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THE LEARNING NEEDS OF DENTAL HYGIENISTS: CONTENT AND DELIVERY

BY

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DEDICATION

This thesis is dedicated to my father, the first of many good teachers. This thesis is also dedicated to my family whose love, support and understanding have truly enabled me to achieve.

ABSTRACT

A determination of the learning needs of health care professionals is critical to the implementation of effective and efficient continuing education activities. This descriptive study explored the learning needs of practicing dental hygienists from a content and delivery perspective. A survey was used to collect data from 1000 dental hygienists practicing in Alberta and Ontario, with a 55% response rate.

Results indicate that content learning needs center around topics that deal with clinical dental hygiene and the latest research findings. Respondents identified their most important reason for pursuing continuing education opportunities as a desire to remain competent.

Four delivery methods were defined and explored in the survey and the motivators and barriers for pursuing each were identified and discussed. Respondents indicated that they most prefer to learn through direct contact with colleagues and other professionals but they actually learn most frequently from printed materials.

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CHAPTER I

INTRODUCTION

At no other time in history has the world in which health professionals function been subject to so many reshaping forces. The knowledge explosion, increasing global competition, deregulation of health care services, legislative change, technological advances and many sociocultural forces are re-shaping the environment in which health professionals function. Educating healthcare practitioners becomes critical when change is so rapid and pervasive. Fortunately, practicing health professionals have access to a number of learning opportunities through continuing education programs.

Growth and change are also evident in the field of education. General health education as well as continuing education for health professionals is being transformed by a technical and scientific knowledge base that is changing rapidly and constantly, by the way in which professionals and consumers understand and access services and by professional relationships that are being eroded and replaced with more competitive relations (Marsick and Smedley, 1989; Curry and Wergin, 1993).

Assuring the continuing competence of health care professionals, including dental hygienists, is a challenging and complicated task in this changing environment.

Several methods have been used by professional credentialing agencies and licensing bodies to determine continuing competence including examinations,

continuing education, self-assessments, peer review, portfolios, case review and professional development programs (Knapp and Greenberg, 1996). Each of these methods of evaluation have their own strengths and weaknesses (Trautman and Watson, 1995). Of all these methods, continuing education is considered to be "an absolute necessity for the maintenance of competence in the profession" (Allen, D.L., Caffesse, R.G., Bornerand, M., Frame, J.W., and Heyboer, A., 1994, p. 511) and is used as a "marker" of competence by the majority of professional associations (Knapp and Greenberg, 1996).

Underscoring the need for competent practice and its link to continuing education are the ethical principles of beneficence and non maleficence. The public needs to be protected from harm and quality care needs to be promoted. The Code of Ethics of the Canadian Dental Hygienists' Association charges dental hygienists with the "maintenance and improvement of dental hygiene practice" (Canadian Dental Hygienists' Association, 1997).

The dental hygiene profession in Canada is in a state of change. Professional association initiatives, driven by research, technology and public health issues, are directing change while new legislation is also impacting the profession. There is a need to provide dental hygienists with information that will influence their practice and their attitudes. Providers of continuing professional education cannot hope to survive in today's environment by developing strategies that simply cope with changes. Instead, they must learn to anticipate change which demands that they understand the needs of the health professionals as learners.

Although the need for frequent updating of knowledge is recognized as a necessity to cope with rapid change and maintain competence, some continuing education activities do not meet the expectations and needs of the professionals (Maudsley, 1993; Miller, 1987, Nowlen, 1988). To determine relevance of content with respect to dental hygiene practice and appropriateness of delivery, an exploration of the learning needs of dental hygienists is warranted.

Purpose of the Study

The purpose of this study is to determine the perceived learning needs and preferences of practicing dental hygienists from a content and delivery perspective. Insight into these learning needs will assist with decision making when planning future continuing education programs and activities.

Research Questions

To meet its intended purpose, the study sought answers to the following more specific research questions:

1. What content areas do dental hygienists identify a need for in their continuing education activities?
2. What learning methods are preferred by dental hygienists engaged in continuing education pursuits?
3. What motivates dental hygienists to pursue continuing education opportunities?

4. What do dental hygienists identify as barriers to pursuing continuing education activities?
5. To what extent does age, year of graduation, formal education completed, community of residence or practice, and employment profile influence the learning needs of dental hygienists?

Assumptions

Underlying this research are the following assumptions:

1. Dental hygienists in Alberta and Ontario perceive their ethical responsibility for participating in continuing education activities.
2. Dental hygienists in Alberta and Ontario are able to make objective analyses of their personal learning needs and preferences.
3. Those surveyed will answer questions honestly and as accurately as possible.

Delimitations

This research study is restricted to an investigation of the perceived learning needs of dental hygienists who are active members of the Alberta Dental Hygienists' Association and the Ontario College of Dental Hygiene. Tests or performance measurements were not undertaken to determine actual areas of deficiency in knowledge or practice.

The study was delimited to a random sample of active dental hygienists in Alberta and Ontario. The results obtained in examining a random sample may not be applicable to all Canadian dental hygienists.

Limitations

The design of this research imposes some limitations on the study:

1. The instruments designed for use in this research were prepared by the researcher. The inherent limitations of these tools and of the imagination of the researcher are acknowledged.
2. The results of the questionnaire were influenced by the respondents' abilities to evaluate their learning needs. Areas of need may have been overlooked because respondents were unaware that the quality of their practice needed improvement.
3. The questionnaire was ten pages in length and was distributed in mid June. The period of distribution as well as the length of the questionnaire may have influenced the rate of return.
4. There could be a response bias. The design of the study did not allow contact with non-respondents. Given the response rate, there may be differences between respondents and non-respondents with respect to their learning needs.

Definition of Terms

For the purposes of this study, the following terms have been defined:

1. ***Continuing Education*** for health professionals can be defined as those processes that are intended to improve health care through learning, and may be performed individually or in conjunction with offerings of continuing education providers. The learning which results may maintain or enhance professional competence and performance, or increase the effectiveness and efficiency of health-care organizations (Suter, E., Green, J.S., Lawrence, K., and Walthall, D.B., 1981).
2. ***Competence*** is the ability of a practitioner to apply, in a manner consistent with the standards of the profession, the knowledge, judgment, attitudes, skills and values required to perform safely in the domain of possible encounters defining the practitioners' scope of practice (Brunke, 1996; Swendon & Boss, 1995; Trautman & Watson, 1995).
3. ***Continuing competence*** is the ability of the practitioner to demonstrate, at any particular time, competence to practice.
4. ***The professional role of the dental hygienist*** includes five primary areas of responsibility: clinical therapy, health promotion, education, administration, and research (C.D.H.A., 1995).
5. ***Dental hygiene care:*** the responsible and ethical provision of dental hygiene therapy for the purpose of achieving definite outcomes that improve a client or community's quality of life (C.D.H.A., 1995).

6. ***Active member:*** a licensed dental hygienist who is engaged in the practice of dental hygiene either full or part time (A.D.H.A., 1998, C.D.H.O., 1996).

7. ***Learner needs assessment***: systematic set of procedures undertaken for the purpose of setting priorities and making decisions with respect to the educational needs of participants (Coldeway & Delisa, 1983; Witkin & Altschuld, 1995).

Significance of the Study

During the past decade, considerable research has been conducted on how health professionals learn and make change to their practice. Continuing education (CE) should be "based on research and theory from the behavioral and social sciences, the learning needs of the students and the performance of professionals" (Fox, Davis, & Wentz, 1994, p.18). There is a need for extensive research in continuing education to enable continuing education providers to promote and provide learning opportunities that are needed and effective. The preferred learning methods of practicing dental hygienists have not been documented. Insight into how dental hygienists learn is the key to the effectiveness of professional learning opportunities. The Canadian Dental Hygiene Association as well as organized dental hygiene at the provincial levels would benefit from information on the learning needs of dental hygienists when planning continuing education activities and conferences, and when organizing print materials for their professional journals.

The quality of dental hygiene care is impacted by the knowledge held by dental hygiene practitioners. Information on content learning needs of practicing dental hygienists would be of particular interest to curriculum planners at Canadian dental hygiene programs and to those employed in the field of continuing education for dental hygienists in Canada and beyond.

Increased consumer awareness has implications for dental hygiene practice (Ray, 1992). As more technological and scientific information becomes available to the public, dental hygiene clients will increasingly request information and access to the technologies from practicing dental hygienists. The public, including consumers of dental hygiene services and those who deliver those services, employers (dentists, regional health authorities, hospitals), private dental insurance companies and professional dental hygiene organizations, would benefit if individual dental hygienists were current in their knowledge and practice.

Organization of the Thesis

Chapter I of this thesis has presented the purpose of the study and the five research questions which were investigated. In addition, assumptions, limitations, delimitations, definition of terms and the significance of the study are outlined.

Chapter II focuses on the relevant literature in the areas of continuing professional education, how professionals learn, and needs assessment.

Chapter III provides a description of the research methodology including a discussion of the instrument, population and procedures for data collection and analysis.

Chapter IV presents the findings of the research study, while Chapter V consists of the summary, discussion, and recommendations of the study.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter presents a review of the literature related to continuing professional education. Discussion will focus on four areas: the role of continuing education in the health professions; the effectiveness of continuing education in the health professions; how professionals learn including models of continuing education delivery; and the importance of needs assessment in planning effective continuing education programs.

The Role of Continuing Education in the Health Professions

Continuing professional education is considered essential because of the "constant increase in knowledge, changes in disease trends, new materials and equipment, new delivery systems, and a desire [by health care professionals] to provide the highest quality care" (Allen et al., 1994, p. 511). The ultimate goal of continuing education in the health professions is improved patient health. In 1977, the World Health Assembly reminded the world of this goal with its adoption of a resolution which stated:

> the main social target of governments and WHO in the coming decades should be the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life (Engel, Vysohlid, Vodoratski, 1990).

To achieve the goal of improving the health of human kind, health professionals look to continuing education to fulfill their ongoing needs and

expectations. Continuing professional education is expected to: transmit new knowledge and teach new skills and technologies (Curry and Wergin, 1993); improve a professional's ability to engage in wise action (Cervero, 1988); promote an understanding of the desirability and nature of change (Engel, Vysohlid, & Vodoratski, 1990); modify behavior which may include 'unlearning' of the familiar or practiced (Bader, 1987; Escovitz and Davis, 1990); and boost the confidence of and provide reassurance to practitioners (Keighley and Murray, 1996).

Scientific theory supporting each of the health professions is progressing so rapidly that continuing professional education is challenged to keep pace. As McGuire states (in Curry and Wergin, 1993):

> It is reliably predicted that our scientific and technical knowledge base, now doubling about every five to eight years, will soon begin to double every year in some fields. The rate of expansion in the quantity of facts, concepts and principles required for competent practice will differ among professions, depending upon the nature of the theories that underlie each (p.8).

As the essential link between research and practice, continuing professional education must exchange an increasingly vast amount of information on a continual basis.

The new information that is facing health care professionals can complicate and may compromise their ability to make sound decisions in practice or it can force premature decisions prior to adequate reflection (Curry and Wergin, 1993). Cervero (1992) strongly believes that "the primary goal of continuing education should be to improve professionals' ability to engage in wise action" (p. 98). Cervero argues for knowledge that is acquired from practice and criticizes the

passive learning techniques that are employed in continuing education because they do not consider the "complexities, uncertainties and conflicting values" that characterize professional practice.

Schön (1990) emphasized the importance of reflection as well as experience. In his discussion on knowing-in-action and reflection-in-action, Schön proposed that it is through the reflective process that professionals extend their zone of mastery. Other literature indicates that critical thinking or higher level reasoning must be addressed in continuing professional education as these skills are not completely developed during undergraduate education (Schank, 1990; Whiteside, 1997; Brutvan, 1998).

New knowledge and technologies influence the environments in which professionals practice. As the familiar and comfortable changes, health care professionals need to learn techniques to cope with change itself and because they are often expected to actively participate in implementing change, health care professionals need a true understanding of the desirability and nature of the change they are implementing (Engel, Vysohlid, and Vodoratski, 1990; Fox, 1996).

Another major goal of continuing professional education is to help practitioners provide optimal health care by modifying their behavior to reflect the advances in knowledge, skills and practice (Kantrowitz, 1991). Interpersonal skills, attitudes and values are integral components of competent practice and must receive attention in continuing professional education.

Finally, a hidden expectation of continuing education in the health

professions is to transmit new knowledge and skills in such a way that the confidence of the health care practitioner is not eroded (Keighley and Murray, 1996). An overload of information can undermine confidence and competence. The personal development and satisfaction of health professionals as learners is very important because it contributes to their sense of self-worth (Fox, Davis, and Wentz, 1994; Nagelsmith, 1995).

The Effectiveness of Continuing Education in the Health Professions

The quality of continuing education in medicine and other health professions has been examined and questioned because of its relationship to competent practice and because it consumes billions of dollars annually (Cervero, 1988). Many of the recent criticisms relate to the educational process utilized in this "expensive educational smorgasbord" (Escovitz and Davis, 1990) but there has been concern with the diversity in and lack of standards for continuing professional education activities for several years.

