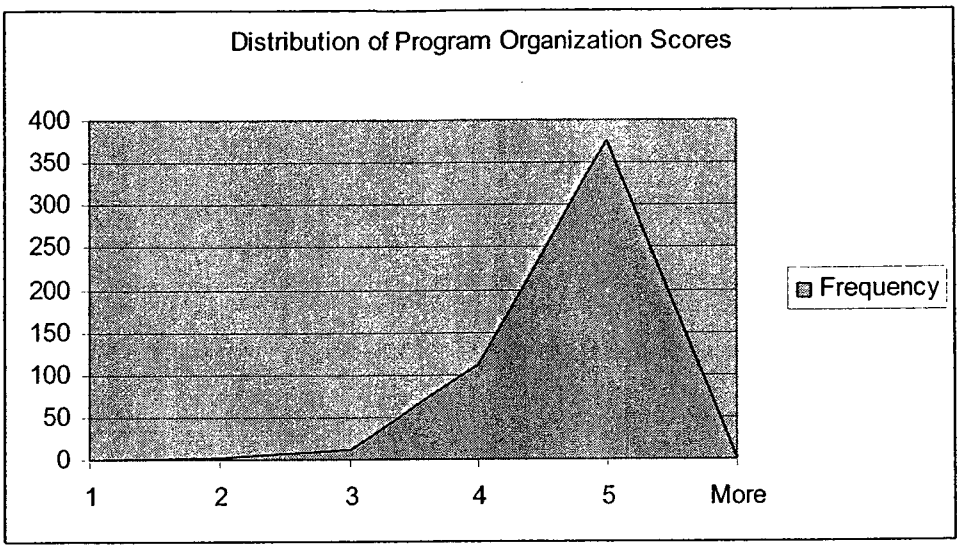


Figure 4.15: Distribution of Program Organization Scores

Once again, a closer look at the program organization mean score results in the post-test shows that while all factors measured were highly important to the program, the speaker was the most important factor.

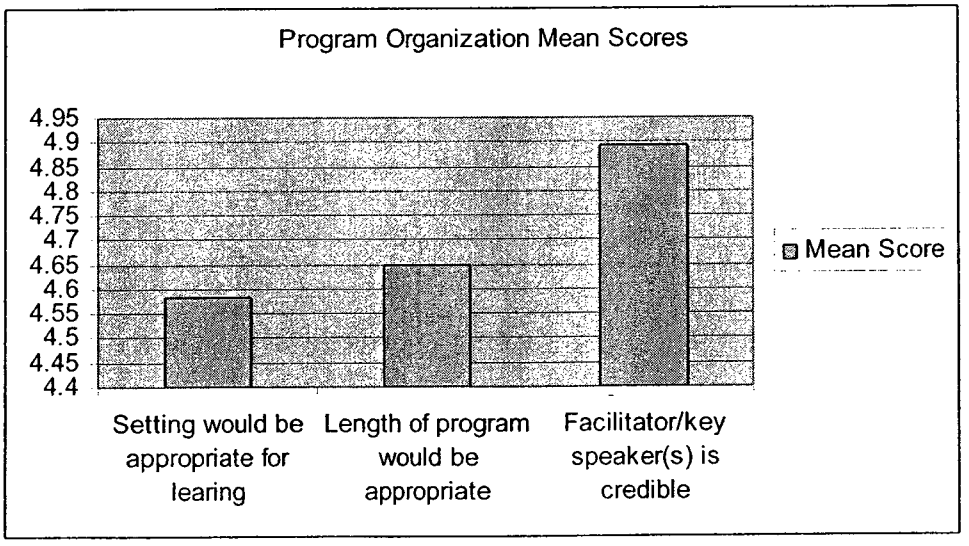


Figure 4.16: Program Organization Mean Scores

In the post-test other factors were also added to program organization that could only be measured after the program took place. These related to the participants experience during the program. These factors were: quality of teaching materials such as

handouts and slides, overall program balance/credibility, clarity of information, speaker's knowledge and time for questions and interactivity. These factors were rated on the same scale as the program organization from 1 (Strongly disagree) to 5 (Strongly agree). The following graph illustrates the mean score results for post program organization.

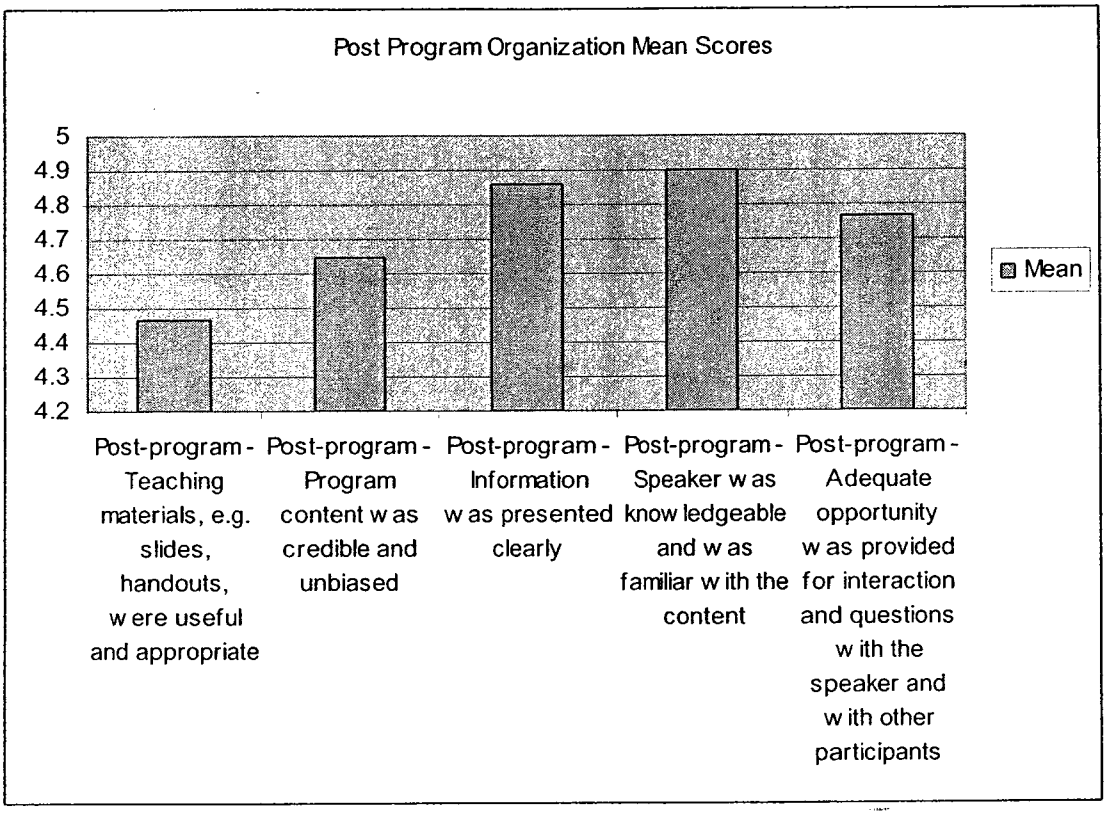


Figure 4.17: Post-Program Organization Mean Scores

e) Barriers to Application (Additional Post-Test Questions)

An additional section was added to the post-test questionnaire in order to identify any potential barriers to the application of knowledge and skills from the educational program. The following clinical practice barriers were considered on a scale from 1 (No barrier) to 5 (Major barrier), lack of experts to consult with, lack of

accessibility to follow up materials, lack of necessary equipment, lack of time, and lack of financial resources. Participants were also prompted to identify any other barriers that were not listed in this section. However, participants did not respond to this question and no further barriers were identified. The graph below summarizes the mean scores for each suggested clinical barrier.

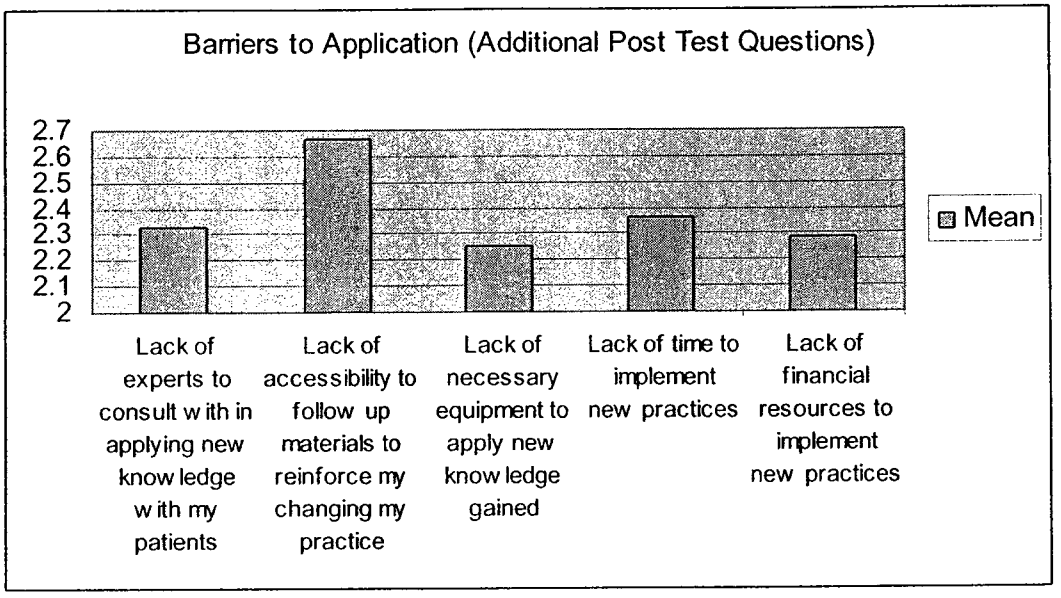


Figure 4.18: Barriers to Application (Additional Post Test Questions)

The post-test results for Barriers to Application received an overall low rating. The mean scores ranged from 2.25 to 2.67 on a scale from 1 (No Barrier) to 5 (Major Barrier). The highest rated barrier was "Lack of follow up tools to reinforce changing my practice" with a mean score of 2.67, followed by "Lack of time to implement new practices" with a score of 2.36, and "Lack of experts to consult with in applying new knowledge with my patients" at 2.33. The lowest rated barriers were "Lack of necessary equipment to apply new knowledge gained" with a mean score of 2.25, and "Lack of financial resources to implement new practices" with a score of 2.28. These scores indicate that while there do not seem to be any major barriers to applying new

knowledge as identified in the questionnaire, a lack of follow up tools, time and experts to consult with are the top barriers concerning participants in the educational activity. Since participants did not offer any other barriers in this section, no additional information was provided in the post-test.

Overall, the results from the post-test questionnaire showed that participants rated the program's learning objectives and topic as very important and very relevant to their practices. Some learning objectives in the post-test were more important than others. Participants also intended to apply what they learned in the program and were confident that they would do so in their practices although they were more or less sure how they would implement changes in the treatment of their patients. All factors measured in the program organization proved important in attracting participants to the event. The facilitator and/or key speaker however were rated as the most important feature of all. Additionally, in the post-test extra post program organization factors were considered. These related to the quality of teaching materials such as handouts and slides, overall program balance/credibility, clarity of information presented, speaker's knowledge and time for questions and interactivity. All factors scored very high by participants. Once again the factors relating to the facilitator and speaker's skills rating the highest. The proposed barriers to practice application in the post-test did not yield high mean scores. No additional barriers were offered by participants.

4.1.4 Comparison of the Pre-Test and Post-Test Results

To compare the results of the post-test to those of the pre-test the Sign test was selected. The data are ratings (ordinal data) and therefore a non-parametric test was appropriate. The Wilcox Sign test is a non-parametric test for assessing whether two

dependent samples of observations come from the same distribution. The Sign test is considered when samples are small and the distributional assumptions necessary for the *t-test* come into question. The null hypothesis concerns the identity of the two population distributions and if the two population distributions are of even moderately similar shape and variability (StatSoft, 2009).