As one step in determining the essential attributes of quality continuing education programs, the Association of American Medical Colleges conducted a significant survey of practitioners, providers of continuing education courses and individuals responsible for accreditation. From this study, a conceptual model for quality continuing professional education was developed. The focal point of this conceptual model was the health professional or adult learner. (Green et al, 1984)

To adequately measure the effectiveness of continuing professional

education, there was a need to develop standards against which quality could be measured. In 1983, House conducted a survey of government agencies, professional associations, licensing agencies, business and industry, colleges, universities , and health related organizations to determine attitudes towards standards of practice in continuing education. Of those respondents to the survey, a large majority (84%) felt that standards would enhance the quality of continuing professional education. Other survey results led House to conclude that standards should "emphasize learner performance and the educational process as opposed to organizational inputs and resource requirements" (p.15).

Despite a growing understanding of the essential elements in quality continuing professional education, the literature shows that effectiveness in continuing education has much room for improvement. Green (as cited in Abrahamson, 1985) identified four specific criticisms of continuing professional education that arise throughout the literature: (a) continuing education activities are rarely designed to bring about changes in competence or performance; (b) evaluation design does not lead to definitive judgments about the impact of the educational endeavors; (c) principles of rigorous scientific inquiry and controlled experimentation are impractical for continuing professional education; and (d) the measurement of health professionals' competence and performance as well as health care outcomes has not been developed.

Accreditation of continuing professional education programs has been considered, in spite of the wide diversity in continuing education providers. Rochte

(1992) recognized this wide diversity when he developed an accreditation model that was dependent upon the involvement of professional licensing bodies, institutional accrediting bodies, professional associations and government regulatory agencies.

In 1992 Harden and Laidlaw proposed a set of criteria to produce effective continuing education programs and applied the acronym CRISIS to stand for: convenience, relevance, individualization, self-assessment, interest, speculation and systematic. These criteria were first described in 1982 at the Association for Medical Education in Europe/Association for the Study of Medical Education meeting and were considered by many to contribute to the effectiveness of continuing medical education.

In recent years, criticism of the educational process utilized for continuing medical education has focused on the "lack of evidence linking educational input to clinical behavioral change; on the limited emphasis given by CME [Continuing Medical Education] programs to define participant needs clearly; on the teacher-dominated transfer of facts rather than active learner participation; and on the episodic rather than continuing nature of the process" (Escovitz and Davis, 1990, p.545).

Chambers (1992), in his article on the continuing education industry as it applied to dentistry, proposed that institution-based continuing dental education was of limited success because it is based on an inappropriate model of knowledge building and certification. He proposed a shift in perspective to balance education

and certification with decision making and network building to ensure better quality in continuing education.

In the model that Chambers advanced, continuing dental education would be "consumer driven rather than provider driven, an equal partner with undergraduate education and research" and rather than "selling prepackaged bundles of information and playing the expert to the profession, continuing education would be customized, fast and practitioner driven" (p.677).

Despite all the criticism of the design, structure and evaluation of continuing education programs in the health professions, there is evidence to support its effectiveness. When Stein (1981) examined eight research reports to determine the effectiveness of continuing medical education, his conclusion was that when sound education principles form the basis for planning and organizing learning activities, continuing medical education can result in changes in the performance for physicians.

In a study designed to determine the effectiveness of a single educational intervention for dental hygienists, ambiguous findings resulted. A group of dental hygienists were evaluated to measure the immediate and long-term (six months post-course) effects of a continuing education course on their knowledge, attitudes and clinical skills with respect to scaling and root planing. Pre- and post-course evaluations and observations and participant self-reports were used to evaluate the effectiveness of the course in relation to its knowledge and skill objectives. Results of the study indicate that, superficially, the course appeared to be successful, as

reported by the significant increase in knowledge of the participants. There was no long-term improvement in behavior, however, as it was found that six months following the course, "there was no change in instrument [curette] preference and a substantial proportion of the students preferred an inappropriate instrument" (Young , Speidel and Willie,1982).

A Canadian study (Davis, Putnam and Gass, 1983) investigated the effectiveness of the most common form of continuing medical education activity, the short course. Through a review of the literature, the authors categorized the types of outcomes expected from short course interventions and organized over 200 articles according to the type of evaluation that was done. This organization identified four types of evaluation: (a) Type I involved perception of the program by the participants; (b) Type II involved changes in knowledge, skills or attitudes by participants; (c) Type III involved measuring performance changes following continuing education programs; and (d) Type IV evaluated patient outcomes. Their findings indicated that when Type I or II evaluation results were considered, short courses were found to be most effective. When change in performance was examined (Type III) or related to health care outcomes (Type IV), no direct link could be made to the impact of a short course.

Haynes, Davis, McKibbon and Tugwell (1984), in their study to establish the efficacy of continuing medical education, reported that only 7% of the 245 articles that were surveyed assessed the impact of continuing medical education on patient outcomes. From their findings, they concluded that "this small figure no doubt

reflects the difficult methodological and logistical barriers to such research" (p. 63).

In 1987, Bader reviewed the dental literature over a 25 year period to determine the effectiveness of continuing education in dentistry and stated that there was an absence of conclusive evidence concerning its effectiveness. This was of particular interest because of the profile of the dental practitioner that Bader thought "will be dominated by a large cadre of middle-aged professionals whose training reflects older knowledge and technology, a different distribution of disease and hence a different treatment emphasis" (p.43). Based on this profile, Bader felt that most of this group would have a need for extensive retraining and knowledge acquisition in the form of continuing education and so the inconclusive evidence concerning its effectiveness was alarming.

Nona, Kenny and Johnson (1988) also examined the literature that evaluated the effectiveness of continuing education programs for health professionals including the dental profession. Studies prior to 1970 were eliminated as were studies which attempted to evaluate only participant satisfaction. This resulted in the examination of 142 research articles and studies which were categorized according to the methodology used, the types of educational outcomes investigated, and overall findings. They concluded that continuing professional education can be effective. In their discussion, two important points were made: relevance is crucial to the effectiveness of a program and studies that fail to show any change in attitude or behavior may "reflect as much upon where the course fits into a professional's process of change as it does upon the effectiveness of the

program" (p. 116).

A two year study to assess the effects of continuing medical education (CME) programs on physician practice behaviour was conducted by the American College of Cardiology (Wergin, Mazmanian, Miller, Papp, & Williams, 1988). Using telephone interviews before and after CME conferences and control groups drawn from program cancellations, the results indicated that there were numerous influences on practice that interacted with the CME content to produce change. The study also indicated that change attributable to a CME program was often delayed.

McLaughlin and Donaldson (1991) reviewed articles describing continuing medical education programs between 1984 and 1988. A total of 135 articles were reviewed over the five year period of the study. It was found that 17% of the articles were targeted toward changing attitude, 59% were targeted toward changes in cognition, and 62% of the articles examined programs interested in addressing patient outcomes and/or physician performance. The authors felt this distribution demonstrated a trend towards evaluations of second-order outcomes i.e. evaluations that went beyond the primary participants in the programs.

An increase in the number and rigor of continuing medical education studies promoted a review of the literature between 1975 and 1991, in order to assess the impact of educational interventions on physician performance and health care outcomes (Davis, Thomson, Oxman, & Haynes, 1992). One of the conclusions of this extensive review was that continuing medical education is more effective when

"it incorporates practice-based enabling and reinforcing strategies and that adequate assessment of physicians' needs leads to increased potential for change" (p.1116).

How Professionals Learn

For the health professional, the path of lifelong learning starts with enrollment in a professional school, and continues throughout professional practice and beyond. The longest stretch on this road to enlightenment and competent practice occurs after graduation. This is also the most complex phase of professional education (Davis & Fox, 1994).

As a health care professional progresses from the level of undergraduate education to graduate and or continuing education, the control for professional learning moves from the institution to the individual. For a student who is proceeding through undergraduate education, the curriculum content is decided by research discoveries and educators, in harmony with the profession. Upon graduation, the onus of responsibility for knowledge acquisition and application shifts to the individual (Green et al, 1984).

In the last two decades, much has been written on how adults learn. In his theory of androgogy, Knowles (in Merriam, 1996) proposed four principles of adult learning: (a) adults must be permitted to be self-directing in their learning; (b) the role of experience must be valued; (c) topics should be relevant to learning; and (d) learning should be problem centered.

The implications of Knowles' theory for continuing professional education is that it nurtures life-long learners, that learning is more authentic when the context for learning is considered and that it should develop or enhance in professionals critical thinking skills (Bennett in Rosof & Felch, 1992). All of these features are critical to competent practice and quality patient care.

In 1986, Belsheim described three models for continuing professional education. The education model focused on content, knowledge, and skills; the change model gave emphasis to the total environment in which the professional was operating and the problem-based model focused on problems of practice and their analysis. Belsheim strongly concluded that problems of practice should be taken into consideration when continuing education programs are being planned.

Traditionally, continuing professional education has followed the educational model where a professional receives knowledge, and learns skills, from experts, usually in a formal setting (Cervero, 1992). The problem with this method is that it ignores the interaction that occurs through everyday practice experiences. A different model is gaining credibility whereby the health care professional is

> actively interpreting experience based on his or her present and past experience, personality, gender, cultural perspectives and environment. Learning is viewed as a cyclical process [where] professional knowledge is...fluid, constantly changing and reforming (Baskett, 1993, p.16).

Research has supported the theories and models involving how professionals, as adults, learn and has provided insight into the methods used.

In an often quoted study, Milgrom (1978), examined the continuing education

practices of Washington state dentists and related them to the quality of restorative dental care. He found that dentists prefer an active (e.g. study clubs) rather than a passive approach to continuing education and yet the greater majority of them participated in passive (e.g. lecture courses) educational experiences. In his study, that involved questionnaires and peer assessment, Milgrom found that those dentists who rated university courses, study clubs and talking shop with colleagues as more useful methods of continuing education provided a higher quality of restorative treatment. Those dentists who rated supply company representatives, trade journals and books as the most useful continuing dental education sources, had lower measures of technical performance and poorer patient oral health. Technical performance and patient oral health were established through clinical examination by trained examiners.

Scanlon and Blagg (1985), studied three major allied health occupations and also found that those sampled tended to be active learners, and that their efforts to pursue continuing education were often self-directed.

A study of the learning methods used and preferred by practicing physicians in Nova Scotia, New Brunswick and Prince Edward Island determined that the Maritime physicians prefer independent learning methods, particularly reading (Curry & Putnam, 1981). This study also found that informal discussion appeared to be used and preferred primarily to update skills rather than to update knowledge. Physicians indicated that formal consultations were the most effective method of changing their management behavior. Several years later, because of the

overwhelming preference for reading and very little research evidence of the effect of reading materials on competency and performance, a group of physicians conducted a randomized trial of a mailed continuing education program on hypertension (Evans, Haynes, Birkett, Gilbert, Taylor, Sackett, Johnston & Hewson, 1986). The study found that the continuing medical education program that had been mailed, had no influence on the practices of physicians and speculated that, although information was transmitted, it was soon forgotten because it was not incorporated into practice.

A decade later, Tamblyn and Battista (1993), sought to determine which educational interventions were most effective in changing clinical practice. They concluded that three factors were important in maximizing learning gain: perceived relevance, the opportunity to practice, and the provision of corrective feedback.

Building on this new understanding of how professionals learn and change and as part of a maintenance of competence program (MOCOMP), Clark, Campbell and Bondocz (1993) surveyed medical specialists to determine the continuing education methods that they used and preferred. Twenty-seven methods of continuing education including formal educational activities, video and audiotapes, scholarly activities and reading were provided in the survey. Browsing of journals was found to be the most frequently used activity, followed by hospital rounds, teaching, and in-depth reading. The survey showed that self-directed continuing education including in-depth reading, literature searches, browsing of journals, and scholarly activities such as teaching were the most preferred methods.

A world wide survey of the participatory continuing education practices of dentists found that the majority of countries surveyed (N=26) offer participatory education courses although it forms only a small proportion of overall continuing education and little evaluation seems to take place to measure the subsequent value to the practitioners attending the courses (Allen et al., 1994).

In 1994, Chambers and Eng surveyed dentists who had been in practice from one to twelve years to determine where they learned to perform specific procedures from a list that included undergraduate education, formal continuing education courses, journals, colleagues or self taught. It was found that just over half of the fifty-six procedures about which the dentists were questioned were improved upon or learned initially in a 'self-teaching' mode.

A study that examined the information seeking patterns of dental hygienists in Northern British Columbia (Covington, 1996) found that dental hygienists are utilizing traditional information sources such as discussions with colleagues and reading journal articles and that the least utilized information sources are the indices to the literature and electronic information sources. Respondents to this survey identified geographic isolation, lack of electronic information sources and cost as the top three barriers to information access.

Needs Assessment

Educational needs assessment is increasingly regarded as an essential component of program planning, design and evaluation in adult and continuing

professional education (Witkin & Altschuld, 1995; Ward, 1988). When Stein (1981) examined eight research reports to determine the effectiveness of continuing medical education, he identified that a major problem in determining course effectiveness was linked to the fact that the descriptions of the continuing education activity were not written in terms of the four major elements of the learning process: (1) needs identification; (2) clear goals and objectives; (3) relevant learning methods with an emphasis on participation; and (4) evaluation.

Coldeway and Delisa (1983) underscored the critical nature of a needs assessment when they identified the determination of practitioner's learning needs as the foundation for quality continuing medical education. In their discussion of the factors that should be considered when prioritizing educational activities, they suggested that learning needs assessments should be designed in such a way that when the data were analyzed it was possible to determine whether the problem was educational, system related or attitudinal. They suggested that attitudinal and systems problems were rarely solvable by education and should be addressed through other methods.

In Frye's (1990) comparative analysis of the impact of mandatory continuing education in the professions of law and medicine, she observed that

> failure to identify learning needs of the practitioner frequently is cited as a reason for ineffective or unsuccessful programs in continuing medical and legal education alike. Accurate assessment of learning needs is perhaps the most difficult and least understood aspect of continuing education because it is an assessment of the type as well as the extent of the deficiencies in learner performance and competence (p.23).

To determine the learning needs of dentists in South Carolina, the Statewide Needs Assessment Program (SNAP) was developed in 1981 (Ross, Smith, Smith & Waldrep). This program had three basic components: a questionnaire, a computer program and a report of results. The questionnaire allowed respondents to rate their perceived needs on a five-point Likert scale with possible responses ranging from "critical need" to "no need". If the respondents indicated a need, they were then required to indicate the level of instruction desired on a three point scale as basic, intermediate or advanced. This design allowed for assessment of type and extent of need. The computer program used in the study produced reports which were distributed to individuals, committees and agencies in South Carolina that were planning to implement dental continuing education courses.

Another study, aimed at general dental practitioners, conducted a needs assessment using Harden and Laidlaw's CRISIS model (1992) for effective continuing education (Davis, Harden, Laidlaw, Pitts, Paterson, Watts & Saunders, 1992). In their paper, Davis et al. describe the development of a mailed distance learning programme that was only successful because the learning needs of the general dental practitioners had been established first. The resource book designed for the programme met the needs of all three groups of practitioners identified in the needs assessment: those who knew about techniques and had already adopted them; those who knew about the techniques but had not integrated them into practice; and those who were not interested in trying the new techniques. Educational strategies were devised to meet the educational needs of the three

groups of general dentists identified in the needs assessment and were incorporated into the resource book.

With educational needs assessment being regarded as a critical component for effective program planning, it is necessary to consider whose needs are being assessed, the provider or the learner. In a study of family physicians, a questionnaire as well as focus groups were used to determine the learning needs of family physicians (Mann and Chaytor, 1992). Based upon a 50% response rate, this study reported that, of all the resources used to meet their learning needs, professional journals and consulting colleagues were most frequently used by physicians to update information. Computers were identified by respondents as important to information access but older, rural physicians reported low skill levels for using computers. One of the conclusions of this study was that for self-directed learners, formal activities may be just one part of an overall learning plan.

One criticism of needs assessment is their cost (Witkin and Altschuld, 1995). An Australian study set out to establish the feasibility, acceptability and value of a needs assessment in planning and conducting a seminar about skin cancer for general practitioners (Ward and Macfarlane, 1993). In this well planned and innovative study, a survey was designed around the educational objectives developed for the course in order to assess the educational needs of registrants. When registrants were mailed their receipts of registration, they were asked to complete the survey and return it before the course presentation. The key findings of the needs assessment were discussed with the speakers of the seminar. This

uncommon use of a needs assessment to refine a continuing education program that was already planned permitted for greater relevance in course information. The high response rate (80%) indicated that the medical practitioners accepted the needs assessment tool especially when it was used to enhance a learning experience in which they had already indicated an interest in.

Summary

Continuing education in the health professions has been strongly linked to competent practice. With the significant changes to the scientific and technical knowledge base occurring at a rapid pace, the understanding of human health and disease requires significant attention. Health care professionals need to maintain a current knowledge level if the health of the public is to be improved and continuing education activities provide the opportunity for doing so.

The way in which continuing professional education is delivered has received much criticism in the literature with respect to its efficacy. Early studies criticized the design and lack of scientific rigor applied to research in this area. More recently, continuing education in the health professions has been criticized for its lack of adherence to proven educational principles.

When health care professionals are studied to determine how they learn most effectively, they appear to resemble other adult learners. They are found to engage in learning that is self directed, with formal continuing education programs acting as only one source of information. Health care professionals value personal

experience and relevance when learning. Learning that is problem centered also appears to be more effective for health care professionals.

When a needs assessment is conducted prior to a continuing education intervention, the research indicates that this is the most effective way by which factors such as knowledge, skills, competence and habitual ways of doing things can be identified. By revealing true and specific deficiencies for learning, programs can be planned that are more relevant, that value experience, that are practice and problem centered and that should result in more efficient learning.

The information gained through the literature search supports the methodology utilized for this research.

CHAPTER III

DESIGN AND METHODOLOGY

This study was designed to investigate the learning needs of a group of Canadian dental hygienists from a content and delivery perspective. This chapter contains the research design and methodology utilized for this quantitative study and is divided into four sections. Included are a description of the research instrument; a discussion of the population; content validity of the survey; a description of data collection; an explanation of data analysis; and ethical considerations for the research.

Research Instrument

The survey (Appendix A) that was utilized for this research was developed following a review of the literature and after consultation with a panel of experts from the dental hygiene profession. The survey contained three sections.

The first section, learning methods, explored the respondent's preferences for specific learning methods. Following a review of the literature, four groups or categories of learning methods were identified: print materials, direct contact with professionals/colleagues, formal educational activities and non print materials. Each group represented an approach to reaching continuing education participants (McLaughlin and Donaldson, 1991). Each method was defined in the questionnaire by using a list of the possible sources of learning using that specific method. For example, formal educational activities included study clubs, professional

conventions, professional activities, university/community college sponsored on-site courses, on-line courses and distance learning courses. Within this category different learning techniques would be possible.

The survey was chosen for data collection because it is an impersonal probe that should minimize bias (Leedy, 1993). A four point rating scale was utilized in the first section of the survey. The rating scale is one of the most widely used measuring instruments and is effective when questions seek to elicit attitudinal information. A middle of the scale rating was not used to force respondents to choose either a positive or negative view (Ary, Jacobs and Razavich, 1990). Each point on the rating scale had clearly defined parameters with an allowance for a non-response.

The second section of the survey involved content needs and was designed around the baseline abilities defined in the C.D.H.A. document, *Dental Hygiene: Definition and Scope* (1995). There are fifteen structure criteria defined in the *Dental Hygiene: Definition and Scope* (1995) document (Appendix F). These structure criteria were used to organize the content section of the survey into fifteen groups. Every standard within each group was considered for a continuing education offering or course title. The list of titles found within a specific group correspondended to the five areas of dental hygiene practice responsibilities (clinical therapy, health promotion, education, administration and research). Respondents were asked to identify all, some, or none of the course titles they preferred to have available.

A panel of experts, consisting of five dental hygiene educators were consulted to verify that the individual continuing education offerings corresponded to the baseline dental hygiene abilities outlined in the *Dental Hygiene: Definition and Scope* (1995) document. The instructions given to the panel of experts are presented in Appendix B and include a request to comment on the process involved in arriving at the possible topics and the end product or individual continuing education offerings.

In the third section, demographic data were collected to help provide general factual information about the respondents. Questions were asked concerning year of graduation, formal education completed, current employment setting, size of community of residence and practice, province of practice and age. Because dental hygiene is predominantly a female profession, a gender question was not asked. All of this information was necessary to provide insight into the areas of greatest need and to reflect the literature that states that age and years from graduation are two of the biggest predictors of professional competence (Caulford, Lamb, Kaigas, Hanna and Norman, 1994).

Content Validity

The content validity of the survey was established in two ways. First, a panel of experts validated the content through their understanding of the roles and responsibilities of dental hygienists. A letter was sent to five dental hygiene educators explaining the organization of, and rationale for, the continuing education

offerings proposed for inclusion in the survey. All five experts responded in writing and four were further interviewed to clarify their input.

Secondly, the survey was field tested on a convenience sample of six practicing dental hygienists to determine or improve a) length of time required for completion and b) clarity of instructions and questions and c) appropriateness of format. The dental hygienists that were contacted for the pilot were from British Columbia (2), Alberta (2) and Ontario (2). The letter that accompanied the pilot survey and the form used for return input are included as Appendix C. Data collected from the pilot study surveys were not utilized in the actual study. Input from the pilot participants resulted in word changes to enhance clarity.

Representativeness of Sample

A random sample of one thousand Canadian dental hygienists were surveyed for this research. One western Canadian province, Alberta, and one eastern Canadian province, Ontario, were selected for this study. Five hundred dental hygienists licensed and actively practicing within the Province of Alberta and members of the Alberta Dental Hygienists' Association (population = 1307) and five hundred dental hygienists licensed and actively practicing within the Province of Ontario (population = 5762) served as the sample for this study. This sample may be representative of the larger population of all Canadian dental hygienists with respect to age, years of dental hygiene practice, current employment setting, and formal education completed.

Data Collection

Once the survey was developed, the Alberta Dental Hygienists' Association and the Ontario College of Dental Hygienists assisted by providing the names and addresses of active registered members of those associations. From these membership lists, a random sample of 500 Alberta dental hygienists and 500 Ontario dental hygienists were selected and mailed the survey. A third party made the selection for the mailout due to the researcher's long history in dental hygiene education and familiarity with many members of the professional association.

The covering letter (Appendix D) that accompanied the survey, explained the purpose of the study, the voluntary and anonymous role of the respondents and the assurance that the information would remain confidential.

The questionnaire was mailed to the potential participants on June 15, 1998 and respondents were given one month to complete the survey (July 15, 1998). A follow-up/ thank you letter was sent two weeks after the initial mailing (Appendix E).

Data Analysis

Both quantitative and qualitative data were obtained from the survey. A Likert scale using four intervals was provided for respondents to rate each forced choice within a question. Respondents were also allowed to provide written input for each question. Data from the returned questionnaires were entered into the Excel program and then the Statistical Package for the Social Sciences (SPSS) was used for statistical analysis. Demographic data were organized according to

descriptive statistics such as range and frequency distribution. Data relating to the respondents preferences in continuing education practices and learning style choices were examined through the calculation of means and frequency distributions. Frequency counts were used to summarize survey data. A significance level of .05 was used for all tests of significance. Data relating to the respondent's levels of expressed need for continuing education or training in relation to baseline abilities were examined through the calculation of means and frequency distributions.

The qualitative component of the survey consisted of comments on the questionnaires which were transcribed utilizing a computer word processing program and analyzed to determine themes.

Ethical Considerations

Ethical approval for this study was obtained from the University of Alberta's Faculty of Education Ethics Committee. All participants received a covering letter outlining the basic information regarding the study including a statement that participation in the study would be kept anonymous and confidential. Participation in the study was voluntary and respondents were advised of this. Anonymity was ensured by reporting grouped data, and the names of people were not used in any report, discussion or publication. All completed questionnaires will be destroyed in accordance with University of Alberta policy.

Methodology Summary

A research instrument exploring the learning needs of dental hygienists was developed following a review of the literature, consultation with a panel of experts and a pilot test of the questionnaire.

A total of 1000 individuals were contacted for the study. This included 500 dental hygienists from western Canada residing in the Province of Alberta and 500 dental hygienists from eastern Canada residing in the Province of Ontario. Respondents were described according to six demographic factors: year of graduation, formal education completed, current employment, size of community of residence and practice, province and age.

Analysis of the data was through the calculation of means and standard deviations for learning delivery needs, and frequency distributions for learning content needs. Qualitative data were analyzed to determine themes.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter presents the findings of the survey which explored the learning needs of dental hygienists in Alberta and Ontario from a content and delivery perspective. It is organized into eight sections. The first section presents the demographic data and background characteristics of the respondents to the survey. The second section examines the respondents' identified learning needs for specific content. The third section of this chapter presents information on the delivery needs of dental hygienists when they are learning. The next four sections discuss the motivators and barriers when using the four delivery methods identified in the survey: print materials, direct contact with colleagues and other professionals, formal educational activities, and non-print materials. The eighth section reports comparisons between subgroups of respondents and perceived learning needs.

Demographics & Background Characteristics

The survey population consisted of active, licensed dental hygienists in the provinces of Alberta and Ontario randomly selected from the registrars' mailing lists. Of the 1000 surveys that were distributed, 500 were sent to Alberta dental hygienists and 500 were sent to Ontario dental hygienists with a total of 563 respondents. There were 298 responses from Alberta. In Alberta, six surveys were returned undelivered and seven surveys were received too late for data entry,

indicating a usable return rate of 59% for 291 surveys. There were 262 responses from Ontario dental hygienists. In Ontario, five surveys were returned as undelivered and twelve were received too late for data entry, indicating a usable rate of 51% for 250 surveys. Following chi-squared analysis this difference in return rate by province was not considered significant. Three respondents did not indicate their province of practice.