The null hypothesis for each question that there was no difference between the pre- and post-test results; while the alternative hypothesis was that there was a significant difference.

The results comparing the pre and post-test questions using the Wilcox Sign test showed the following:

a) Importance of Learning Objectives

The null hypothesis was accepted for all questions in this section as there was no statistical difference between the pre- and the post-test scores for all four learning objectives ($p <= 0.81$, $p <= 0.88$, $p <= 0.87$, $p <= 0.89$ respectively). The table below highlights the Importance of Learning Objectives pre and post-test scores using the Wilcox Sign test.

Table 4.5: Importance of Learning Objectives Wilcox Sign Test Results

QUESTION 1: Importance of Learning Objective I n+ 10, n- 8, p <= 0.81
QUESTION 2: Importance of Learning Objective II n+ 22, n- 24, p < = 0.88
QUESTION 3: Importance of Learning Objective III n+ 20, n- 18, p < = 0.87
QUESTION 4: Importance of Learning Objective IV n+ 27, n- 25, p < = 0.89

b) Relevance to Practice

The null hypothesis for question 5 and 6 in this section was accepted as there was no statistically significant difference between the pre- and post test scores for this question of the Relevance to Practice section ($p <= 0.84$ and $p <= 0.69$ respectively). However, the null hypothesis for questions 7 and 8 was rejected, as there were statistically significant differences between the pre- and post test scores for these questions of the Relevance to Practice section ($p <= 0.02^*$ and $p <= 0.02^*$ respectively). The table below highlights the Importance of Relevance to Practice pre and post-test scores using the Wilcox Sign test.

Table 4.6: Relevance to Practice Wilcox Sign Test Results

QUESTION 5: The topic of this program is highly relevant to my clinical practice
n+ 12, n- 14, p <= 0.84
QUESTION 6: The topic of this program is unrelated to my practice
n+ 27, n- 31, p <= 0.69
QUESTION 7: The knowledge I gained in attending this program will improve my clinical practice
n+ 34, n- 58, p <= 0.02*
QUESTION 8: I have patients who will benefit from my increased knowledge about this topic
n+ 72, n- 104, p <= 0.02*

c) Perceived Impact on Practice

The null hypothesis for question 9 in this section was accepted as there was no statistically significant difference between the pre- and post test scores for this question of the Perceived Impact on Practice section ($p <= 0.62$). However, the null hypothesis for questions 10 and 11 was rejected, as there were statistically significant differences between the pre- and post test scores for these questions of the Perceived Impact on

Practice section (p <= 0.04*, p <= 0.008* respectively). The table below highlights the Perceived Impact on Practice pre and post-test scores using the Wilcox Sign test.

Table 4.7: Perceived Impact on Practice Wilcox Sign Test Results

QUESTION 9: To what extent do you think you will apply what you will learn in this session to the treatment of your patients in your clinical practice
n+ 16, n- 20, p <= 0.61
QUESTION 10: Have you considered how you will implement changes in your treatment of patients following this program
n+ 45, n- 27, p <= 0.04*
QUESTION 11: How confident are you that you will apply what you will learn in this program to the treatment of your patients
n+ 80, n- 49, p <= 0.008*

d) Program Organization

The null hypothesis for all questions in this section was accepted as there was no statistically significant difference between the pre- and post test scores (p <= 0.47, p <= 0.08, n+ 7, n- 5, p <= 0.77 respectively). The table below highlights the Importance of Program Organization pre and post-test scores using the Wilcox Sign test.

Table 4.8: Program Organization Wilcox Sign Test Results

QUESTION 18: Setting would be appropriate for learning
n+ 27, n- 21, p <= 0.47
QUESTION 19: Length of program would be appropriate
n+ 31, n- 18, p <= 0.085
QUESTION 20: Facilitator/key speaker(s) is credible
n+ 7, n- 5, p <= 0.77

Overall, the results comparing the pre and post-tests for this program showed some statistically significant differences concerning the relevance of the topic to participants' practice and the confidence of the participants to apply what they learned from the educational program.

4.1.5 The one Month Follow-up Interview Descriptive Statistics

The follow up interview guide was designed as a structured questionnaire for sponsor representatives to follow up with participants one month post CHE event to collect feedback on the event and assess the impact of the CHE program as it relates to the participants' reaction to the program, perception of knowledge gain, views on relevance to practice, intended and actual practice change, perception of impact on patient outcomes, perceived value of the program, as well as any change in sponsor representative interaction with the participant. The follow up guide consisted of sixteen closed ended questions using the likert 5-point scale to rate individual responses from 1 (Not at all) to 5 (Very much) (see appendix 3). It also included two additional open ended questions relating to any further assistance the sponsor representative could provide as an outcome of the program and understanding the specific barriers that prevent the health care professional from implementing what was learned. The follow-up interview was conducted on a completely voluntary basis by participants. A total of n=34 out of n=173 participants agreed to complete the one month follow-up interview.

4.1.6 Results from the One Month Follow-up Interview

The results of the one month follow up interview demonstrate that participants thought positively about the educational program and found the program both relevant and useful to their practice. The program was successful in making participants think about their current practice and had an impact on health participants' practices. Although the program was not reported to have any impact on patient outcomes by participants, the educational activity was reported by participants to be highly valued.

Sponsor representatives reported some positive changes in their relationship with the participants. The details regarding the follow up interview results are given below.

a) Reaction to the program

The interview results one month post program demonstrates that overall participants thought positively about the educational program. Participants rated the question *What did you think about the program*? a mean score of 3.70 on a scale from 1 to 5. Feedback obtained from some representatives conducting the interview was that overall participants felt it was a "good" and "thorough" program. The results from the interviews also show that participants felt the program was credible and unbiased. The mean score for this question was 3.88 on a scale from 1 to 5. Finally, the follow up interviews demonstrated that participants for the most part did not *yet* have a chance to speak to other health care professionals (HCPs) who attended the program about any of the content. The mean score for this question was 2.06 on a scale from 1 to 5. Feedback which was written on some of the interview guides suggested that for some of the participants it was too early, as comments such as "not yet" and that "it has not come up yet" were written down beside the question. The following table highlights the mean, standard deviation, median and mode scores for the "Reaction to the program" section.

Table 4.9: Follow-up Interview: Reaction to Program Scores

Follow up Interview: Reaction to Program	Mean	Standard D	Median	Mode
What did you think about the program?	3.7	0.94	4	3
Was the program content credible and unbiased?	3.88	1	4	4
Did you have a chance to ask questions and speak with other HCPs attending the program?	2.06	1.9	2	1

b) Views on Relevance to Practice & Perception of Knowledge Gain

The results for Views on Relevance and Perception of Knowledge Gain from the post event interviews show that overall participants found the program relevant and useful. Participants rated the question *Do you see patients who can benefit from the*

program? a mean score of 3.65 on a scale from 1 to 5, and *Were the knowledge and skills presented in this program useful?* a mean score of 3.4 on a scale from 1 to 5. However, the perception from the representative one month after the event was that participants did not gain as much knowledge and skills as the participants suggested. Representatives conducting the interviews rated the *health care professionals' knowledge gain* a mean score of 2.5 on a scale from 1 to 5. The following table highlights the mean, standard deviation, median and mode scores for the "Views on Relevance to Practice & Perception of Knowledge Gain" section.

Table 4.10:

Follow-up Interview Relevance to Practice/Perception of Knowledge Gain Scores

Follow up Interview: Relevance to practice/Perception of knowledge Gain	Mean	Standard Deviation	Median	Mode
Do you see patients who can benefit from the program?	3.65	1.32	4	5
Were the knowledge and skills presented in this program useful?	3.41	1.05	3	3
CHE Champion's perception of HCP knowledge gain	2.5	1.02	3	3

The difference between the participants' responses and the representatives' responses can be explained by the heterogeneous sample. The sample consisted of case workers, nurses, specialists, support group/social workers and family physicians. In looking closer at the data relating to this question both the mode and the median was a score of 3 on a scale of 1 to 5. The minimum response was 0 (although the lowest rating was supposed to be 1, representatives wrote 0 or N/A beside questions) and the maximum response was 4. This indicates that although most representatives felt that participants did gain knowledge there was a great variance for a few respondents from not gaining any new knowledge because of their ability to implement key learnings in the treatment of their patients. The lower ratings for some participants skewed the

distribution of the data. The following table illustrates the distribution of scores for the CHE champion's perception of knowledge gain question.

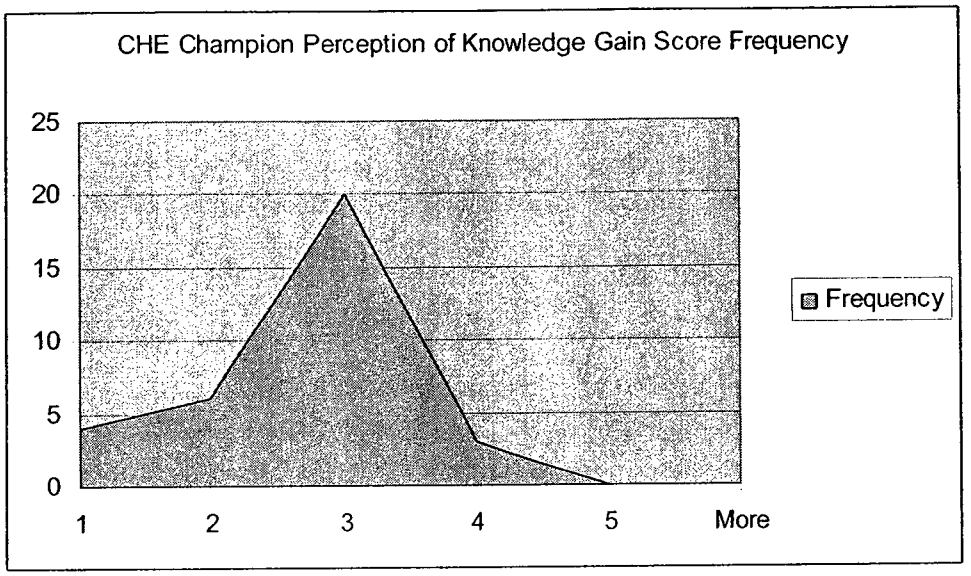


Figure 4.19: CHE Champion Perception of Knowledge Gain Score Frequency

Furthermore, the additional qualitative feedback from respondents in this area was that depending on their role some knowledge was more useful for some than others. Frequently the comment "Case worker" "Cannot apply treatment information" or "Not an MD" was written on questionnaires. Sometimes these comments were written in bold and rather large letters at the top of the interview questionnaire by the representatives as a point that came out of discussions in interviews. Therefore depending on who the representatives were following up with, some participants displayed a greater appreciation for the application of gained knowledge and skills than others and this in turn influenced the representatives' perceptions.

c) Intended and Actual Practice Change

The results for Intended and Actual Practice Change from the post event interviews show that the program was successful in making participants think about

their current practice. This question was rated a mean score of 4.29 on a scale from 1 to 5. The program also helped to change participants' practices. When participants were asked if they are doing anything differently in their practice as a result of the program participants rated this a mean score of 3.94 on a scale of 1 to 5. This was further confirmed by the representatives' perception of practice change which was rated a mean score of 3.62 on a scale of 1 to 5 and in line with the respondents' answers. The following table highlights the mean, standard deviation, median and mode scores for the "Intended and Actual Practice Change" section.

Table 4.11: Follow-up Interview: Intended Practice Change Scores

Follow up Interview: Intended Practice Change	Mean	Standard Deviation	Median	Mode
Did anything in the program make you think about your current practice?	4.29	1.11	5	5
Are you doing anything differently as a result of what you learned in this program?	3.94	0.74	4	4
CHE Champion's perception of intent of HCP to change practice	3.62	0.65	4	4

Qualitative data was also collected by the representatives to identify what exactly health care professionals were doing differently as a result of the program. Participants identified three major themes. Participants were a) sending away for tests that they did not perform in the past b) conducting tests at an earlier stage than previously or c) considering using more than one active agent for treating patients. The following is a sample of the responses that were obtained: "sending in tropism tests", "earlier tropism test", "requesting profile tests", "R5 tropic or not", "considering tropism", "obtaining tropism data" "including tropism in the treatment decision" and "seeing a need for 3 active drugs".