Discussions with Dave Odynak, a researcher with the Population Research laboratory at the University of Alberta, indicated that the return rate for mailed surveys is generally between 10% to 40% (personal communication, September 8, 1998). Thus, the study's overall return rate of 55% reflects an acceptable return rate level.

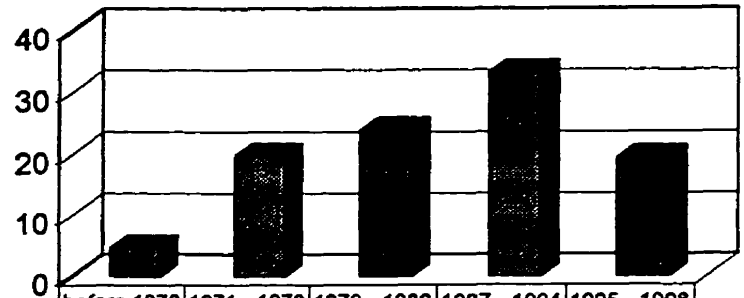
Year of Graduation

Figure 1 depicts the year that the respondents graduated from their dental hygiene program. Figures 2 and 3 indicate the year of graduation as a dental hygienist for Alberta and Ontario respondents. Respondents indicated a range between new graduates (within the last three years) and those over 28 years away from graduation. In both provinces, the largest group of respondents graduated from four to eleven years ago while the smallest group were those dental hygienists who graduated prior to 1970. Three quarters of the respondents are within nineteen years of graduation. Three respondents did not indicate the province but are included in the total.

Figure 1: Distribution of Total Respondents (n=544) by Year of Graduation

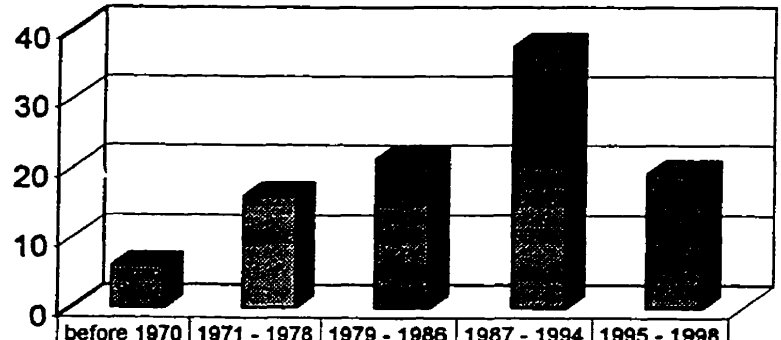
	before 1970	1971 - 1978	1979 - 1986	1987 - 1994	1995 - 1998	no answer
Percentage	5.1	17.8	22.4	34.9	19.3	0.4

Figure 2: Distribution of Alberta (n=291) Respondents by Year of Graduation



	before 1970	1971 - 1978	1979 - 1986	1987 - 1994	1995 - 1998
Percentage	4.5	19.6	23.7	33	19.2

Figure 3: Distribution of Ontario (n=250) Respondents by Year of Graduation



	before 1970	1971 - 1978	1979 - 1986	1987 - 1994	1995 - 1998
Percentage	6	16	21.2	37.6	19.2

Educational Background

There were four educational categories identified in the survey: those dental hygienists with diplomas/certificates, those with bachelor degrees, those with masters degrees and 'other'. Table 1 indicates that the majority of respondents in both provinces hold diplomas/certificates with 9.3% of Alberta respondents having completed bachelor degrees and 8.4% of Ontario respondents also holding bachelor degrees. Three respondents (1.0%) from Alberta held masters degrees. A total of 4.2% of respondents did not answer this survey question.

Table 1: Educational Background

formal education completed	Alberta n=291		Ontario n=250		Total* n=544	
	f	%	f	%	f	%
Diploma/certificate	244	83.8	205	82.0	450	82.7
Bachelor degree	27	9.3	21	8.4	48	8.8
Master degree	3	1.0	-	-	3	0.6
Other	10	3.4	10	4.0	20	3.7
no answer	7	2.4	14	5.6	23	4.2
Total	291	100.0	250	100.0	544	100.0

*Three respondents did not indicate the province, but are included in the total.

Answers from the 'other' category, which involved 3.4% of Alberta respondents and 4.0% of Ontario respondents, indicated that this segment held credentials as dental therapists (5), dental assistants (3), nurses (2), expanded duty dental hygienists (6), and teachers (4) or they were currently pursuing bachelor degrees (7) and had

partially completed required courses toward a specific credential.

Current Employment

The majority of respondents from both provinces indicated that they practiced four or more days per week or full time. The remaining respondents indicated part time (less than four days per week) employment. Table 2 provides percentage figures for each province concerning full and part time employment.

Table 2: Current Employment Status

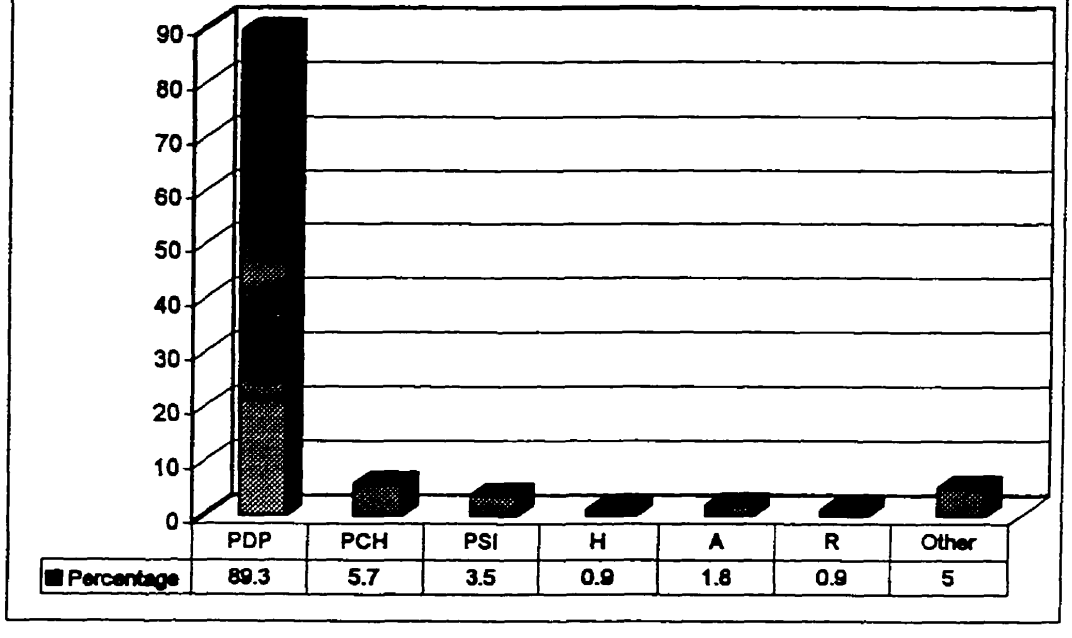
Employment status	Alberta (n=291)		Ontario (n=250)		Total* (n=544)	
	f	%	f	%	f	%
Full time (≥4 days/week)	171	58.8	135	54.0	307	56.9
Part time (≤4 days/week)	112	38.5	111	44.4	223	41.0
no answer	8	2.7	0	1.6	14	2.6
Total	291	100.0	250	100.0	544	100.0

*Three respondents did not indicate the province, but are included in the total.

The majority of respondents in both provinces indicated employment in private dental practice, as displayed on Figure 4. Dental hygienists employed in public/community health represented the next largest category while practice in hospitals or employment in research were identified by the smallest number of respondents. The 'other' category was answered by dental hygienists involved in atypical clinic practice settings (e.g. military dental clinic, group home, occlusal management clinics, correctional institution); advanced management positions (e.g.

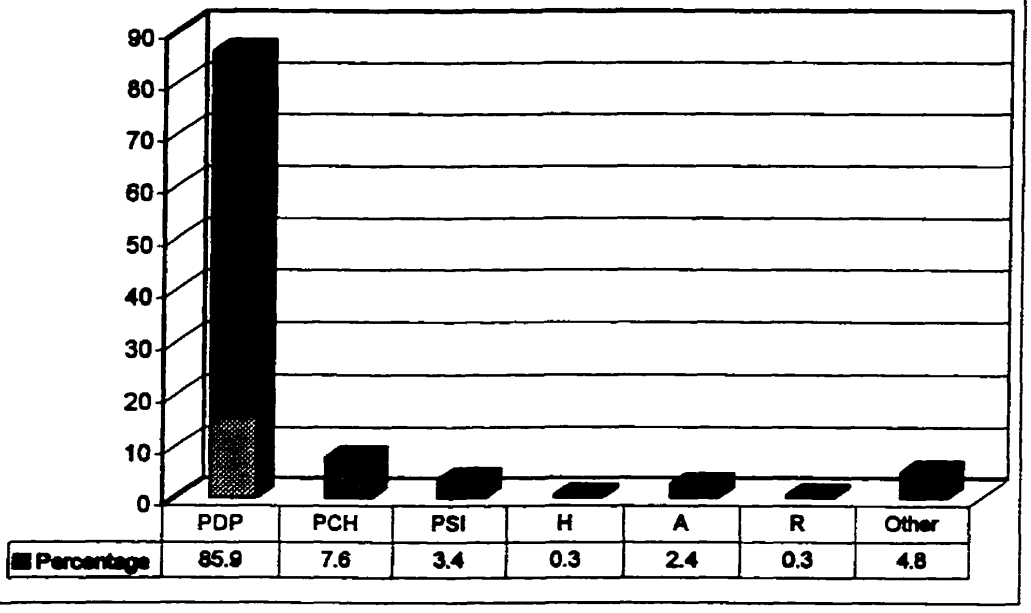
president of dental employment agency, practice management coordinator, contractor nursing homes); or those who wished to disclose that they were currently unemployed (e.g. disability leave, maternity leave). Alberta and Ontario respondents exhibited similar profiles concerning their employment settings (Figures 5 and 6).

Figure 4: Distribution of Respondents by Employment Setting



Legend for Figure 4:
PDP Private Dental Practice (Including general and specialty practice)
PCH Public/Community Health
PSI Post Secondary Institution
H Hospital
A Administration
R Research

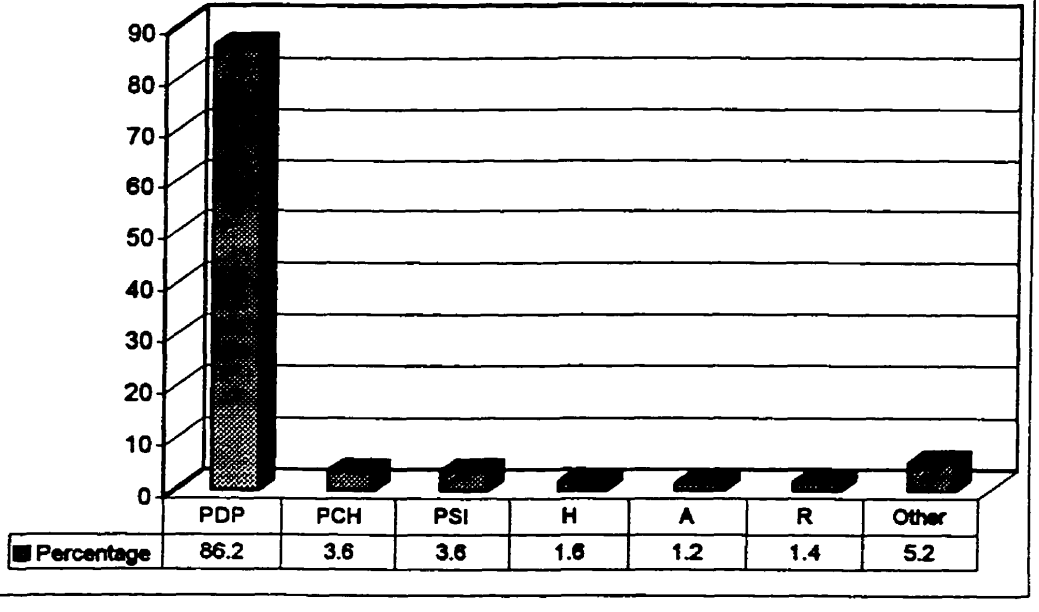
Figure 5: Distribution of Respondents by Employment Setting: Alberta



Legend for Figures 5 and 6:

PDP	Private Dental Practice (Including general and specialty practice)
PCH	Public/Community Health
PSI	Post Secondary Institution
H	Hospital
A	Administration
R	Research

Figure 6: Distribution of Respondents by Employment Setting: Ontario



Community of Residence and Practice

The largest group of respondents in both Provinces live and practice in an urban community with a population that is greater than 100,000 people while the smallest groups practice in rural communities (less than 5000 people) and live in small urban communities with between 5000 and 10,000 residents. Table 3 identifies the distribution of respondents according to community size. A greater number of respondents in both Alberta and Ontario live in rural communities than practice there.

Table 3: Distribution According To Community Size

Size of community	Alberta (n=291)		Ontario (n=250)		Total (n=544)*	
	f	%	f	%	f	%
Practice in:						
Rural (<5000)	22	7.6	11	4.4	33	6.1
Urban 1 (>5000 <10,000)	26	8.9	16	6.4	43	7.9
Urban 2 (>10,000 <100,000)	59	20.3	76	30.4	135	24.8
Urban 3 (>100,000)	179	61.5	146	58.4	325	59.7
No answer	5	1.7	1	0.4	8	1.5
Live in:						
Rural (<5000)	42	14.4	35	14.4	77	14.2
Urban 1 (>5000 <10,000)	18	6.2	16	6.4	35	6.4
Urban 2 (>10,000 <100,000)	51	17.5	72	28.8	123	22.6
Urban 3 (>100,000)	172	59.1	123	49.2	295	54.7
No answer	8	2.7	4	1.6	14	2.6

*Three respondents did not indicate Province but are included in total.

Age

The age of respondents ranged from less than 25 years to over 50 years of age. The largest group of respondents in both provinces were 31 to 40 years of age. Figures 7 and 8 detail age distribution by province. Two respondents did not indicate their age.

Figure 7: Age of Respondents - Alberta

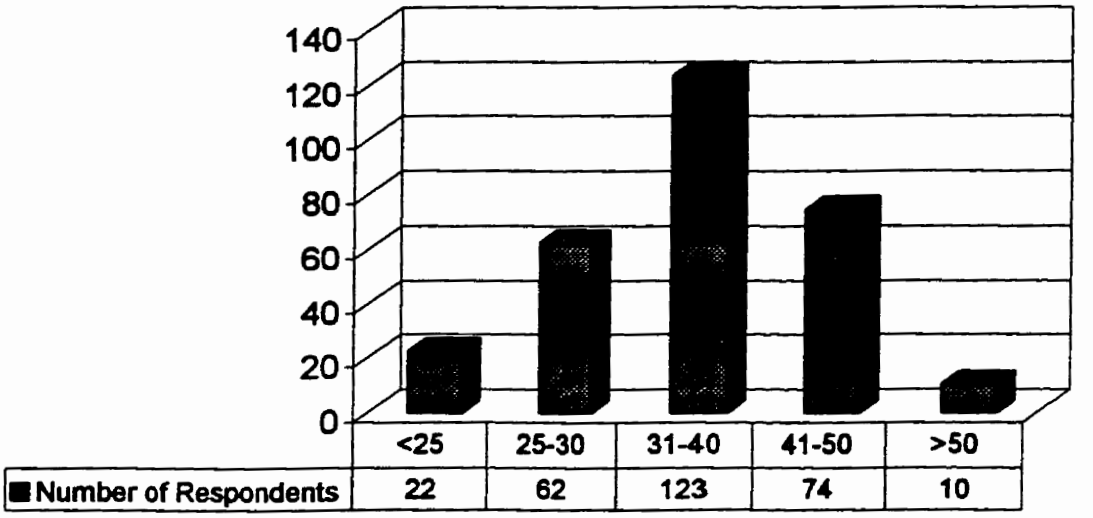
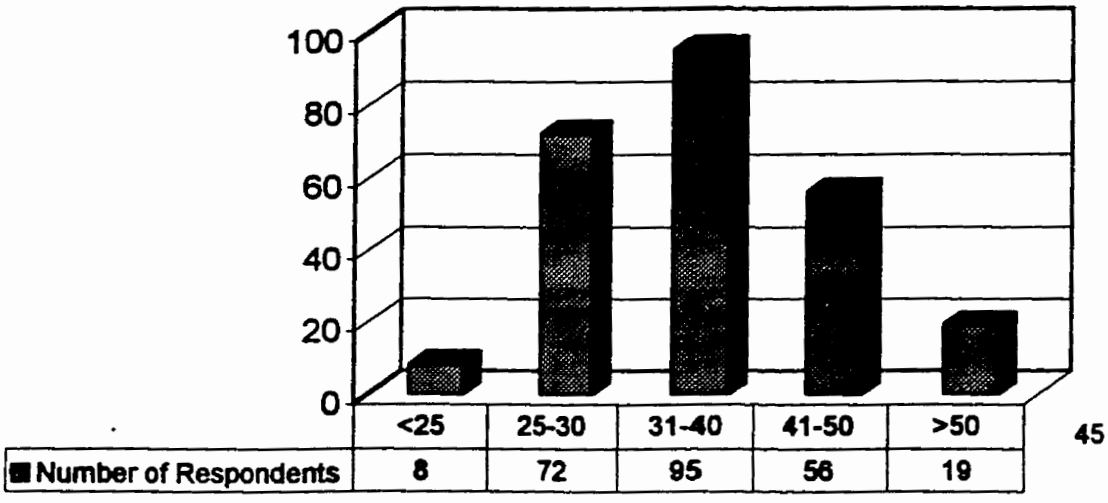


Figure 8: Age of Respondents - Ontario



In summary, the respondents were most likely to have a diploma/certificate in dental hygiene; to have graduated between 1987 and 1994; to be employed full time in private dental practice in a large urban centre and be between 31 and 40 years of age.

Content Needs

To address the research question investigating the learning needs of dental hygienists from a content perspective, the survey listed professional development offerings (ie. course titles) which were designed around the standards defined in *Dental Hygiene: Definition and Scope* (C.D.H.A. 1995). Table 4 lists the fifteen structure criteria that organize the 197 standards into distinct groups. Appendix F defines each of the structure criteria and details the standard expected for each criteria.

Descriptive statistics (frequency counts) are used to describe the need for specific content within each structure criteria. To identify an overall frequency of content need within the fifteen groups of standards, the frequencies with which respondents chose a specific title within the group were divided by the number of content choices available under that heading. Table 5 displays the fifteen structure criteria and through percentage calculations indicates the need for content within each group of standards.

Approximately half of the respondents expressed a need for content related to ten of the fifteen groups of standards. A need for content related to the remaining five groups of standards was indicated by approximately one third of the respondents. Respondents in both provinces indicated the highest need for knowledge specific to Criteria J: *Client/Clinician safety* and the lowest need for information from Category M: *Evaluation - Ongoing*.

Table 4: Structure Criteria Used to Group the Dental Hygiene Standards and the Number of Content Choices Found in the Survey

Structure Criteria Headings Used to Group Standards	# of Content Choices Found in the Survey
A. Dental hygiene responsibilities	7
B. Participative decision making	7
C. Support and Resource Requirements	7
D. Maintaining professional competence	6
E. Information management	8
F. Practicing professionally	7
G. Individualizing services	5
H. Assessment	7
I. Planning - Client participation	6
J. Implementation - Client/Clinician Safety	5
K. Implementation - Equipment and Resource selection	4
L. Implementation - Provision of Care	7
M. Evaluation - Ongoing	6
N. Evaluation - Revision	4
O. Evaluation - Outcomes	5
Total	90

Table 5: Percentage of Respondents Indicating a Need for Content Within the Fifteen Groups of Standards

Topic	Alberta		Ontario		Total*	
	%	Rank	%	Rank	%	Rank
A. Dental Hygiene Responsibilities	54.9	4	56.1	2	55.4	4
B. Participative Decision making	52.4	7	46.9	7	49.7	6
C. Support and Resource Requirements	51.5	8	45.9	9	48.8	10
D. Maintaining professional competence	57.0	3	55.7	3	56.4	3
E. Information Management	50.9	9	47.5	5	49.2	8
F. Practicing Professionally	50.8	10	47.3	6	49.0	9
G. Individualizing Services	39.7	13	37.4	13	38.7	13
H. Assessment	44.3	12	41.7	11	43.1	11
I. Planning-Client Participation	59.4	2	54.0	4	56.8	2
J. Implementation-Client/Clinician Safety	61.2	1	61.6	1	61.3	1
K. Implementation-Equipment and Resource Selection	54.6	5	46.2	8	50.7	5
L. Implementation-Provision of Care	45.7	11	39.9	12	43.0	12
M. Evaluation-Ongoing	32.1	15	27.1	15	29.8	15
N. Evaluation-Revision	32.7	14	27.2	14	30.2	14
O. Evaluation-Outcomes	53.2	6	45.8	10	49.7	7

*Three respondents did not indicate province but are included in total.

Descriptive statistics (frequency counts) are used to present the need for specific professional development offerings or course titles. Two thirds of all respondents chose the fifteen titles identified in Table 6 as needed content topics. Table 7 lists the least needed content topics that were identified by respondents.

In Alberta, respondents indicated a higher level of need for specific content that dealt with: (a) research on the latest products; (b) the latest in prevention: products and techniques; (c) techniques to stay current; (d) the impact of alternative medicine on dental hygiene care; and (e) the latest in dental treatment options: materials and techniques. These are all topics which focus on what the current research is saying and deal with knowledge and skill enhancement. Lower levels of need are associated with content dealing with the undertaking or understanding of research methodology.

In Ontario, respondents indicated a higher level of need for specific content that dealt with: (a) techniques to stay current; (b) research on the latest products; (c) the impact of alternative medicine on dental hygiene care; (d) the latest in prevention: products and techniques; and (e) advanced periodontal therapies. These are all topics that deal with leading-edge knowledge and the accompanying skills. Lower levels of need in Ontario mirrored Alberta's low need areas for content dealing with the understanding or undertaking of research.

Table 6: Percentage of Respondents Indicating a High Need for Specific Content

Offering Title	Alberta (n=291)		Ontario (n=250)		Total* (n=544)	
	f	%	f	%	f	%
Research on the latest products	254	87.3	192	76.8	448	82.3
Techniques to stay current	244	83.8	196	78.4	443	81.4
The impact of alternative medicine on dental hygiene care	244	83.8	189	75.6	436	80.1
The latest in prevention: products and techniques	248	85.2	185	74.0	435	79.9
The latest in dental treatment options materials and techniques	231	79.4	175	70.0	409	75.1
Advanced periodontal therapies	224	77.0	178	71.2	404	74.2
Optimal use of dental hygiene skills	210	72.2	176	70.4	389	71.5
How to improve client satisfaction with dental hygiene care	221	75.9	166	66.4	388	71.3
Infection control controversies	212	72.9	170	68.0	384	70.5
Treating high risk clients	197	67.7	173	68.2	373	68.5
Dental hygiene career alternatives	203	69.8	168	67.2	372	68.3
The evolving role of the dental hygienist	195	67.0	169	67.6	364	66.9
Alternative pain control methods	210	72.2	151	60.4	364	66.9
Motivational techniques	205	70.4	158	63.2	364	66.9
Infectious disease and dental hygiene practice	192	66.0	169	67.6	362	66.5

*Three respondents did not indicate the province but are included in the total.

Table 7: Percentage of Respondents Indicating a Low Need for Specific Content

Course Title	Alberta (n=291)		Ontario (n=250)		Total* (n=544)	
	f	%	f	%	f	%
How to conduct surveys	57	19.6	48	19.2	105	19.3
Statistical analysis explained	64	22.0	43	17.2	107	19.6
Identifying research limitations	72	24.7	50	20.0	122	22.4
Standards for clinical research	66	22.7	56	22.4	122	22.4
Defining the problem through co-discovery	71	24.4	57	22.8	129	23.7

*Three respondents did not indicate the Province but are included in the total.

The survey structure allowed for respondent input at the end of each category or group of professional development offerings. Very few respondents (1.8%) added information in the "other" choice in each question related to content and no discernable themes were evident within the written items.

In summary, respondents indentified Category J, *Implementation: Client/Clinician Safety* as the most needed content category. Category M, *Evaluation: Ongoing* was identified by respondents as the least needed content category.

Respondents indicated their greatest learning needs for specific educational offerings that deal with the results of current research on products, techniques, materials and alternative medicine. Respondents indicated their lowest learning needs in content areas that deal with research design, implementation and interpretation.

Delivery Needs

To address the research question dealing with the learning methods preferred by dental hygienists engaged in continuing education pursuits, the survey asked general questions with respect to learner preferences for the delivery of continuing education activities. These data are presented using frequency distributions and percentages. To address the research questions dealing with motivators and barriers to pursuing continuing education activities, respondents were also asked to indicate frequency of use and the barriers and motivators for each specific delivery method using a four point rating scale. Means and standard deviations were calculated for each specific learning method.

Learning Methods Currently Used and Preferred

The majority of respondents (96%) indicated that they currently used print materials (i.e. professional journals, professional newsletters, text books, magazines, consumer reports, promotional literature) the most frequently when engaged in continuing education activities, and that non-print materials (audiotapes, videotapes, Internet, computer assisted instruction, CD ROM) were used the least often. Table 8 details the learning methods currently used by the dental hygienist respondents. Print materials, direct contact with colleagues and other professionals, and formal education activities all rated highly as the most frequently used learning methods.