Furthermore, representatives also asked participants to list any barriers to implementing changes in their practices. The following themes were identified a) access to tests were a barrier b) labs were a barrier c) requirements for tests were a barrier. The

following is a sample of responses obtained: "1000 VL requirement", "need for 1000 viral load", "blood test is a barrier" ,"blood test difficult", "blood test slows it down", "labs collecting blood" "labs slow it down" "tropism" , "tropism test" and "labs".

d) Perception of Impact on Patient Outcomes

The results for Perception of Impact on Patient Outcomes from the post event interviews show that the program did not have any significant perceived impact on patient outcomes. Participants rated this question a mean score of 1.53 on a scale from 1 to 5. Feedback to explain this answer was communicated very clearly as comments in the interview questionnaires by the representatives. The participants cited for the most part that it was "too early" in the process to have any impact whatsoever on patient outcomes. The following table highlights the mean, standard deviation, median and mean scores for the "Perception of Impact on Patient Outcomes" section.

Table 4.12: Follow-up Interview: Perception of Impact on Patient Outcomes Scores

Follow up Interview: Perception of Impact on Patient Outcomes	Mean	Standard Deviation	Median	Mode
Have you seen any improvement in the impact of your management of patients as a result of your	1.53	1.31	1	1

e) Perceived Value of the Program

The results for Perceived Program Value from the post event interviews show that the program was highly valued by participants as it was rated a mean score of 4.02 on a scale of 1 to 5. The following table highlights the mean, standard deviation, median and mode scores for the "Perceived Program Value" section.

Table 4.13: Follow-up Interview: Perceived Program Value Mean Score

Follow Up Interview: Perceived Program Value	Mean	Standard Deviation	Median	Mode
Would you suggest (this program) to your colleagues?	4.02	0.87	4	5

f) Changes in Sponsor Representative Interaction with the Participant

The results for Changes in Sponsor Representative Interaction with the Participant from the post event interviews show that the program had some impact on the representatives' perception of their relationship with the participant. In this section 5 out of 6 questions were aimed at the representative's impressions. Representatives rated the amount of time, potential for follow up and change in tenor of discussion among the most positive outcomes as a result of organizing the educational program. Increased Time was rated a mean score of 4.5, Follow up in Providing Care to Patients was rated a mean score of 3.67 and Change in Tenor of Discussion with Participant was rated a mean score of 3.58 all on a scale of 1 to 5. In terms of increased time for representatives the respondents commented that they viewed prioritization over representatives from other companies and frequency of visits as being the most changed variable post program.

The program did not seem to affect the length of visits, the number of requests for information or samples nor the scope of the discussion. However the representatives commented that it was "too early" to tell as it had only been approximately one month since the program and for many representatives this was the first time they had visited with the participant since that time.

The only question in this section directed towards the participants was concerning the potential for representatives to follow up in providing care to patients. This question was rated positively with a mean score of 3.68 on a scale from 1 to 5. The feedback from participants was there was a variety of follow ups that could be provided. The following are a sample of comments that were cited: "looking for updates in

research", "patient pamphlets", "Resource Program", "keep me updated on new information", "next speaker programs" and "tools". The following table highlights the mean, standard deviation, median and mode scores for the "Changes in Sponsor Representative Interaction with the Participant" section.

Table 4.14:

Follow-up Interview: Interaction between CHE Champion and Participant Scores

Follow up Interview: Interaction Between CHE Champion and Participant	Mean	Standard Deviation	Median	Mode
Increased time for CHE Champion	4.5	0.51	4.5	5
Length of visit	2.88	1.04	3	3
Follow up in providing care to your patients? Information? Research? Guidelines? Tools?	3.68	1.09	4	4
Change in scope of discussion between HCP and CHE Champion	2.06	1.01	2	3
Increase in requests for information, samples, interaction	1.59	0.89	2	2
Change in tenor of discussion - more open, more friendly	3.59	0.92	3	3

Overall, the interview results one month post program demonstrates that participants thought positively about the educational program and found the program both relevant and useful to their practice. The program was successful in making participants think about their current practice and showed that the program also had an impact on participants' practices. Additionally, the educational activity was highly valued by the participants. However, one month was consistently cited as being "too early" for the program to have any impact on patient outcomes. Finally, representatives reported that organizing the program positively affected the amount of time, follow up opportunity and tenor of discussion with participants. However, the program did not impact the length of a visit, scope of discussion or requests for general information and product samples.

4.2 Results of the Scorecard

The results of the return on educational value model scorecard for the CHE program in this research are calculated below.

Table 4.15: Return on Educational Value Model Scorecard

SCORECARD			
Pre-Post-event Questionnaire	Average Pre-Event	Average Post-Event	Average Difference
Importance of Learning Objectives 1. Very Important - 5. Not Important	4.20	4.50	0.06
Relevance to Practice 1. Strongly Disagree - 5. Strongly Agree	3.79	3.54	-0.28
Perceived Impact on Practice 1. Very Much - 5 - Not at all	4.00	3.30	-0.01
Barriers to Application 1. No Barrier - 5. Major Barrier		2.39	
Program Organization 1. Strongly Disagree - 5. Strongly Agree	4.46	4.80	0.10
Overall Average	**4.18**	**4.15**	**-0.03**
		Average does not include barriers	

Post-One Month Questionnaire	Average
1. Reaction to Program	3.21
2. Perception of Knowledge Gain, Relevanc	3.18
3. Practice Change - Intended and Actual	3.95
4. Perception of Impact on Patient Outcom	1.53
5. CHE Champion Interaction with Client	3.40
6. Perceived Program Value	4.05
Overall Average	**3.22**

Scorecard	1.63 / 5	32.66%

14 (objectives change) + 14 (relevance change) + 14 (impact change) + 7 (organization change) + 7 (F/U

The components of the ROEV model scorecard are a) the average difference in pre and post-test scores of the learning objectives section combined, b) the average difference in pre and post-test scores of the relevance to practice section combined, c) the average difference in pre and post-test scores of the perceived impact on practice section combined, d) the average difference in pre and post-test scores of the program organization section combined, e) the overall average of the post program follow-up interview questions. Each average section score of the pre and post-test and individual interview sections score are then weighted according to the organizations' priorities and

definition of "value" for educational programs. This approach was used in order to further link together the provider's organizational objectives as well as the assessment of the overall program in addition to the specific activity assessment (Gilman, 2002). In this case the change in learning objectives, relevance to practice, impact on practice and the CHE champion's interaction with participants average score were weighted twice as much as all the other domains since these areas were viewed as most important to the organization and CHE division. This was done by calculating the following equation: (14*learning objectives average difference)+(14*relevance to practice change average difference)+(14*impact on practice change average difference)+(7*program organization average difference)+(7*reaction to practice average score)+(7*perception of knowledge gain average score)+(7*practice change intended and actual average score)+(7*patient outcomes average score)+(16*CHE champion interaction average score)+(7*perceived program value average score))/100. This score (1.63) was then divided by 5 to provide an overall total percentage score signifying the program's return on educational value. In this case the program demonstrated a return of 32.66%.

It is important to note that for this model of calculating return on value for educational programs any score greater than 1 or greater than 20% is a positive gain based on the organization's definition of "value" and any score less than 1 or less than 20% is considered a negative decline or a loss in "value". This is because the 1 or 20% represents the minimal score on all instruments using the likert 5-point scale and therefore this represents the break-even point. The percentage score does not a represent return on investment (ROI) in monetary value but rather an indicator of overall "value" as defined by the educational provider.

In this case the program received a total gain of 32.66%. Practically speaking this translates into an incremental gain of 12.66% in 'value' or 'benefit' to the organization. The scorecard demonstrates that gains in value resulted from the following variables: the importance of the program's learning objectives (0.06) from the pre-post tests, the participants' reaction to the program (3.21), the participants' perceived knowledge gain (3.18), the participants' actual and intended practice change (3.95), the CHE champion's interaction with client (3.40), as well as the participants' perceived value of the program (4.05) from the one month post program follow up interviews. The losses in value resulted from the following areas according to the ROEV model scorecard: the relevance to practice (-0.28), the perceived impact on practice (-0.01) and the program organization (0.10) from the pre-post tests, as well as the perception of impact on patient outcomes (1.53) from the one month post program follow up interviews. Since the following areas were 'double weighted' the results from the following areas contributed twice as much to the final score of the program: importance of learning objectives, relevance to practice, and perceived impact on practice from the pre-post tests and the CHE champion interaction with client from the one month post program follow up interview.

CHAPTER 5

DISCUSSION

5.1. Discussion of Findings

This research thesis includes a review and critical synthesis of literature relevant to return-on-investment (ROI) and continuing health education (CHE). Through an empirical investigation into calculating return on educational value in the pharmaceutical industry, this research contributes to the overall knowledge of return-on-education modeling in a new and under-studied market. In addition, this research presents insight into the potential of a new model for assessing the value of investment into educational initiatives worthy of consideration by academics, the medical profession, industry professionals, and other key stakeholders.

This research focused on a variety of health care professionals working in the field of HIV. Included were Specialists, Family Physicians, Nurses, Pharmacists, Support Group & Social Workers as well as Case workers. Convenience sampling was used for all health care professionals participating in a continuing health education program sponsored by a Canadian subsidiary of an international pharmaceutical company. In total 173 Health Care Professionals participated in this research project from across Canada.

The objective of this study was to develop and assess a model to determine the impact of a particular CHE program. A model was developed which identified the major domains of valued outcomes for the subsidiary of an international pharmaceutical company in order to measure the impact of CHE programs on specific value targets. This approach was used in order to further link together the provider's organizational objectives as well as the assessment of the overall program in addition to the specific

activity assessment (Gilman, 2002). The CHE program serving as an educational intervention was focused on the area of HIV. The learning objectives were as follows:

At the end of the program, participants will be able to:

- Understand the course of disease progression with CCR5 vs. CXCR4 tropic viruses
- Review the latest evidence on new therapies for treatment-experienced patients in HIV
- Describe the place of CCR5 antagonists in HIV management
- Apply clinical trial results to the management of treatment-experienced patients in their practice

The program was case-based and centered on finding ways through new novel therapies, to achieve maximal response in patients having previously received antiretroviral therapy for HIV. The program proposed participants test for different categories of resistance/cross-resistance and identify specific mutations in order to choose appropriate treatments and discussed the place for the various treatments according to guidelines and specific objectives of treatment.

Pre and Post tests as well as a one month follow up interview were implemented to measure the outcomes of the program and generate a scorecard to measure the overall "value" of the program to the organization. The pre and post-test questionnaires and follow up interview guide were all based on the Dixon four levels of evaluation. One month later, structured follow up interviews were implemented in order to provide further qualitative feedback on the program and obtain further insight into the results of the pre-post questionnaires.

The results comparing the pre and post-tests for this program showed some statistically significant differences on the participants' perceptions concerning the relevance of the topic to their practice and the confidence of the participants to apply what they learned from the educational program. The one month follow-up interviews also helped to confirm, explain and provide suggestions for future areas to explore. The interviews confirmed that participants viewed the educational program positively and found it relevant, valuable and useful to their practice. They confirmed initial results from the pre and post-tests by suggesting that the program did have some effect on participants' practices despite significant barriers to implementing clinical practice changes as well as a very heterogeneous sample participating in the educational program with limited ability to effect changes in practice. The interviews also suggested areas of positive change in the relationship between the participants and the sponsor representatives.