Table 8: Learning Methods Currently Used (n=544)

Method	Alberta (n=291)		Ontario (n=250)		Total (n=544)	
	f	%	f	%	f	%
print materials	279	95.9	240	96.0	522	96.0
direct contact with professionals, colleagues	248	85.2	206	82.4	456	83.8
formal education activities	276	94.8	192	76.8	470	86.4
non-print materials	63	21.6	57	22.8	121	22.2
other	5	1.7	5	2.0	10	1.8

*Three respondents did not indicate Province but are included in the total.

The 'other' category responses were so low that no discernable theme(s) could be found. The majority of responses made here could be classified under one of the listed method categories.

When asked how they prefer to learn, respondents indicated a preference for contact with other professionals (i.e. staff meetings, committee work, E-mail, patient referrals, formal and informal conversations). Table 9 indicates the mean response and its standard deviation based on the four point response scale (1 = least prefer, 4 = most prefer) for each learning method category.

Table 9: Preference Ratings For Identified Learning Methods

Learning Method	Alberta (n=291)		Ontario (n=250)		Total (n=544)*	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
print materials	3.09	.72	3.27	.70	3.18	.72
direct contact	3.39	.71	3.52	.65	3.45	.68
formal educational	3.48	.71	3.33	.78	3.41	.75
non-print materials	2.23	.95	2.26	.95	2.25	.95

*Three respondents did not indicate a province but are included in the total.

Respondents were asked to rate their reasons for pursuing continuing education opportunities from a forced choice list. A four point scale allowed the opportunity for respondents to rate their reasons from low to high importance. Higher importance is indicated through a higher numbered mean. Table 10 displays the results of this survey question.

Table 10: Importance Ratings of Reasons For Pursuing Education Opportunities

Reason for pursuing	Alberta		Ontario		Total
	Mean	Rank	Mean	Rank	Total Mean
Desire to remain competent	3.85	1	3.88	1	3.87
Self improvement	3.64	2	3.73	2	3.69
Need to increase understanding	3.65	3	3.68	3	3.67
Value for learning	3.61	4	3.61	4	3.61
Self esteem	3.15	6	3.33	5	3.24
Continuing education points	3.36	5	2.73	7	3.12
Gain advanced credentials	2.61	8	2.75	6	2.69
Social contact	2.68	7	2.68	8	2.69
Economic need	1.87	9	2.27	9	2.06

Respondents from Ontario indicated that a desire to remain competent, self improvement and a need to increase understanding were the most important reasons for pursuing continuing education opportunities. Respondents from Alberta indicated the same three reasons were of top importance. Both Ontario and Alberta respondents ranked economic need as the least important reason for pursuing continuing education opportunities. Less than .02% of respondents documented a reason other than the forced choices available on the survey and no discernable theme(s) was evident from these data.

Each method for learning that was defined in the questionnaire, was investigated to determine the frequency with which respondents engaged in a particular method and those factors which motivated or represented obstacles for using that learning method.

Print Materials

Print materials were defined in the survey by listing examples of professional journals, professional newsletters, text books, magazines, consumer reports and health promotion literature. Respondents were asked to indicate their frequency of use on a four point scale: 1 = daily, 2 = weekly, 3 = monthly and 4 = yearly. Means and frequency distributions were calculated for each print material. Respondents were also asked to rate their motivations for and obstacles in using

print materials on a four point scale. Possible responses ranged from "low motivator" to "high motivator" and "small obstacle" to "big obstacle" with lower numbers representing the low/small end of the scale and higher numbers representing the high/big end of the scale.

Table 11 shows the rankings of print materials by frequency of use. Lower means indicated more frequent use of a material. Alberta and Ontario respondents use professional journals most frequently and textbooks least frequently. Newspapers were identified as a print material utilized by respondents who provided written input.

Table 11: Ranking of Frequency of Use of Print Materials

Print Material	Alberta n=291		Ontario n=250		Total* n=544
	Mean	Rank	Mean	Rank	Mean
professional journals	2.98	1	2.87	1	2.93
professional newsletters	2.98	1	2.94	2	2.96
magazines	3.04	3	2.95	2	2.99
promotional materials	3.10	4	3.02	4	3.07
consumer reports	3.36	5	3.27	5	3.31
textbooks	3.59	6	3.44	6	3.52

*Three respondents did not indicate Province but are included in the total.

Motivators for Use of Print Materials

The survey requested respondents to rate six motivational factors for using print materials. Alberta respondents indicated that *accessibility* was the greatest motivator while Ontario respondents identified *interest* as their greatest motivator.

All respondents rated the motivational factors highly. A total of 23 respondents, ten from Alberta and 13 from Ontario, indicated other motivational factors than the ones listed in the survey. *Quality of information* was a theme that emerged from these entries. Table 12 reports the means and standard deviations for each motivational factor.

Table 12: Rating of Motivators For Using Print Materials

Motivating factors	Alberta		Ontario		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
accessibility	3.58	.58	3.52	.66	3.55	.62
convenience	3.57	.64	3.52	.63	3.55	.64
interest	3.42	.57	3.53	.61	3.47	.64
quality	3.29	.72	3.52	.69	3.30	.71
time	3.25	.77	3.26	.78	3.26	.77
cost	2.64	1.00	2.70	1.00	2.67	1.1

Barriers to Use of Print Materials

The survey asked respondents to rate six obstacles faced when using print material. Table 13 details the obstacles and identifies the mean and standard deviation for each. Alberta respondents identified *time* as the biggest obstacle for using print materials, followed by *accessibility* and *convenience*. Ontario respondents identified *time* as the biggest obstacle for using print materials, with *complexity of information* and *quality of information* ranking next as substantial obstacles. One theme emerged in the written responses under "other" for this survey question. *Relevance* or lack thereof was identified as an obstacle to the use

of print materials.

Table 13: Rating of Obstacles When Using Print Materials

Obstacle	Alberta		Ontario		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
time	2.75	1.01	2.71	1.03	2.74	1.02
complexities of information	2.09	.91	2.30	.96	2.18	.93
quality	2.11	.88	2.23	.97	2.17	.92
accessibility	2.14	.96	2.09	.99	2.12	.97
convenience	2.12	1.03	2.06	1.00	2.10	1.01
costly	1.89	.87	1.98	.92	1.94	.90
other	2.66	1.22	2.91	1.16	2.81	1.16

The survey asked respondents to identify publications that they routinely read. These responses were tallied and averaged in order to arrive at a mean number of journals. Table 14 indicates the number of journals routinely read and presents a range from zero (0) to ten (10) publications. On average, respondents routinely read three publications.

Table 14: Number of Publications Routinely Read			
Number of Publications	Alberta	Ontario	Total
	(f)	(f)	(f)
0	26	31	57
1	28	31	59
2	65	43	108
3	68	44	112
4	58	37	95
5	28	28	56
6	11	19	30
7	4	7	11
8	1	7	8
9	1	2	3
10	1	1	2
Mean:	2.94	3.15	3.02

Analysis of the written responses identified a variety of professional journals and other publications were routinely read by respondents. Alberta respondents indicated the CDHA Journal (*Probe*), the ADHA Newsletter (*Probe*) and Colgate's *Oral Report* most frequently read. Ontario residents indicate the CDHA Journal (*Probe*), ODHA Newsletter (*Milestones*), and *PhD Services* were the most frequently read publications.

Direct Contact with Colleagues and Other Professionals

The survey allowed a range of activities for respondents to consider when defining direct contact with other professionals and colleagues including staff meetings, committee work, E-mail, patient referrals, and formal and informal

conversations. Respondents were asked to indicate their frequency of use on a four point scale between 1 (low frequency) and 4 (high frequency). Table 15 describes the frequency that respondents reported involvement through direct contact with colleagues and other professionals by indicating means for the frequencies.

Alberta and Ontario respondents ranked their frequency of use similarly, with informal discussions, staff meetings, and patient referrals being the most frequently used form of contact with other professionals and colleagues. Thirty four respondents indicated other activities where they exchanged information with other professionals, including study clubs, professional association meetings and continuing education workshops. All of these activities are explored in the formal educational activity section of the survey. By mentioning these activities in this section, respondents are acknowledging the collaborative learning that occurs when people gather together in more formal settings.

Table 15: Ranking of Frequency of Use of Direct Contact Opportunities

Opportunities:	Alberta n=291		Ontario n=250		Total n=544*
	Mean	Rank	Mean	Rank	Mean
informal discussions	3.10	1	3.11	1	3.11
staff meetings	2.60	2	2.72	2	2.65
Other: Formal educational activities	2.90		2.33		2.64
patient referrals	2.13	3	2.28	3	2.20
committee work	1.71	4	1.90	4	1.79
E-mail	1.41	5	1.37	5	1.39

*Three respondents did not indicate Province but are included in the total.

Motivators and Barriers When Pursuing Direct Contact Opportunities

The survey allowed respondents to rate four motivators for pursuing direct contact with colleagues and other professionals using a four point scale from low (1) to high (4). The same four choices were listed as obstacles, and respondents were expected to rate each one on a four point scale with 1 representing a small obstacle and 4 representing a large obstacle. Tables 16 and 17 report the motivators and obstacles when pursuing direct contact learning opportunities by indicating means and standard deviations.

Alberta and Ontario respondents rated the motivators for using direct contact similarly. The most motivating reason for pursuing opportunities that provide direct contact with other professionals is the *stimulation* that such contact provides. As one respondent said: "different points of view encourage discussion, it is fun to visit and exchange information". On the other hand, the biggest obstacle to experiencing direct contact was identified by both Alberta and Ontario respondents as *accessibility*. The frustration with getting together with colleagues is evident in the comment: "everyone is so busy, it is hard to schedule regional gatherings". Very few respondents (12) documented other factors that motivated their direct contact with other professionals and no themes were evident. Similarly, only eight individuals documented factors that acted as obstacles to their pursuit of direct contact and no theme(s) were evident in these responses.

Table 16: Rating of Motivators for Using Direct Contact With Other Professionals and Colleagues

Motivator:	Alberta		Ontario		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
stimulation	3.47	.69	3.44	.75	3.46	.72
accessibility	3.21	.94	3.28	.87	3.24	.91
reliability of information exchanged	3.02	.79	3.18	.84	3.09	.81
time saved	2.94	.98	2.98	1.02	2.96	.99

Table 17: Rating of Obstacles To Using Direct Contact With Other Professionals and Colleagues

Obstacles:	Alberta		Ontario		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
accessibility	2.27	1.05	2.35	1.06	2.30	1.05
time spent	2.18	1.03	2.33	1.07	2.25	1.05
reliability of information exchanged	2.10	.86	2.09	.97	2.09	.91
stimulation	1.78	.86	1.89	1.00	1.83	.92

Formal Educational Activities

The survey defined formal educational activities to include study clubs, professional conventions, professional activities, university/community college sponsored on-site courses, on-line courses and distance learning courses. Condensed, the designation of formal would apply to those educational activities that require advance registration and involve a fee. Eighty-six percent of respondents currently engage in formal educational activities.

Respondents were asked to rate the frequency with which they attended

formal educational activities on a four point scale (1 = daily, 2 = weekly, 3 = monthly and 4 = yearly). Table 18 indicates the frequency of use of educational activities. Because of the scale used in the survey, the lower the mean, the higher the frequency of use. It is not surprising that professional conventions are the least frequently used formal educational activity as conventions are usually only offered on a yearly basis. Study clubs are the most frequently utilized form of formal educational activity identified by Alberta and Ontario respondents. Respondents did not identify other activities in their documentation associated with this section.

Table 18: Frequency of Use of Formal Learning Methods

Activity:	Alberta		Ontario		Total
	Mean	Rank	Mean	Rank	Mean
Study clubs	3.18	1	3.43	1	3.29
Distance learning courses (computer or correspondence)	3.39	2	3.67	2	3.52
Professional seminars/activities	3.61	3	3.64	3	3.63
University/College sponsored courses	3.77	4	3.82	4	3.79
Community sponsored courses	3.83	5	3.86	5	3.85
Professional conventions	3.96	6	3.95	6	3.96

Motivators for Using Formal Educational Activities

The survey asked respondents to rate five motivators for pursuing formal educational activities on a four point scale with (1) equating to low motivation and (4) indicating a high motivator. Table 19 identifies means and standard deviations for each motivator by Province. The strongest motivators for both Alberta and

Ontario respondents are *accessibility, socialization*, and *time away from work*. Nine percent (49) of respondents identified another motivator in this section. Review of this data indicated that *quality of presentations* and *reliability of information* were strong motivators for this group.