Verbal feedback during the educational activities which was not captured as part of the questionnaires or interview questions further emphasized the barriers to practice, specifically relating to the tests proposed in this educational program. These were the tests required to make use of the new novel therapies also identified and explained in the module. This feedback was reported in an informal way to the Therapeutic CHE manager directly involved with the research project. Some of the steps involved in such tests were as follows:

-3.0 mL of plasma must be sent for optimal performance of the assay, for best results, viral loads should be confirmed within the two weeks prior to submission for testing,

-the assay is intended for use only for patients with viral loads >1,000 copies/mL

-Draw whole blood into either two 5.0 mL PPT (pearl top)

or two tubes containing EDTA anticoagulant (lavender top)

-Immediately centrifuge blood (within 2 hours of collection)

at 1,000-1,200 x g at room temperature (18-25oC)

for 10-15 minutes

-For EDTA samples: after centrifugation, immediately remove plasma from cells

and transfer to a screw-cap top tube

-Immediately after centrifugation, freeze plasma sample

at or below -20oC in a standard laboratory freezer.

Sample should be frozen when courier arrives to pick it up.

-DO NOT THAW SAMPLE AFTER FREEZING!

Additionally, the verbal feedback from participants during CHE events was that the steps involved in administering the tropism tests were "difficult" to implement. The tropism test was required to verify cell receptors and to determine if a patient was a good candidate for a specific therapy. The test results needed to be sent in to a site in the United States in order to obtain results at time of launch of this program. This eventually changed to regional sites within Canada; however this occurred sometime after the program was rolled out. Additionally, the associated testing costs were high. Therefore the required tests were initially viewed as a roadblock upon initial roll out of the program. This could explain some of the decreased score results for the post test questions relating to impact on practice and perhaps explain why participants were more

or less sure how they would implement potential changes in their treatment of patients following the program.

The heterogeneous sample participating in this program seemed to also play a role in the results of the study. The faculty responsible for the development and design of the program consisted of a group of Infectious Disease Specialists, Internal Medicine Specialists, Pharmacologists and one General Practitioner. However, the audience participating in programs consisted of Inter-professional or Inter-disciplinary groups including Specialists, General Practitioners as well as other Allied Health Professionals such as Nurses, Nurse Practitioners, Pharmacists, Social Workers and Case Workers. Since the program was case-based with a main focus on a) tropic viruses, b) the latest evidence on new therapies and c) the application of clinical trial results to patients in their practice, it would make sense that the program would be of interest to everyone from an educational standpoint. However, the program without a multi-disciplinary design approach built in to represent everyone's role, seemed to have limited impact with the Allied Health participants in terms their initial reaction to the program and in terms of any potential impact on their practices.

The time allotted between the educational event and the follow up interview proved to also play an important role in the study. On a consistent basis participants reported one month post event that it was "too early" to put into practice the learnings from the educational intervention with their patients. Also, one month post event very few participants had the opportunity to engage with other participants to exchange on the content or any key insights from the program. This would seem to indicate that the

time required for an educational activity to impact practice is longer than originally estimated.

Perhaps one of the most interesting results from this research came out of the one month follow up interviews. This was concerning the perception of sponsor representatives themselves that the program helped to produce a positive change in the relationship between the participants and the sponsor representative. Positive changes included "Increased Time" "Follow up in Providing Care to Patients" and "Change in Tenor of Discussion with Participant". In terms of increased time for representatives the respondents commented that they viewed prioritization over representatives from other companies and frequency of visits as being the most changed variable post program. These results are interesting because they are based on the internal perceptions of the representatives organizing the CHE activities and demonstrate the variety of ways that the educational program supports interactions occurring between participants and representatives long after the program is completed.

The scorecard that was generated using the proposed ROEV model demonstrated that the program produced a total gain in value of 32.66% to the organization. This amounts to an incremental gain of 12.66% from the break even threshold of 20%. As Davis argued, to effectively demonstrate the outcomes of CHE efforts evaluation should focus on identifying, measuring, and describing the value provided by a program or activity (2003). The scorecard provides a broad high level view of where CHE is contributing to particular value targets, assesses where CHE initiatives are succeeding or failing to meet expectations, and helps to monitor and guide future CHE initiatives to maximize return on educational value (ROEV). It is important to note that according to

this model that the participants' high rankings on pre-tests impact the overall score. For example, if participants rank the program high on the pre-test prior to the program and then again rank the program high again on the post-test, the difference between both ranks will be minimal. This needs to be considered in any future utilization of the scorecard as it impacts the overall score and can be misleading regarding potential weaknesses associated with the overall educational program.

Unlike the measurement of return on investment (ROI) which is a financial exercise, the final score of the ROEV model is intended as an indicator of the educational value of a given program based on specific corporate targets. In this case, according to the ROEV scorecard the CHE program is succeeding most in addressing knowledge gain, providing value and intended practice changes for learners, as well as helping CHE champions improve interactions with the participants attending the educational activities. However, the CHE program is failing most to meet expectations on demonstrating any perceived impact on clinical practice and patient outcomes (according to the scorecard's calculations). These findings from the Scorecard indicate that CHE efforts are performing well on conducting educational needs assessments and identifying the most relevant course objectives for participants. CHE efforts are also helping to strengthen and improve interactions between representatives and customers. However, more CHE effort should be focused in demonstrating a higher degree of perceived impact on clinical practices as well as patient outcomes.

These results are both confirmed and challenged in both the pre-and post test results using the Wilcox Sign test and the one month post program interviews. Results from the Wilcox Sign test demonstrated little statistically significant changes in both

groups; this suggests a fair amount of overlap between the two groups. The only exceptions were some differences between both groups in terms of Relevance to Practice as well as Perceived Impact on Practice in the one on one interviews. This can be explained by the heterogeneous sample and important barriers to practice change. The follow-up interviews demonstrated the relevance of the program to participants as well as practice changes occurring as a result of the program. It further demonstrated a positive impact on the relationship between the participant and the representative and suggested more time would be required to see any improvements in patient outcomes as a result of the educational intervention.

Although the scorecard provides confirmable and reproducible results, the scorecard by itself does not fully explain results. The scorecard, by using only mean scores from pre-and post tests, does not account for the ordinal rank scores and distributional assumptions. Furthermore, the ROEV scorecard also does not address the context in which the program was implemented, the beliefs and perceptions of the participants and the representatives implicated in the programs, the explanations of existing barriers to application, the examples of actual clinical practice change, the potential follow up actions, the tools and resources that can help encourage practice changes, the ways in which CHE champions are benefiting from the program in their interactions with clients, nor the existing differences among participants attending the educational event. By using only mean scores, the ROEV Scorecard assumes population normality and homogeneity of variance and does not account for any qualitative data. It does not address how, why and when health care professionals change behavior nor

does it help to pinpoint what more can be done to further facilitate changes in practice and impact in patient outcomes.

5.2. Overall significance of the study

This research thesis builds on the existing body of knowledge on the effectiveness of CHE and further extending them to the Canadian context. The findings complement existing literature on return-on-investment models and help to provide a good starting point for future research designed to measure the effectiveness of CHE activities. This research proposes a Return on Educational Value Model for CHE offerings that was piloted within a Canadian subsidiary of an International pharmaceutical company and provides reliable and valid information about the impact of a CHE program using Dixon multilevel evaluation models. Finally, factors that contribute to an effective CHE activity are identified.

This research is significant for a number of reasons. Beyond helping the CHE Division of the Canadian subsidiary of an International pharmaceutical company to better assess the value of educational investments and to justify its resources, it also helped the organization improve its understanding of measuring "value added" investments. It also adds to the research within the CHE field which currently describes a variety of promising evaluation models but requires considerable testing and refinement with more research in order to provide more sophisticated information about the impact of CHE for a variety of stakeholders involved in this form of education.

5.3. Relationship of results to existing studies

This research suggests that participation in educational programs combined with sufficient time to allow participants to begin clinical practice changes with appropriate follow-ups to the program, is likely to have a high degree of impact on health care professionals practices. This is consistent with recent literature which has shown that changing health care outcomes requires multiple educational interventions including a formal CHE activity followed up by small group interventions as well as a concerted effort in providing effective patient education (Davis, 2006).

The program's weakest domain according to the ROEV model scorecard was its perceived impact on patient outcomes. In the comparison between pre and post-test results using the Sign test, the results showed some statistically significant differences on the participants' perceptions concerning their confidence to apply what they learned from the educational program. The one month post program follow-up interviews expanded on this as the qualitative data and suggested that participants felt it was "too early" to answer the question of whether or not they have seen any improvement in the impact of their management of patients as a result of attending the program. Although participants indicated they were in effect starting to implement some practice changes related to patient testing, according to the follow-up interviews the changes were difficult to carry out due to barriers in application. Barriers were primarily related to the steps involved in testing patients and to the heterogeneity of participants attending the program in their ability to carry out changes due to limitations in their role. Participants offered ways for representatives to help facilitate changes in their practices by citing resource programs, tools, patient pamphlets, updates in research, and further educational

programs as highly valued post program offerings. This underlines the importance following up on key knowledge and skills to facilitate changes in practice over time to ultimately effect patient outcomes.

5.4. Limitations

There are several limitations to this study that need to be acknowledged. The first limitation is concerning the study design. The study design for this research project was a pre-experimental design. A pretest, post-test, and structured one month follow up interview were implemented without any control group. Although the one month follow up interview served to reinforce the internal validity of the research, the major weakness of any design without a control group it is difficult to know if the effects of the educational intervention may have actually been responsible for the results. Single group threats for this study included history and testing threats. The results of this study were also based on participants' self-assessment and perceptions therefore the research was not based on actual observations. This represents another weakness of this research. The second limitation of this study surrounds the instruments used in this research. Although the questionnaires and follow up interview guide were developed according to appropriate principles in instrument/questionnaire design and demonstrated reliable results throughout the study, they were not validated instruments. Therefore the validity of the results may be questioned. The third limitation is concerning the sample. Convenience sampling was used for this study. The resulting sample consisted of a heterogeneous group of health care professionals working in the HIV field including specialists, nurses, family physicians, pharmacists, case workers, support group and social workers. As participant information was optional for participants to complete no

demographic or any specific participant characteristic information was obtained for the sample. Therefore the results cannot be considered representative of a particular group. Finally, a fourth limitation to this research is a potential bias associated with company representatives sponsoring the educational program collecting pre-post tests for this research and implementing the one month post program follow up interviews themselves. Additionally, the participants attended the educational program based on their own existing interests in the topic and therapeutic area and therefore this may be cause for potential bias as well. The findings of this research are therefore subject to under-reporting bias with interventions.

5.5 Implications for future research

The findings of this study demonstrate the need for further research in six key areas relating to measuring the return of CHE interventions within the pharmaceutical industry. Firstly, industry sponsored CHE activities are typically implemented and evaluated as a one time event. For certain types of industry sponsored CHE events this is justified, such as a yearly congress symposium. However, for other types of CHE programs implemented in an on-going basis, future research should explore the results from multiple CHE events in multiple different formats implemented as a concerted effort to impact changes in patient outcomes. Studying CHE activities as applied in a variety of formats with a similar group of health care professionals over time would help to better understand the impact of sustained efforts to impact participants' clinical practice and patient outcomes. It would also provide valuable insight into the amount of time required for changes to begin occurring in practice as well as the specific type of follow ups required to adequately reinforce key learning objectives.

Secondly, as the CHE field evolves towards an emphasis on practice changes and patient outcomes as target measures of CHE, the one shot pre-post test evaluation design needs to be reconsidered. The field of CHE has become dependant on the one shot pre-post test design to evaluate all CHE activities largely because it has been an effective measure of knowledge translation to date and is the most simple and convenient assessment design available. However, the one shot pre-post test design represents a participant's self assessment of his or her own attributes or characteristics based on participation at one single educational activity, not on an on-going basis. This method of evaluating changes in practice and outcomes on patients is sub-optimal for such variables which according to the literature occur over time and generally as a result of more than one intervention. Therefore future research should focus on identifying, developing and evaluating a variety of validated behavior and/or practice change instruments and implementing them within CHE program assessment to find more effective ways of measuring these types of outcomes.

Thirdly, as the CHE field focuses its efforts on measuring outcomes related to its impact on practices and patients, investigators should more carefully consider what types of practice changes and patient outcomes are being targeted. Future research should seek to identify the types of practice changes which are most effectively achieved through CHE activities. Further insight into this area would allow CHE providers to better understand where and when and with whom CHE can play a role to effectively impact changes in practice and similarly when changes may be too great and/or complex, involve too many steps to effectively be applied, or simply be unrealistic.

Fourthly, more studies are required on barriers to change and their impact on the effectiveness of CHE programs. A better understanding of the impact of barriers to change on the effectiveness of CHE would allow educational providers to plan more effectively for barriers within the development of programs, determine the exact role and nature of barriers for specific types of programs, and better evaluate the risks versus benefits of developing programs associated with specific barriers. This type of research would be invaluable to not only improve the effectiveness of the educational intervention but also to better understand where when and with whom CHE can play a role to effectively impact changes in practice and patient outcomes as well as when barriers to change may be too great for any changes to be applied.

Fifthly, the area of inter-disciplinary and inter-professional education needs to be better understood. Over the past few years the field of CHE has witnessed the growth of interdisciplinary and inter-professional education. As Health Care Professionals in Canada increasingly work together in teams the educational interventions that are offered to them and implemented within CHE need to reflect this reality in both their development/design and implementation in order for the educational programs to be truly effective. Assessment instrument and tools need to also take into consideration the various "lenses" that educational programs are being looked through with heterogeneous groups of participants and incorporate this into their design.

Sixthly, more studies such as this are needed to further develop and refine models of calculating gains or losses from educational programs using the most appropriate methods. The model developed for this study can be thought of as a starting place in an aim to demonstrate the value of CHE within an organization. Although it

demonstrated significant findings, the increasing need for continuing health education coupled with the significant investment required warrants further investigation into a model to measure the overall value of these activities for all stakeholders involved in CHE.

5.6 Conclusion

This research thesis includes a review and critical synthesis of literature relevant to return-on-investment (ROI) and continuing health education (CHE). Through an empirical investigation into calculating return on educational value in the pharmaceutical industry, this research contributes to the overall knowledge of return-on-education modeling in a new and under-studied market. In addition, this research presents insight into the potential of a new model for assessing value of investment into educational initiatives worthy of consideration by academics, the medical profession, industry professionals, and other key stakeholders.

As a result of this particular study the CHE department of an international subsidiary of a pharmaceutical company is currently implementing an adapted version of the pre-post questionnaire of this ROEV model and scorecard into CHE offerings. Furthermore the ROEV model has been further adapted for the needs of other areas of the organization for similar but different approaches to measuring 'value-added' initiatives. Unlike the ROEV model, which relies on mostly participants' perceptions and input, the other approaches rely purely on the input from those carrying out the initiative to provide their best judgment on pre-specified 'value' targets to evaluate the associated outcomes. This is different than the ROEV model, which was developed primarily to help define, assess and improve the overall value of the organizations' sponsored educational

initiatives. This model can be thought of as a starting place in an aim to demonstrate the value of CHE. Clearly, more studies such as this are needed to further develop and refine models of calculating the value of educational programs.

REFERENCES

Abelson, R. (2008). Cleveland Clinic Discloses Doctors' Industry Ties. *New York Times, December 3, B1.*

Accreditation Council for Continuing Medical Education.ACCME annual report data 2005. (2006). Chicago, IL: *Accreditation Council for Continuing Medical Education.*. Retrieved from: http://www.accme.org/dir_docs/doc_upload/9c795f02-c470-4ba3-a491-d288be965eff_uploaddocument.pdf.

Amin,Z. (2000). Theory and Practice in Continuing Medical Education. *Academic Medecine, 29*(4), 49-50.

Association of American Medical Colleges (2008*). Industry Funding of Medical Education: Report of an AAMC Task Force.* Washington: Association of American Medical Colleges.

Bennett, N.L, Davis, D.A., Easterling, W.E. Jr, Friedmann, P., Green, J.S., Koeppen, B.M., Mazmanian, P.E., & Waxman, H.S. (2000). Continuing Medical Education: a New Vision of the Professional Development of Physicians. *Academic Medicine, 75*(12), 167-172.

Bowman, M.A. (1986). The Impact of Drug Company Funding on the Content of Continuing Medical Education. *Mobius, 6,* 66-9.

Bowman, M.A., & Pearle, D.L. (1988). Changes In Drug Prescribing Patterns Related to Commercial Company Funding of Continuing Medical Education. *Journal of Continuing Education in the Health Professions, 8*, 13-20.

Canadian Information Centre for International Medical Graduates (IMG-Canada) (2009). Medical Training/Licensure System in Canada Stages for Canadian Medical Graduates Registration to Practice Medicine in Canada. Retrieved from http://www.img-canada.ca/en/licensure_overview/exam%20chart.htm.

Canadian Institute for Health Information. (2008). Supply, Distribution and Migration of Canadian Physicians. *Health Human Resources*. 11-14.

Canadian Medical Association. CMA Code of Ethics. Ottawa (ON) (2004): *The Association*. Retrieved from: http://policybase.cma.ca/PolicyPDF/PD04-06.pdf.

Canadian Policy Research Networks (CPRN) (2006). A High Return on Investment: Adult Education in Canada. *News Release*. Retrieved from www.cprn.org.

Cauffman, J.G., Forsyth, R.A, Clark, V.A., Foster, J.P., Martin, K.J., Lapsys, F.X., & Davis, D.A. (2002). Randomized Controlled Trials of Continuing Medical

Education: What Makes Them Most Effective? *Journal of Continuing Education in the Health Professions, 22*(4), 214-21.

Davis,D., Barnes,B., & Fox, R. (2003). *The Continuing Professional Development of Physicians: From Research to Practice.* Chicago, IL.: AMA Press.

Davis, D., O'Brien, M.A., Freemantle, N., Wolf, F.M., Mazmanian, P., & Taylor-Vaisey, A. (1999). Impact Of Formal Continuing Medical Education: Do Conferences, Workshops, Rounds, and Other Traditional Continuing Education Activities Change Physician Behavior or Health Care Outcomes? *Journal of the American Medical Association, 282*(9), 867-74.

Davis, D.A., & Taylor-Vaisey, A.L. (1997): Translating Guidelines into Practice: A Systematic Review of Theoretic Concepts, Practical Experience and Research Evidence in the Adoption of Clinical Practice Guidelines. *Canadian Medical Association Journal, 157,* 408-416.

Davis, D.A. Mazmanian, P.E., Fordis, M., Thorpe, K.F., & Perrier, I. (2006), Accuracy Of Physician Self-Assessment Compared With Observational Measures Of Competence. *Journal of the American Medical Association, 296*(9), 109-110.

Ebell, M.H., & Shaughnessy, A (2003). Integrating Continuing Medical Education with the Information Needs of Clinicians. *Journal of Continuing Education in the Health Professions, 23*(1), 53-62.

Figueiras, A., Sastre, I., & Gestal-Otero, J.J. (2001). Effectiveness Of Educational Interventions On The Improvement Of Drug Prescription In Primary Care: A Critical Literature Review. *Journal of Evaluation in Clinical Practice, 7*(2), 223-41.

Gagnon, M.A., & Lexchin, J. (2008). The Cost of Pushing Pills: A New Estimate of Pharmaceutical Promotion Expenditures in the United States. PLoS Medicine.Retrieved from:http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0050001#journal-pmed-0050001-b004.

Gilman, S.C., Cullen, R.J., & Leist, J.C. (2002). Domains-Based Outcomes Assessment of Continuing Medical Education: The VA's model. *Academic Medicine, 77(8), 810-17.*

Goodyear-Smith, F., Whitehorn, M., & McCormick, R. (2003). General Practitioners' Perceptions Of Continuing Medical Education's Role In Changing Behaviour. *Educatioal Health (Abingdon), 16*(3), 328-38.

Greene, J.C. (1994). *Qualitative Program Evaluation.* Thousand Oaks, *CA.:Sage.*

Guba, E.G., & Lincoln, Y.S., (1981). *Effective Evaluation.* San Francisco:Jossey-Bass.

Hebert, P. (2008). The Need for an Institute of Continuing Health Education. *Canadian Medical Association Journal. March, 178* (7).

IMS Health (2007). Canadian Drug Stores and Hospital Purchases. *IMS Health Canada.*

Kirkpatrick, D.E. (1998). *Evaluating Training Programs: The Four Levels.* (2nd ed.). San Francisco, CA.:Berett-Koehler.

Kneller, G.F. (1971). *Introduction to the Philosophy of Education.* New York: John Wiley and Sons.

Levinson, W. (2008). Revalidation of physicians in Canada: Are we passing the test?. *Canadian Medical Association Journal, 179*(10).

Lexchin, J. (2007). Does the C in CME stand for "Continuing" or "Commercial"? *Canadian Medical Association Journal, 18,* (2) 17.

Lu, C.Y., Ross-Degnan, D., Soumerai, S.B., & Pearson, S. (2008). Interventions Designed To Improve The Quality and Efficiency of Medication Use In Managed Care: A Critical Review Of The Literature – 2001–2007. *BMC Health Services Research, 8* (75).

Marinopoulos, S.S., Dorman, T., Ratanawongsa, N., Wilson, L.M., Ashar, B.H., Magaziner, J.L., Miller, R.G., Thomas, P.A., Prokopowicz,G.P., Qayyum, R., & Bass, E.B. (2007). Effectiveness of Continuing Medical Education. Evidence Report/Technology Assessment No. 149 *AHRQ Publication No. 07*-E006.

Marlow, B. (2004). The Future Sponsorship of CME in Canada: Industry, Government, Physicians or a Blend? Commentary. *Canadian Medical Association Journal, ; 171* (2).

Mazmanian, P.E. (2009). Continuing Medical Education Costs and Benefits: Lessons for Competing in a Changing Health Care Economy. *The Journal of Continuing Education in the Health Professions, 29* (3), 133-134.

Pearson, S.A., Ross-Degnan, D., Payson, A., & Soumerai, S.B. (2003). Changing medication use in managed care: a critical review of the available evidence. *American Journal of Managed Care, 9,* 715-731.

Phillips, J.J. (2003). *Return on Investment in Training and Performance Improvement Programs* (2nd ed.). New York, NY: Butterworth-Heinemann.

Relman, S. (2001). Separating Continuing Medical Education from Pharmaceutical Marketing. *Journal of the American Medical Association, 285*(15), 209-212.

Canada's Research Based Pharmaceutical Companies (2009). Overview. Retrieved from http://www. canadapharma.org/About_RxD/Overview/index_e.html.

Scriven, M. (1973). *Goal-free Evaluation.* (1973). Berkeley, CA.: McCutchen.

Silver, I., Campbell, C., Marlow, R., & Sargeant, J. (2008). Self Assessment and Continuing Professional Development: The Canadian Perspective. *Journal of Continuing Education in the Health Professions, 28,* 25-3.

Simon, G.E., VonKorff, M., Rutter, C., & Wagner, E. (2000). Randomised Trial of Monitoring, Feedback, and Management of Care By Telephone to Improve Treatment of Depression in Primary Care. *British Medical Journal. 320,* 550-554.

Soumerai, S.B., McLaughlin, T.S., & Avorn, J. (1989). Improving drug prescribing in primary care: A critical analysis of the experimental literature. *Milbank Q, 6,7,* 268-317.

Stake, R.E. (1975). *Program Evaluation.* Urbana: University of Illinois, CIRCE.

StatSoft (2009). Electronic Statistics textbook. Retrieved from http://www.statsoft.com/textbook/stathome.html?stbasic.html&1.

Steinbrook, R. (2008). Disclosure of Industry Payments to Physicians. *New England Journal of Medicine, 359,* 559-61.