Table 19: Rating of Motivators For Using Formal Educational Activities

Motivators:	Alberta (291)		Ontario (250)		Total (544)*	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
accessibility	3.13	1.04	3.17	.99	3.15	1.01
socialization	2.81	1.02	2.70	1.09	2.75	1.05
time away from work	2.40	1.19	2.48	1.27	2.45	1.23
accommodation	2.39	1.14	2.36	1.19	2.39	1.17
cost	2.32	1.14	2.41	1.19	2.36	1.16
other	3.75	.70	3.42	1.07	3.61	.88

Obstacles to Using Formal Educational Activities

Respondents were asked to rate obstacles which kept them from registering for formal educational activities using a four point scale with (1) being a small obstacle and (4) representing a big obstacle. Table 20 identifies means and standard deviations for all five obstacles. Forty-eight respondents (8.8%) identified and rated other obstacles which limited their participation. Themes emerging from this data indicate that *time away from family*, *subject matter*, and *quality of offerings* were substantial barriers when accessing formal educational activities.

In Alberta, respondents indicated that *accessibility* and *cost* were the biggest obstacles to their participation in formal educational activities. From the written

input by Alberta respondents, another theme emerged. *Politics* was identified as a barrier to accessing formal educational activities. Examination of the written comments in association with this theme indicated that a recent cancellation of a scheduled course was viewed by several Alberta respondents as an action connected to a political agenda. In Ontario, respondents indicated that *time away from work* and *cost* were their biggest obstacles when accessing formal educational activities.

Table 20: Rating of Obstacles When Using Formal Educational Activities

Obstacles	Alberta (291)		Ontario (250)		Total (544)*	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
time away from work	2.93	1.07	3.26	.98	3.08	1.04
accessibility	3.09	.87	3.02	1.04	3.06	1.00
cost	3.01	.96	3.07	1.09	3.04	1.02
accommodation	2.59	1.12	3.50	.85	2.67	1.11
socialization	1.60	.74	3.14	.81	1.67	.82
other	3.41	1.06	3.03	.92	3.40	1.03

*Three respondents did not indicate a Province but are included in total.

Preference for Teaching Strategies

Different strategies are used by educators involved in delivering formal educational activities. Respondents were asked to rate their preferences for specific teaching strategies on a four point scale where (1) was "least prefer" and (4) was "most prefer". There was no opportunity for respondents to add their own comments for this question on the survey.

Alberta respondents indicated a preference to learn through lecture presentations, workshops and interactive discussions. These same respondents found panel discussions to be the least preferred teaching strategy.

Ontario respondents indicated their preference to learn through workshops and lectures and interactive discussions primarily while self paced study was ranked as the least preferred way to learn for this group.

Table 21 reports the teaching strategies preferred by respondents when they are engaged in formal educational activities by identifying the mean and standard deviation for each strategy.

Table 21: Preference For Specific Teaching Strategies When Engaged in Formal Educational Activities

Learning strategy	Alberta n=291		Ontario n=250		Total n=544*	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
lecture	3.15	.82	3.14	.81	3.15	.81
workshop	3.08	.81	3.21	.85	3.14	.83
interactive discussion	2.90	.85	3.03	.92	2.96	.89
group activity	2.73	.91	2.90	.94	2.81	.93
self paced study	2.49	.97	2.39	1.07	2.45	1.02
panel discussion	2.42	.93	2.42	.94	2.42	.93
individualized study	2.47	1.01	2.37	1.08	2.42	1.05

*Three respondents did not indicate a Province but are included in the total.

Non-print Materials

The smallest number of respondents (22%) indicated that they were currently using non-print materials such as audiotapes, videotapes, internet, computer assisted instruction and CD ROM. When respondents were asked to indicate the

frequency of use of the various materials in this category, two thirds of the respondents indicated that they did not use any of these, so the means that are reported reflect the opinions of the small number of respondents who do use non-print materials. The four point scale utilized for this question was: 1 = daily use, 2 = weekly, 3 = monthly and 4 = yearly. Higher means would translate to less frequent use. Table 22 reports frequency of use of each non-print material by indicating means and rank. Also reported in this table are the percentage of respondents who do not use each non-print material. Overall, respondents use the internet most frequently. In Alberta, respondents use audiotapes least frequently. In Ontario, respondents indicated most frequent use of the internet with videotapes used least frequently.

Table 22: Ranking of Frequency of Use of Non-Print Materials

Non-print materials	Alberta			Ontario			Total		
	Mean	Rank	% Do not use	Mean	Rank	% do not use	Mean	Rank	% do not use
videotapes	3.80	3	59.5	3.82	4	54.8	3.81	4	57.4
audiotapes	3.83	4	75.9	3.78	3	71.6	3.80	3	73.9
computer assisted learning	3.48	2	86.3	3.58	2	85.2	3.52	2	85.7
internet	3.01	1	75.3	3.20	1	78.0	3.09	1	76.5

Motivators and Obstacles When Using Non-print Materials

Respondents were asked to rate each of the motivators and obstacles provided for using non-print materials on a four point scale with (1) representing low

motivation or a small obstacle and (4) representing high motivation or a big obstacle. Tables 23 and 24 report the data using means and standard deviations for each non-print material.

In Alberta, respondents indicated that their highest motivators for using non-print materials were *convenience* and *access to information*. Alberta respondents identified *knowledge as to what is available* and *access to information* as their greatest obstacles. Ontario respondents identified the same motivators and obstacles that Alberta respondents did. *Convenience* and *access to information* were strong motivators while *knowledge as to what is available* and *access to information* were the biggest obstacles.

Table 23: Rating of Motivators For Using Non-Print Materials

Motivators:	Alberta		Ontario		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
convenience	3.18	.97	3.13	1.02	3.16	.99
access to information	3.05	1.05	3.02	1.09	3.04	1.07
availability of materials	2.98	1.13	2.90	1.08	2.94	1.11
reliability of information	2.85	.99	2.98	.99	2.91	.99
knowledge as to what's available	2.88	1.14	2.93	1.13	2.90	1.13
cost	2.53	1.12	2.52	1.19	2.52	1.15

Table 24: Rating of Obstacles When Using Non-Print Materials

Obstacles:	Alberta		Ontario		Total	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
knowledge as to what's available	3.38	.87	3.24	.90	3.32	.88
access to information	3.12	1.06	3.10	1.00	3.11	1.03
availability of materials	3.09	.98	2.97	1.00	3.03	.99
convenience	2.68	1.16	2.74	1.08	2.70	1.12
cost	2.47	1.14	2.64	1.17	2.54	1.15
reliability of information	2.17	1.00	2.25	1.04	2.21	1.01

Comparison of Subgroups

To address the research question investigating the possibility that perceived need patterns might vary significantly between subgroups of respondents, analyses were performed using personal data items to form comparison groups. Alberta and Ontario respondent data were investigated separately.

Reasons for pursuing continuing education opportunities were compared to age, year of graduation, formal education completed, size of community of residence and current employment. No significant differences were found when the personal data were compared to each forced choice provided in the questionnaire including: need to increase understanding; desire to remain competent; continuing education points; to gain advanced credentials; self improvement; self esteem; social contact; economic need; and value for learning.

Delivery methods currently utilized by respondents and those that they preferred were compared with subgroups differentiated by age, year of graduation,

formal education completed, community of residence and current employment. Chi squared analysis revealed no significant differences for any single subgroup with respect to the delivery methods used by respondents.

Preference for learning methods between the subgroups of respondents by Province did identify a difference following Chi-squared analysis. In Alberta, it was found that older respondents (those 41 years of age and older) preferred to learn by direct contact with colleagues and other professionals more than the younger respondents (those 30 years of age and younger). Those respondents with degrees preferred to learn through contact with colleagues and other professionals more than diploma dental hygienists.

A significant difference in preference for learning through formal educational activities was found with older respondents and respondents with educational credentials beyond the diploma in dental hygiene. Those respondents with degrees preferred to learn by formal education methods when compared to diploma dental hygienists. Older respondents (>41 years) preferred to learn through formal education methods when compared with younger respondents (<30 years of age). Alberta respondents living in larger urban communities (>100,000 people) preferred to learn by non-print materials when compared with respondents from rural communities.

For Ontario respondents, it was found that those respondents who lived in rural settings (<5000 people) preferred contact with colleagues and other

professionals over respondents who lived in larger urban centers (>100,000 people). A significant difference for learning through formal education activities was found with older respondents and respondents with higher educational credentials. Those respondents with degrees preferred to learn by formal education activities when compared to diploma dental hygienists. Also, respondents 41 years of age and older preferred to learn by formal methods when compared with younger dental hygienists (those 30 years of age and younger).

Content need was examined and compared to subgroups differentiated by age, year of graduation, formal education completed, and current employment. Age and year of graduation were found to influence the needed content choices of respondents in Alberta and Ontario for several of the topics cited. These topics included:

(a) Guidelines for employment contracts,
(b) Strategies for developing research activities,
(c) Skill workshops to enhance efficiency,
(d) Building effective recall systems,
(e) The business side of dental hygiene,
(f) Learning to listen to what the client needs,
(g) Managing dental phobias and fears,
(h) Making good choices in a changing marketplace, and
(I) How to tell if your clients are getting healthier.

Appendix G identifies those content needs that were influenced by age. Alberta and Ontario data are reported separately. Appendix H identifies those content needs that were influenced by year of graduation and reports Alberta and Ontario data separately.

Chapter Summary

This chapter has presented the findings of the study. Survey demographics indicate that 291 Alberta dental hygienists and 250 Ontario dental hygienists responded to the survey. In profile, the majority of the respondents graduated between 1987 and 1994 and are between 31 and 40 years of age. The respondents were most likely to hold a diploma in dental hygiene and to be employed full time in private dental practice in an urban community.

Overall, respondents identified Category J - *Implementation: Client/Clinician Safety* the most frequently for content need. Specific content needs were identified by respondents for individual professional development offerings that dealt with the latest research on products, materials and techniques. The impact of alternative medicine on dental hygiene care was also identified by 80% of the respondents as a needed content area.

In examining the data on learner needs related to the delivery of continuing education activities, it was found that the majority of dental hygienists prefer to learn through direct contact with colleagues and other professionals.

Print materials, currently used by 96% of the respondents, were used because they were accessible and convenient. Time was identified as the biggest obstacle to using print materials by the respondents.

Direct contact with colleagues and other professionals, a learning method used by 83.8% of the respondents, is utilized because of the stimulation it

generates. The greatest obstacle for conferring with others was identified as accessibility.

Formal educational activities, currently utilized by 86.4% of the respondents, were pursued because of the quality and reliability of the information. Accessibility, cost and time away from work were identified as barriers to accessing formal educational opportunities.

Non-print materials were utilized by the smallest percentage of respondents, 22.2%. Those respondents who did use non-print materials were motivated to do so by their convenience and the access to information. The greatest barrier to using non-print materials was knowledge as to what is available.

Tables 25 and 26 summarize the barriers and motivators for each delivery method explored in the survey. Accessibility to the various delivery methods acts as both a motivator and a barrier for use.

A significant difference was found to exist between subgroups of respondents and preferences for learning methods. Content needs were influenced by age and year of graduation.

Table 25: Summary of The Motivators For Using Each Delivery Method

Method:	Motivators:
Print materials	accessibility interest
Direct contact with professionals, colleagues	stimulation accessibility
Formal educational activities	accessibility socialization
Non-print materials	convenience access to information

Table 26: Summary of Greatest Obstacles to Using Each Delivery Method

Method:	Obstacle:
Print materials	time
Direct contact with professionals, colleagues	accessibility time spent
Formal educational activities	cost accessibility
Non-print materials	knowledge as to what is available access to information

CHAPTER V

SUMMARY, DISCUSSION AND RECOMMENDATIONS

Dental hygienists, as health care professionals, are committed to updating and enhancing their knowledge and skill base in order to remain competent throughout their professional lives. With a technological and scientific knowledge base that is changing rapidly and constantly, dental hygienists are challenged to remain current. Information on how dental hygienists learn and what they need to learn about is critical for planning continuing education interventions that are effective, efficient and appropriate.

The purpose of this study was to determine the perceived learning needs and preferences of practicing dental hygienists from a content and delivery perspective. Insight into these learning needs will assist with planning continuing education programs and activities. Documentation of these learning needs will also act as a baseline of comparison as continuing education opportunities for dental hygienists evolve in the next century.

A survey, based on the 197 baseline abilities identified in the *Dental Hygiene: Definition and Scope* (C.D.H.A., 1995) document and a review of the literature, was used to collect data in four main areas: (a) dental hygienists' identified learning needs for specific content in continuing education; (b) preferred learning methods of dental hygienists when engaging in continuing education pursuits; (c) the motivators for dental hygienists pursing continuing education

opportunities; and (d) the barriers dental hygienists experience when engaging in continuing education activities.

A total of 1000 individuals were contacted for this study. This included 500 dental hygienists from a western Canadian province, Alberta, and 500 dental hygienists from an eastern Canadian province, Ontario. Respondents were described according to six demographic factors: year of graduation, formal education completed, current employment, size of community of residence and practice, province of practice, and age.

Analysis of data was through means and standard deviations for learning delivery preferences and frequency distributions for learning content needs.

This chapter summarizes the findings of the study and is organized to reflect the four main areas of investigation. Following a summary and discussion of the highlights of the research findings, recommendations are made to the dental hygiene community, continuing education planners and curriculum planners in dental hygiene undergraduate education. Finally, recommendations are made for future research.