Steinman, M.A. (2007). Is Continuing Medical Education A Drug-Promotion Tool? *Canadian Family Physician, 53,* 165-167.

Stufflebeam, D.L. (1973). *Educational Evaluation: Theory and Practice.* Worthington, OH: Charles A. Jones.

Tian, J.; Atkinson, N.L. Portnoy, B. & Gold, R.S. (2007). A Systematic Review of Evaluation in Formal Continuing Medical Education. *Journal of Continuing Education in the Health Professions, 27,* 16-27.

The College of Canadian Physicians (2008). Mission and Goals. Retrieved from http://www.cfpc.ca/English/cfpc/about% 20us/mission/default.asp?s=1.

Tyler, R.W. (1950). *Basic Principles of Curriculum and Instruction.* Chicago: University of Chicago Press.

World Health Organization. (1998). Ethical Criteria for Medicinal Drug Promotion. Retrieved from www.who.int.

Wazana, A. (2000). Physicians and the Pharmaceutical Industry. Is a gift ever just a gift? *Journal of the American Medical Association, 283*,373-80.

Wolfe, S.M. (1996). Why do American Drug Companies Spend More than $12 Billion a Year Pushing Drugs? Is it Education or Promotion? *Journal of General Internal Medicine, 11*,637-9.

Worthen, B., R., Sanders, J., R. Fitzpatrick, J. L. (1997). *Program Evaluation: Alternative Approaches and Practical Guidelines*. New York: Longman.

Yen, B.M. (2006). Engaging Physicians to Change Practice. *Journal of Clinical Outcomes Management, 13* (2), 103-10.

APPENDIX 1 CONSENT FORM TO PARTICPATE IN RESEARCH

This is to state that I agree to participate in research conducted by Jenna Momy of the Continuing Health Education Department of Pfizer Canada Inc. and student at Concordia University.

A. PURPOSE

I have been informed that the purpose of the research is to assess a continuing health education program and develop an assessment method for future programs.

B. PROCEDURES

The participant will be asked to fill in a pre-test questionnaire as well as a post test questionnaire when attending a CHE event.
Furthermore a representative will follow up with a questionnaire to be discussed 1 month after the activity.

C. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at anytime without negative consequences.
- I understand that my participation in this study is confidential, anonymous at my discretion.
- I understand that the results of this study may be published.

I HAVE STUDIED THE ABOVE INFORMATION AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print):_____
SIGNATURE_____

Witness Signature_____
Date_____

If at any time you have questions about your rights as a research participant or care to know more information on this research project, please do not hesitate to contact Adela Reid, Research Ethics and Compliance Officer at Concordia University, at 514-848-2424 x7481 or by email at adela.reid@Concordia.ca

APPENDIX 2: PRE- / POST-CHE EVENT QUESTIONNAIRE

Pre- / Post-CHE Event Questionnaire

Location [INSERT FIELD]

Date [INSERT FIELD]

[INSERT FIELD]

Participant Information

Facilitator's Name: [INSERT FIELD]

Organizer's Name: [INSERT FIELD]

Date of Session: [INSERT FIELD]

Participant Information (Please print the following): Code: [INSERT FIELD]

Name: [INSERT FIELD]

Address: [INSERT FIELD]

[INSERT FIELD]

Telephone: **[INSERT FIELD]**

Fax: [INSERT FIELD]

Email: [INSERT FIELD]

Preferred method of contact: _____

All information collected in this survey will remain strictly confidential to Pfizer Continuing Health Education & Development Department. Your personal identity will not be revealed and will never be linked to the answers you provide. Participation in the survey is completely voluntary. Your identity will not be disclosed in any subsequent reports or publications that result from the study. You can have access to published aggregate findings, should you wish to receive them.

[INSERT FIELD]

Participant Characteristics

Please check or write responses where indicated.

0.1 Healthcare Profession

- ❑ **Family Physician**
- ❑ **Specialist (Specify):** _____
- ❑ **Nurse**
- ❑ **Pharmacist**
- ❑ **Other (Specify):** _____

0.2 Years Experience in Current Role

- ❑ Less than 5 years
- ❑ 6-15 years
- ❑ 16-26 years
- ❑ 25+ years

0.3 Type of Practice

- ❑ **Solo** (one healthcare provider)
- ❑ **Group** (two or more healthcare providers)

0.4 Setting

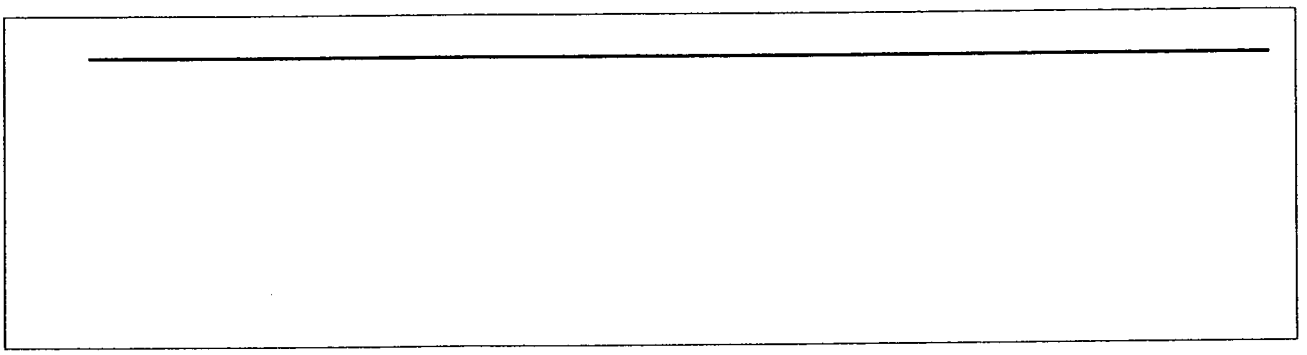
- ❑ **Private Office / Clinic / Community-based** (non-teaching practice)
- ❑ **Hospital-based**
- ❑ **Academic-based** (teaching practice)

0.5 Location of Practice

- ❑ **Urban** – > 500,000
- ❑ **Suburban** – 100,000 – 500,000
- ❑ **Rural** – < 100,000

0.6 How were you informed about this program?

- ❑ Colleague
- ❑ Journal advertisement
- ❑ University or university publication
- ❑ Professional association
- ❑ CHE provider / pharmaceutical company
- ❑ Pharmaceutical representative
- ❑ Invitation
  - ❑ Email invitation
  - ❑ Mail invitation
  - ❑ Phone invitation
  - ❑ Verbal invitation
- ❑ Other: Please Specify:



Pre-CHE Event Questionnaire

The following statements and questions seek to evaluate what you expect to gain by participating in the INSERT FIELD] program. Please consider each statement and respond as indicated on the scale provided.

IMPORTANCE OF LEARNING OBJECTIVES **1.1. Please review each learning objective listed below and rate its importance to you to your clinical practice. Circle the appropriate number on the 5-point scale, from 1 (Very important) to 5 (Not Important) to your clinical practice.**	**Very Important** **Not Important**
I. [INSERT OBJECTIVE]	1 2 3 4 5
II. [INSERT OBJECTIVE]	1 2 3 4 5
III. [INSERT OBJECTIVE]	1 2 3 4 5
IV. [INSERT OBJECTIVE]	1 2 3 4 5
RELEVANCE TO PRACTICE **1.2.Consider the following statements about the knowledge you expect to gain from this program. Please indicate the extent to which you agree with these statements on the 5-point scale, from 1 (Strongly Disagree) to 5 (Strongly Agree).**	**Strongly Disagree** **Strongly Agree**
I. The topic of this program is highly relevant to my clinical practice	1 2 3 4 5
II. The topic of this program is unrelated to my practice	1 2 3 4 5
III. I anticipate that the knowledge I will gain from this program will improve my clinical practice	1 2 3 4 5
IV. I believe I have patients who will benefit from my increased knowledge about this topic	1 2 3 4 5
PERCEIVED IMPACT ON PRACTICE **1.3.The following questions relate to your intent to apply the knowledge you hope to gain in this program to your clinical practice. Please review these questions and rate how much you intend to apply the knowledge on the 5-point scale, from 1 (Very much) to 5 (Not at all).**	**Very Much** **Not at All**
I. To what extent do you think you will apply what you will learn in this session to the treatment of your patients in your clinical practice	1 2 3 4 5
II. Have you considered how you will implement changes in your treatment of patients following this program	1 2 3 4 5
III. How confident are you that you will apply what you will learn in this program to the treatment of your patients	1 2 3 4 5

PROGRAM ORGANIZATION **1.4.Please tell us about the setting and organization of this program. Rate the extent to which you agree with the following statements as factors that attracted to you to this program on the 5-point scale, from 1 (Strongly Disagree) to 5 (Strongly Agree).**	**Strongly Disagree** **Strongly Agree**
I. Setting will be appropriate for learning	1 2 3 4 5
II. Length of program will be appropriate	1 2 3 4 5
III. Facilitator/key speaker(s) is credible	1 2 3 4 5

Post-CHE Event Questionnaire

The following statements and questions seek to evaluate your experience in participating in the INSERT FIELD] program. Please consider each statement and respond as indicated on the scale provided.

IMPORTANCE OF LEARNING OBJECTIVES **2.1 Please review each learning objective below and rate the importance to your clinical practice of what you learnt today. Circle the appropriate number on the 5-point scale, from 1 (Very important) to 5 (Not important) to your clinical practice.**	**Very Important** **Not Important**
I. [INSERT OBJECTIVE]	1 2 3 4 5
II. [INSERT OBJECTIVE]	1 2 3 4 5
III. [INSERT OBJECTIVE]	1 2 3 4 5
IV. [INSERT OBJECTIVE]	1 2 3 4 5
RELEVANCE TO PRACTICE **2.2 Consider the following statements regarding the knowledge you gained from this program. Please indicate the extent to which you agree with these statements on the 5-point scale, from 1 (Strongly Disagree) to 5 (Strongly Agree).**	**Strongly Disagree** **Strongly Agree**
I. The topic is highly relevant to my clinical practice	1 2 3 4 5
II. The topic of this program is unrelated to my practice	1 2 3 4 5
III. The knowledge I gained from attending this program will improve my clinical practice	1 2 3 4 5
IV. I have patients who will benefit from my increased knowledge about this topic	1 2 3 4 5
PERCEIVED IMPACT ON PRACTICE **2.3 The following questions relate to your intent to apply the knowledge you hope to gain in this program to your clinical practice. Please review these questions and rate how much you intend to apply the knowledge on the 5-point scale, from 1 (Very much) to 5 (Not at all).**	**Very Much** **Not at All**
I. To what extent do you think you will apply what you learned in this session to the treatment of your patients in your clinical practice	1 2 3 4 5

II. Have you considered how you will implement changes in your treatment of your patients following this program	1 2 3 4 5
III. How confident are you that you will apply what you learned in this program to the treatment of your patients	1 2 3 4 5

Post-CHE Event Questionnaire

BARRIERS TO APPLICATION **2.4 Think about your clinical practice and the barriers or obstacles you might encounter in putting the new knowledge you gained today into practice. Please rate the importance of the potential barriers listed below in preventing you from applying what you learnt from this program using the 5-point scale provided, from 1 (No barrier) to 5 (Major barrier).**	**No Barrier** **Major Barrier**
I. Lack of experts to consult with in applying new knowledge with my patients	1 2 3 4 5
II. Lack of accessibility to follow up materials to reinforce my changing my practice	1 2 3 4 5
III. Lack of necessary equipment to apply new knowledge gained	1 2 3 4 5
IV. Lack of time to implement new practices	1 2 3 4 5
V. Lack of financial resources to implement new practices	1 2 3 4 5
VI. Other. Please Specify _____	1 2 3 4 5
PROGRAM ORGANIZATION **2.5 Please tell us about the setting and organization of this program. Rate the extent to which you agree with the following statements on the 5-point scale, from 1 (Strongly Disagree) to 5 (Strongly Agree).**	**Strongly Disagree** **Strongly Agree**
I. Setting was appropriate for learning	1 2 3 4 5
II. Length of program was appropriate	1 2 3 4 5
III. Facilitator/key speaker(s) was credible	1 2 3 4 5
IV. Teaching materials, e.g. slides, handouts, were useful and appropriate	1 2 3 4 5
V. Program content was credible and unbiased	1 2 3 4 5
VI. Information was presented clearly	1 2 3 4 5
VII. Speaker was knowledgeable and was familiar with the content	1 2 3 4 5
VIII. Adequate opportunity was provided for interaction and questions with the speaker and with other participants	1 2 3 4 5

APPENDIX 3: RETURN ON EDUCATIONAL VALUE FOR CHE&D

FOLLOW-UP INTERVIEW GUIDE

Return on Educational Value for CHE&D

Follow-up Interview Guide

Prioritization: **1. Must ask** 2. Should ask 3. Could ask if have time or interest

▪ tems in Italics are for CHE Champion to respond based on reflection of HCP input and feedback			
Priority			**Not at all Very Much**
1	**3.1**	**Was the program content credible and unbiased?**	**1 2 3 4 5**
1	**3.2.1**	**Were the knowledge and skills presented in this program useful?**	**1 2 3 4 5**
	3.2 2	***CHE Champion perception of HCP knowledge gain***	*1 2 3 4 5*
1	**3.3.1**	**Did anything in the program make you change your current practice?**	**1 2 3 4 5**
	3.3.2	***CHE Champion perception of intent of HCP to change practice***	*1 2 3 4 5*
1	**3.4.1**	**Are you doing anything differently as a result of what you learned in this program?**	**1 2 3 4 5**
	3.4.2	***CHE Champion perception of HCP practice change***	*1 2 3 4 5*
1	**3.5**	**Is there any way that I can help you in providing care to your patients? Information? Research? Guidelines? Tools? Networking contacts?**	**1 2 3 4 5** **Open Field**
1	***3.6***	***Change in scope of discussion between HCP and CHE Champion*** ▪ ***Increase in requests for information, samples, interaction*** ▪ ***Change in tenor of discussion – more open, more friendly***	**1 2 3 4 5**
1	***3.7***	***Increased time for CHE Champion*** ▪ ***Frequency*** ▪ ***Length of visit*** ▪ ***Prioritization of Pfizer CHE Champion over Reps from other companies***	**1 2 3 4 5** **1 2 3 4 5** **1 2 3 4 5**
2	3.8	Did you have a chance to ask questions and speak with other healthcare professionals attending the program?	1 2 3 4 5
2	3.9.1	What stops you from implementing what you learned the way that you would like to?	Open Field
	3.9.2	*CHE Champion perception of HCP barriers to practice change*	*1 2 3 4 5*
3	3.10	What do you think about the program? ??	1 2 3 4 5
3	3.11	Do you see patients who can benefit from the program? ??	1 2 3 4 5
3	3.12	Have you seen any improvement in the impact of	1 2 3 4 5

		your treatment and management of [FIELD] as a result of your attending this program?	
3	3.13	Would you suggest (this program) to your colleagues?	1 2 3 4 5

APPENDIX 4: DATA TABLES

2.1.I. Post-program - Importance of Learning Objective I

Mean	1.279761905
Standard Error	0.043811163
Median	1
Mode	1
Standard Deviation	0.567857569
Sample Variance	0.322462218
Kurtosis	2.654335466
Skewness	1.923662606
Range	2
Minimum	1
Maximum	3
Sum	215
Count	173
Confidence Level(95.0%)	0.086495104

2.1.II. Post-program - Importance of Learning Objective II

Mean	1.255952381
Standard Error	0.043049086
Median	1
Mode	1
Standard Deviation	0.55797993
Sample Variance	0.311341603
Kurtosis	9.093907258
Skewness	2.730003972
Range	3
Minimum	1
Maximum	4
Sum	211
Count	173

Confidence Level(95.0%)	0.084990559
2.1.III. Post-program - Importance of Learning Objective III	
Mean	1.297619048
Standard Error	0.040102097
Median	1
Mode	1
Standard Deviation	0.519782587
Sample Variance	0.270173938
Kurtosis	3.880204824
Skewness	1.781661968
Range	3
Minimum	1
Maximum	4
Sum	218
Count	173
Confidence Level(95.0%)	0.079172404
2.1.IV. Post-program - Importance of Learning Objective IV	
Mean	1.380952381
Standard Error	0.040323687
Median	1
Mode	1
Standard Deviation	0.522654714
Sample Variance	0.27316795
Kurtosis	1.790041362
Skewness	1.128052026
Range	3
Minimum	1
Maximum	4
Sum	232
Count	173
Confidence Level(95.0%)	0.079609882
2.2.I. Post-program Relevance to Practice - The topic of this program is highly relevant to my clinical practice	
Mean	4.55952381

Standard Error	0.053865665
Median	5
Mode	5
Standard Deviation	0.69817882
Sample Variance	0.487453664
Kurtosis	4.847479652
Skewness	-1.924411237
Range	4
Minimum	1
Maximum	5
Sum	766
Count	173
Confidence Level(95.0%)	0.106345417
2.2.II. Post-program Relevance to Practice - The topic of this program is unrelated to my practice	
Mean	1.327380952
Standard Error	0.042633095
Median	1
Mode	1
Standard Deviation	0.552588073
Sample Variance	0.305353579
Kurtosis	3.116512894
Skewness	1.688803155
Range	3
Minimum	1
Maximum	4
Sum	223
Count	173
Confidence Level(95.0%)	0.08416928
2.2.III. Post-program Relevance to Practice - The knowledge I gained in attending this program will improve my clinical practice	
Mean	4.267857143
Standard Error	0.065112269
Median	4
Mode	5

Standard Deviation	0.843951458
Sample Variance	0.712254063
Kurtosis	2.586020384
Skewness	-1.449850349
Range	4
Minimum	1
Maximum	5
Sum	717
Count	173
Confidence Level(95.0%)	0.128549258
2.2.IV. Post-program Relevance to Practice - I have patients who will benefit from my increased knowledge about this topic	
Mean	3.994047619
Standard Error	0.053729608
Median	4
Mode	4
Standard Deviation	0.696415319
Sample Variance	0.484994297
Kurtosis	1.906203553
Skewness	-0.745570767
Range	4
Minimum	1
Maximum	5
Sum	671
Count	173
Confidence Level(95.0%)	0.106076803
2.3.I. Post-program Perceived Impact on Practice - To what extent do you think you will apply what you will learn in this session to the treatment of your patients in your clinical practice	
Mean	1.577380952
Standard Error	0.059997757
Median	1
Mode	1

Standard Deviation	0.777659807
Sample Variance	0.604754776
Kurtosis	0.744572406
Skewness	1.207760984
Range	3
Minimum	1
Maximum	4
Sum	265
Count	173
Confidence Level(95.0%)	0.118451826
2.3.II. Post-program Perceived Impact on Practice - Have you considered how you will implement changes in your treatment of patients following this program	
Mean	2.077380952
Standard Error	0.05339689
Median	2
Mode	2
Standard Deviation	0.692102791
Sample Variance	0.479006273
Kurtosis	-0.89403216
Skewness	-0.103242621
Range	2
Minimum	1
Maximum	3
Sum	349
Count	173
Confidence Level(95.0%)	0.105419926
2.3.III. Post-program Perceived Impact on Practice - How confident are you that you will apply what you will learn in this program to the treatment of your patients	
Mean	1.738095238
Standard Error	0.043248224
Median	2

Mode	2
Standard Deviation	0.560561045
Sample Variance	0.314228685
Kurtosis	-0.422356661
Skewness	0.008581636
Range	2
Minimum	1
Maximum	3
Sum	292
Count	173
Confidence Level(95.0%)	0.08538371

2.4.I. Post-program Barriers to Application - Lack of experts to consult with in applying new knowledge with my patients

Mean	2.327380952
Standard Error	0.074804671
Median	3
Mode	3
Standard Deviation	0.969579351
Sample Variance	0.940084117
Kurtosis	-0.953555691
Skewness	-0.29975778
Range	4
Minimum	1
Maximum	5
Sum	391
Count	173
Confidence Level(95.0%)	0.147684686

2.4.II. Post-program Barriers to Application - Lack of accessibility to follow up materials to reinforce my changing my practice

Mean	2.666666667
Standard Error	0.092746126
Median	3
Mode	4
Standard Deviation	1.20212719
Sample Variance	1.44510978
Kurtosis	-1.483984296
Skewness	-0.252719381
Range	3
Minimum	1
Maximum	4
Sum	448
Count	173
Confidence Level(95.0%)	0.18310598

2.4.III. Post-program Barriers to Application - Lack of necessary equipment to apply new knowledge gained

Mean	2.25
Standard Error	0.080873299
Median	3
Mode	3
Standard Deviation	1.048237757
Sample Variance	1.098802395
Kurtosis	-0.582954683
Skewness	0.209142579
Range	4
Minimum	1
Maximum	5
Sum	378
Count	173
Confidence Level(95.0%)	0.159665802

2.4.IV. Post-program Barriers to Application - Lack of time to implement new practices

Mean	2.363095238
Standard Error	0.063981567
Median	2
Mode	2
Standard Deviation	0.829295894
Sample Variance	0.687731679
Kurtosis	-0.508493415
Skewness	0.125936585
Range	3
Minimum	1
Maximum	4
Sum	397
Count	173
Confidence Level(95.0%)	0.126316948

2.4.V. Post-program Barriers to Application - Lack of financial resources to implement new practices

Mean	2.285714286
Standard Error	0.071713149
Median	3
Mode	3
Standard Deviation	0.929508641
Sample Variance	0.863986313
Kurtosis	-0.996989487
Skewness	-0.193119392
Range	4
Minimum	1
Maximum	5
Sum	384

Count	173
Confidence Level(95.0%)	0.141581184

2.4.VI. Post-program Barriers to Application - Other. Please Specify

Mean		1
Standard Error		0
Median		1
Mode	#N/A	
Standard Deviation	#DIV/0!	
Sample Variance	#DIV/0!	
Kurtosis	#DIV/0!	
Skewness	#DIV/0!	
Range		0
Minimum		1
Maximum		1
Sum		1
Count		1
Confidence Level(95.0%)	#NUM!	

2.5.I. Post-program Program Organization - Setting was appropriate for learning

Mean	4.583333333
Standard Error	0.048071348
Median	5
Mode	5
Standard Deviation	0.623075881
Sample Variance	0.388223553
Kurtosis	2.548738061
Skewness	-1.523369176
Range	3
Minimum	2
Maximum	5
Sum	770
Count	173
Confidence Level(95.0%)	0.094905864

2.5.II. Post-program Program Organization - Length of program was appropriate	
Mean	4.648809524
Standard Error	0.041482955
Median	5
Mode	5
Standard Deviation	0.537680547
Sample Variance	0.289100371
Kurtosis	0.463341602
Skewness	-1.203002316
Range	2
Minimum	3
Maximum	5
Sum	781
Count	173
Confidence Level(95.0%)	0.081898591

2.5.III. Post-program Program Organization - Facilitator/key speaker(s) was credible	
Mean	4.892857143
Standard Error	0.033810086
Median	5
Mode	5
Standard Deviation	0.438228801
Sample Variance	0.192044482
Kurtosis	40.99009606
Skewness	-5.723549949
Range	4
Minimum	1
Maximum	5
Sum	822
Count	173
Confidence Level(95.0%)	0.06675027

2.5.IV. Post-program Program Organization - Teaching materials, e.g. slides, handouts, were useful and appropriate	
Mean	4.464285714
Standard Error	0.058430216
Median	5
Mode	5
Standard Deviation	0.757342163
Sample Variance	0.573567151
Kurtosis	1.681507067
Skewness	-1.342508239
Range	4
Minimum	1
Maximum	5
Sum	750
Count	173
Confidence Level(95.0%)	0.115357077
2.5.V. Post-program Program Organization - Program content was credible and unbiased	
Mean	4.648809524
Standard Error	0.043167204
Median	5
Mode	5
Standard Deviation	0.559510917
Sample Variance	0.313052466
Kurtosis	9.34399876
Skewness	-2.16735521
Range	4
Minimum	1
Maximum	5
Sum	781
Count	173
Confidence Level(95.0%)	0.085223756

2.5.VI. Post-program Program Organization - Information was presented clearly	
Mean	4.863095238
Standard Error	0.033693797
Median	5
Mode	5
Standard Deviation	0.436721526
Sample Variance	0.190725691
Kurtosis	21.49602339
Skewness	-4.182557166
Range	3
Minimum	2
Maximum	5
Sum	817
Count	173
Confidence Level(95.0%)	0.066520684

2.5.VII. Post-program Program Organization - Speaker was knowledgeable and was familiar with the content	
Mean	4.898809524
Standard Error	0.032305085
Median	5
Mode	5
Standard Deviation	0.418721764
Sample Variance	0.175327916
Kurtosis	47.67975266
Skewness	-6.103408859
Range	4
Minimum	1
Maximum	5
Sum	823
Count	173
Confidence Level(95.0%)	0.063778991

2.5.VIII. Post-program Program Organization - Adequate opportunity was provided for interaction and questions with the speaker and with other participants	
Mean	4.767857143
Standard Error	0.049930958
Median	5
Mode	5
Standard Deviation	0.647179179
Sample Variance	0.41884089
Kurtosis	14.17191453
Skewness	-3.491821751
Range	4
Minimum	1
Maximum	5
Sum	801
Count	173
Confidence Level(95.0%)	0.098577238

2.5.IV. Post-program Program Organization - Teaching materials, e.g. slides, handouts, were useful and appropriate	
Mean	4.464286
Standard Error	0.05843
Median	5
Mode	5
Standard Deviation	0.757342
Sample Variance	0.573567
Kurtosis	1.681507
Skewness	-1.34251
Range	4
Minimum	1
Maximum	5
Sum	750
Count	173
Confidence Level(95.0%)	0.115357

2.5.V. Post-program Program Organization - Program content was credible and unbiased	
Mean	4.64881
Standard Error	0.043167
Median	5
Mode	5
Standard Deviation	0.559511
Sample Variance	0.313052
Kurtosis	9.343999
Skewness	-2.16736
Range	4
Minimum	1
Maximum	5
Sum	781
Count	173
Confidence Level(95.0%)	0.085224

2.5.VI. Post-program Program Organization - Information was presented clearly	
Mean	4.863095
Standard Error	0.033694
Median	5
Mode	5
Standard Deviation	0.436722
Sample Variance	0.190726
Kurtosis	21.49602
Skewness	-4.18256
Range	3
Minimum	2
Maximum	5
Sum	817
Count	173
Confidence Level(95.0%)	0.066521

2.5.VII. Post-program Program Organization - Speaker was knowledgeable and was familiar with the content	
Mean	4.89881
Standard Error	0.032305
Median	5
Mode	5
Standard Deviation	0.418722
Sample Variance	0.175328
Kurtosis	47.67975
Skewness	-6.10341
Range	4
Minimum	1
Maximum	5
Sum	823
Count	173
Confidence Level(95.0%)	0.063779

2.5.VIII. Post-program Program Organization - Adequate opportunity was provided for interaction and questions with the speaker and with other participants	
Mean	4.767857
Standard Error	0.049931
Median	5
Mode	5
Standard Deviation	0.647179
Sample Variance	0.418841
Kurtosis	14.17191
Skewness	-3.49182
Range	4
Minimum	1
Maximum	5
Sum	801
Count	173
Confidence Level(95.0%)	0.098577

One Month Follow Up – Descriptive Statistics

Relevance to Practice/Perception of Knowledge Gain

3.11.Do you see patients who can benefit from the program?

Mean	3.647058824
Standard Error	0.226900187
Median	4
Mode	5
Standard Deviation	1.323044078
Sample Variance	1.750445633
Kurtosis	0.234292314
Skewness	-0.797203398
Range	5
Minimum	0
Maximum	5
Sum	124
Count	34
Largest(1)	5
Smallest(1)	0
Confidence Level(95.0%)	0.4616319

3.2.1 Were the knowledge and skills presented in this program useful?

Mean	3.411764706
Standard Error	0.179708851
Median	3
Mode	3
Standard Deviation	1.047873664
Sample Variance	1.098039216
Kurtosis	0.116259622
Skewness	-0.423515353
Range	4
Minimum	1
Maximum	5
Sum	116
Count	34
Largest(1)	5
Smallest(1)	1
Confidence Level(95.0%)	0.365620404

3.2.2 CHE Champion's perception of HCP knowledge gain

Mean	2.5
Standard Error	0.175352967
Median	3

Mode	3
Standard Deviation	1.022474716
Sample Variance	1.045454545
Kurtosis	-0.262607476
Skewness	-0.451802391
Range	4
Minimum	0
Maximum	4
Sum	85
Count	34
Largest(1)	4
Smallest(1)	0
Confidence Level(95.0%)	0.356758292

Reaction to Program

3.11.What did you think about the program?

Mean	3.705882353
Standard Error	0.160932065
Median	4
Mode	3
Standard Deviation	0.938387132
Sample Variance	0.88057041
Kurtosis	0.449868383
Skewness	-0.292031351
Range	4
Minimum	1
Maximum	5
Sum	126
Count	34
Largest(1)	5
Smallest(1)	1
Confidence Level(95.0%)	0.327418747

3.1.Was the program content credible and unbiased?

Mean	3.882352941
Standard Error	0.172868769
Median	4
Mode	4
Standard Deviation	1.007989475
Sample Variance	1.016042781
Kurtosis	-0.448033018
Skewness	-0.695104376
Range	3
Minimum	2
Maximum	5

Sum	132
Count	34
Largest(1)	5
Smallest(1)	2
Confidence Level(95.0%)	0.351704153

3.9 Did you have a chance to ask questions and speak with other healthcare professionals attending the program?

Mean	2.058823529
Standard Error	0.32687462
Median	2
Mode	1
Standard Deviation	1.905990182
Sample Variance	3.632798574
Kurtosis	14.59426265
Skewness	3.23099428
Range	11
Minimum	0
Maximum	11
Sum	70
Count	34
Largest(1)	11
Smallest(1)	0
Confidence Level(95.0%)	0.66503141

Intended Practice Change

3.3.1 Did anything in the program make you think about your current practice?

Mean	4.294117647
Standard Error	0.191296411
Median	5
Mode	5
Standard Deviation	1.11544017
Sample Variance	1.244206774
Kurtosis	1.230761834
Skewness	-1.463727609
Range	4
Minimum	1
Maximum	5
Sum	146
Count	34
Largest(1)	5
Smallest(1)	1
Confidence Level(95.0%)	0.389195473

3.3.2 CHE Champion's perception of intent of HCP to change practice

Mean	2.558823529

Standard Error	0.189714
Median	2
Mode	2
Standard Deviation	1.10621321
Sample Variance	1.223707665
Kurtosis	1.219586316
Skewness	1.554732165
Range	4
Minimum	1
Maximum	5
Sum	87
Count	34
Largest(1)	5
Smallest(1)	1
Confidence Level(95.0%)	0.385976034

3.4.1 Are you doing anything differently as a result of what you learned in this program?

Mean	1.911764706
Standard Error	0.251085512
Median	2
Mode	3
Standard Deviation	1.46406754
Sample Variance	2.143493761
Kurtosis	-1.418114228
Skewness	0.038446984
Range	4
Minimum	0
Maximum	4
Sum	65
Count	34
Largest(1)	4
Smallest(1)	0
Confidence Level(95.0%)	0.510837312

3.4.2 CHE Champion's perception of HCP practice change

Mean	1.882352941
Standard Error	0.081918897
Median	2
Mode	2
Standard Deviation	0.477665147
Sample Variance	0.228163993
Kurtosis	1.428721766
Skewness	-0.380267696
Range	2
Minimum	1
Maximum	3
Sum	64
Count	34

Largest(1)	3
Smallest(1)	1
Confidence Level(95.0%)	0.166665248

Perception of Impact on Patient Outcomes

3.13 Have you seen any improvement in the impact of your treatment and management of [FIELD] as a result of your attending this program?

Mean	1.529411765
Standard Error	0.224344139
Median	1
Mode	1
Standard Deviation	1.30813988
Sample Variance	1.711229947
Kurtosis	0.215090647
Skewness	0.881201156
Range	5
Minimum	0
Maximum	5
Sum	52
Count	34
Largest(1)	5
Smallest(1)	0
Confidence Level(95.0%)	0.45643158

Perceived Program Value

3.6 Would you suggest (this program) to your colleagues?

Mean	4.029411765
Standard Error	0.149182527
Median	4
Mode	5
Standard Deviation	0.869876136
Sample Variance	0.756684492
Kurtosis	-0.898711474
Skewness	-0.352391668
Range	3
Minimum	2
Maximum	5
Sum	137
Count	34
Largest(1)	5
Smallest(1)	2
Confidence Level(95.0%)	0.303514131

Interaction between CHE Champion and Participant

Increased time for CHE Champion

Mean	4.5
Standard Error	0.087038828

Median	4.5
Mode	5
Standard Deviation	0.507519219
Sample Variance	0.257575758
Kurtosis	-2.129032258
Skewness	-7.14916E-18
Range	1
Minimum	4
Maximum	5
Sum	153
Count	34
Largest(1)	5
Smallest(1)	4
Confidence Level(95.0%)	0.177081826

Length of visit

Mean	2.882352941
Standard Error	0.177949831
Median	3
Mode	3
Standard Deviation	1.037616905
Sample Variance	1.076648841
Kurtosis	0.127621803
Skewness	0.247718038
Range	4
Minimum	1
Maximum	5
Sum	98
Count	34
Largest(1)	5
Smallest(1)	1
Confidence Level(95.0%)	0.362041652

3.5 Is there any way that I can help you in providing care to your patients? Information? Research? Guidelines? Tools? Networking contacts?

Mean	3.676470588
Standard Error	0.18749017
Median	4
Mode	4
Standard Deviation	1.09324616
Sample Variance	1.195187166
Kurtosis	-1.14811524
Skewness	-0.334318275
Range	3
Minimum	2

Maximum	5
Sum	125
Count	34
Largest(1)	5
Smallest(1)	2
Confidence Level(95.0%)	0.381451616

3.7 Change in scope of discussion between HCP and CHE Champion

Mean	2.058823529
Standard Error	0.173776223
Median	2
Mode	3
Standard Deviation	1.013280794
Sample Variance	1.026737968
Kurtosis	-1.28527482
Skewness	-0.123361659
Range	4
Minimum	0
Maximum	4
Sum	70
Count	34
Largest(1)	4
Smallest(1)	0
Confidence Level(95.0%)	0.353550381

§ *Increase in requests for information, samples, interaction*

Mean	1.588235294
Standard Error	0.15291375
Median	2
Mode	2
Standard Deviation	0.891632723
Sample Variance	0.795008913
Kurtosis	0.792090956
Skewness	-0.146164568
Range	4
Minimum	0
Maximum	4
Sum	54
Count	34
Largest(1)	4
Smallest(1)	0
Confidence Level(95.0%)	0.311105363

§ *Change in tenor of discussion - more open, more friendly*

Mean	3.588235294
Standard Error	0.158635262

Median	3
Mode	3
Standard Deviation	0.92499458
Sample Variance	0.855614973
Kurtosis	-0.862718939
Skewness	0.213683684
Range	3
Minimum	2
Maximum	5
Sum	122
Count	34
Largest(1)	5
Smallest(1)	2
Confidence Level(95.0%)	0.322745865