Summary of Findings

The survey population consisted of a random sample of active, licensed dental hygienists in the provinces of Alberta and Ontario. There was an overall fifty-five percent completed survey response rate. This response rate and the thoroughness with which the surveys were completed suggest that the survey was

successful in collecting valid and reliable information.

Demographic Information

The average respondent to the survey was between thirty one and forty years of age and graduated from four to eleven years ago with a diploma in dental hygiene. The majority of respondents are employed four or more days per week in a general dental practice in a large urban community (> 100,000 people).

According to the Alberta Dental Hygienists' Association (1998) and the College of Dental Hygienists of Ontario (1998), respondents appear to be representative of the study population with respect to educational background, age, number of years from graduation, and frequency of employment.

Content Learning Needs

Of all the categories of professional development offerings identified by respondents as needed content categories, Category J, *Client/ Clinician Safety* was identified the most frequently.

Of the ninety professional development offerings found in the survey, two thirds of the respondents identified fifteen as needed content. The predominant topics dealt with clinical dental hygiene practice and the clinical role of the dental hygienist. Current information on products, techniques, materials, dental hygiene therapies and strategies, and dental treatments were identified as the most frequently needed. Three topics identified a need for information related to patient/client safety:

- infection control controversies,

- treating high risk clients,
- infectious diseases and dental hygiene practice.

Three topics chosen by respondents reflect the dental hygiene administrative role and included a need for information on:

- optimal use of dental hygiene skills,
- dental hygiene career alternatives,
- the evolving role of the dental hygienist.

One topic, the impact of alternative medicine on dental hygiene care, reflects a change with current health care delivery and is related to the health promotion role of the dental hygienist.

Five professional development offerings were identified as topics of lesser need by the low frequency with which respondents chose them. These topics include:

- how to conduct a survey,
- statistical analysis explained,
- identifying research limitations,
- standards for clinical research,
- defining the problem through co-discovery.

All of these professional development offerings were derived from the researcher role of the dental hygienist and deal with research design, implementation and interpretation.

While the needed professional development offerings identified by Alberta

and Ontario respondents varied in individual frequencies, the fifteen offerings most frequently chosen were the same in each province as were the least frequently chosen offerings. When chi squared analysis was done to determine if there was a significant difference between Alberta and Ontario respondent content needs, a relatively small number of offerings were identified as exhibiting a significant difference. It was not within the scope of this study to investigate these differences.

Delivery Learning Needs

When engaging in continuing educational pursuits, the dental hygiene respondents indicated that they most prefer to learn through direct contact with colleagues and other professionals and they least preferred to learn using non-print materials. This differs slightly from the learning methods actually used by the respondents where print materials are the most frequently used learning method, followed by formal educational activities and direct contact with professionals and colleagues. Non-print materials are the least frequently utilized learning method identified by the respondents.

When asked to consider their reasons for pursuing educational opportunities, Alberta and Ontario respondents identified the most important reasons are a desire to remain competent, self improvement, and the need to increase understanding. Gaining advanced credentials, social contact and economic need were identified by respondents from both provinces as the least important reasons for pursuing continuing education opportunities.

Ninety-six percent of the respondents identified print materials as a learning

method currently utilized. Of all the print materials currently used, professional journals and newsletters are used most frequently while textbooks are used the least frequently. The average number of journals that the dental hygiene respondents read is three and these were identified as those professional publications that are mailed to dental hygienists as a benefit of membership within their professional association. Respondents in both provinces felt that the greatest motivator for utilizing print materials was convenience and that the greatest obstacle to their use was identified as time.

Direct contact with colleagues and other professionals is a learning method currently utilized by 83.8% of the respondents. Of all the possibilities for direct contact, informal discussions and staff meetings were identified as most frequently utilized and E-mail was the least frequently utilized form of direct contact with colleagues and other professionals. In both provinces, motivation for using direct contact was attributed to the stimulation it provided. The greatest obstacle for conferring and collaborating with others was identified as accessibility.

Formal education activities were utilized by 86.4% of the survey respondents. Study clubs and distance learning courses were identified as those activities most frequently engaged in while professional conventions were identified as the least frequently accessed continuing education activity because they are usually offered only once per calendar year. Accessibility and socialization were identified by respondents in both provinces as the strongest motivators for pursing this method when learning. Respondents found that time away from work and

family, accessibility, and cost were the greatest obstacles for using formal educational activities.

Non print materials were utilized by the smallest percentage of respondents in both provinces and they were also identified as the least preferred learning method. Those respondents who did use non print materials for learning most frequently accessed the internet and least frequently utilized audiotapes. Respondents were motivated to use non-print materials because of their convenience and the wealth of information that could be accessed. Knowledge of what is available and access to information are identified by both Ontario and Alberta respondents as the biggest obstacles to accessing non print materials.

Comparison of Subgroups

The delivery methods currently utilized by respondents and respondents' reasons for pursuing continuing education opportunities were not influenced by their age, year of graduation, formal education completed, size of community of residence and practice environment.

For Alberta respondents, age, formal education completed, and residence in larger urban communities influenced their preferences for learning methods. For Ontario respondents, residence in rural settings, age, and formal education completed influenced their preferences for learning methods.

Content needs were influenced by age and year of graduation for both Alberta and Ontario respondents.

Discussion of Findings

Dental hygienists in this study have indicated that they have distinct preferences in what they need to learn and how they wish to learn, and this will be discussed in relation to existing research on the topic.

Content Learning Needs

Respondents had an opportunity to choose from ninety different continuing education titles or offerings when identifying their content needs. By survey design, no attempt was made to determine the extent of the content need and for this reason the content needs could not be ranked from high to low need. This limits the amount of insight to be gained from this research (Ross et al., 1981). Also, respondents indicated that the content needs identified by the survey may be temporary. As one respondent said: "there is always a learning need in all areas even if I recently attended a course because it may change next week".

With awareness of these limitations, it can still be reliably stated that over two thirds of the respondents identified content learning needs for topics that deal with patient centered clinical dental hygiene practice and the process of care. As the majority of respondents are employed in private dental practices, this focus on the clinical aspect of dental hygiene care is understandable. The need for the most current information on products, techniques, materials, therapies and treatments is also understandable from a group of health care professionals who pursue continuing education activities because they want to remain competent, feel a need to improve themselves, and wish to increase their understanding of the science that

forms the basis of their practice. This is also consistent with the findings of the Statewide Needs Assessment Program (Ross et al., 1981) where dentists identified a need for content that emphasized the most recent developments within the subspecialties in dentistry. Clinical topics predominated.

Less than 25% of the respondents identified the professional development offerings that dealt with research design, implementation and interpretation, suggesting a low need. Without some form of assessment of the content of professional journals, formal continuing education courses, on-line information, or curriculum content in dental hygiene programs, it is impossible to say if this response indicates a true lack of need as reflected by the comment: "my continuing educational activities over the past few years have encompassed a lot of the areas that I didn't check off so I didn't consider these areas as learning needs" or if 75% of the respondents just did not perceive a need for information on these specific offerings. The low need for these topic areas may reflect upon the employment situation of the dental hygienist as less than one percent of the respondents to the survey indicated employment in the area of research.

The data does suggest that dental hygienists in Ontario and Alberta are interested in research beyond a summary of the 'latest' that some of the offered topics promoted. Forty-six point three percent of the respondents expressed a need for information on research opportunities for the dental hygienist. This is important for, as Malvitz (1995) suggested:

> if dental hygiene is to survive as a profession and to improve the public's oral health...every dental hygienist must possess genuine

regard for the centrality of research (p.51).

Delivery Needs for Dental Hygiene Learners

Dental hygiene respondents, through their identification of the methods they currently use for learning and those methods by which they prefer to learn, suggest that they are self-directed learners who assume major responsibility for their learning activities. Formal educational activities represent only one source for their learning experiences. The identification of non-print materials as the least frequently utilized learning method is consistent with the literature that has reported that health care providers, including dental hygienists, lag behind other professionals in their use of computers (Mann & Chaytor, 1992; Gravois in Covington, 1996; Covington, 1996).

Examination of the reasons the respondents offered for pursuing continuing education opportunities suggests an ethical commitment to life-long learning by dental hygienists.

Of the print materials that the respondents utilize, professional journals and newsletters were identified as the most frequent source of information. This finding is consistent with the research that has found physicians and other health care professionals prefer scientific and professional journals to meet their learning needs (Curry & Putman, 1981; Mann & Chaytor, 1992; Covington, 1996).

Direct contact with colleagues and other professionals was indicated as the most preferred learning method and the strong preference for it is linked to the intellectual stimulation it provides. This finding is consistent with research

involving allied health occupations, dentists, physicians and dental hygienists (Scanlon & Blagg, 1985, Milgrom, 1978; Curry & Putman, 1981; Covington, 1996) that has identified informal discussions to be used and preferred when updating knowledge and skills. Many earnest and articulate comments enriched the quantitative data on this topic and ranged from "the fellowship and camaraderie is second to none and always leads to new information" to "it is so much fun to learn from your peers, it boosts my self confidence too!". These findings are supported by other research that has found that female independent learners do not enjoy or benefit from isolation and that sharing continuing education experiences builds cohesion and confidence (Kirkup and Von Prummer, 1990; Temkin, 1986).

Formal education activities, the most popular of which is the short course, are greatly preferred as a learning method by respondents but the barriers to participating in continuing education activities are substantial for the predominately female dental hygiene respondents and include time away from work and family, cost, and accessibility. Other research has identified similar barriers to accessing formal education activities (Covington, 1996). Providers of continuing education activities would be wise to consider these barriers when planning courses for dental hygienists.

Non-print materials are utilized by the smallest percentage of respondents and are the least preferred learning method. What is alarming about this finding is that many of the lay public access information, even scientific information, via the internet, and may have information before the dental hygienist does, especially if

she or he is reliant upon print materials. It is conceivable that a dental hygienist in practice may not have sufficient time to reflect upon information before being challenged about it.

Comparison of Subgroups of Respondents

Age and year of graduation significantly influence the content learning needs of dental hygienists in nine topic areas. Recent graduates, who are predominately younger (less than 30 years of age), differ from older graduates in years of clinical experience. Also, recent graduates have learning needs more closely associated with the curriculum taught at their graduating institution so this difference in content needs is understandable. This finding is also consistent with other research related to competent practice (Caulford et al, 1994).

Delivery methods preferred by respondents were influenced by age, formal education completed and the size of the community of residence. Older dental hygienists and those with higher educational credentials preferred to learn through formal educational activities. This preference for traditional, formal method may be closely related to the non-threatening, non-participatory "lecture" where a great deal of information is disseminated in a short period of time.

The preference by urban residents in Alberta to using non-print materials and rural respondents from Ontario to prefer learning through direct contact with colleagues and other professionals, may reflect the problems of learning and accessing information related to isolation (Covington, 1996).

Recommendations

The findings of this research have implications for dental hygiene practitioners, providers of continuing education opportunities including dental hygiene professional associations and educational institutions, and dental hygiene programs. The following recommendations, based upon the findings of this study, are offered:

1. **The C.D.H.A. should consider increasing the amount of scientific content within its national journal or creating a new journal dedicated to research with expedited peer review so that more timely scientific information is published.**
    - Dental hygienists primarily use and prefer print materials when learning. The predominant source of these print materials are journals and newsletters supplied by the national and provincial dental hygiene associations. These professional associations have a responsibility to support and challenge dental hygienists who learn in this manner by ensuring quality of their publications.
2. **Professional associations need to recognize other methods of learning when they contemplate competency evaluation, quality assurance and/or professional development programs.**
    - Practicing dental hygienists do not learn solely from continuing education courses. Continuing education courses represent only one method for learning with print materials, direct contact with

professionals and colleagues and non-print materials representing other learning methods.

3. **Professional associations must continue to support and more actively promote study clubs. Provincial and national associations need to develop computerized networking which could include E-mail discussion groups. When program planners design continuing education activities, this need for interaction must be considered and encouraged and sufficient time allowed for colleagues to exchange information.**

   - Dental hygienists prefer to learn through direct contact with colleagues and other professionals.

4. **Dental hygiene programs across Canada must teach information access through computers so that graduates have increased skills in this area. Professional associations need to recognize computer upgrading as a necessary continuing education activity essential to competent practice. The Canadian Dental Hygiene Association should develop an on-line journal to promote computer use. Educational institutions and libraries need to offer 'informatic' courses for dental hygienists with low instructor to student ratios where the principles of adult learning are upheld. Time must be permitted for and recognition given to dental hygienists to incorporate computerization into their life-**

long learning skills.

- Dental hygienists have indicated that they neither utilize nor do they prefer to learn from non-print methods. In our current electronic information age, dental hygienists must be encouraged to take advantage of modern technology.

5. **Planning of continuing education courses by educational institutions and professional associations must consider the barriers and motivators dental hygienists experience when learning. The timing of courses, for example, must respect the difficulties dental hygienists face in being away from work and family commitments.**

6. **Needs assessments should be conducted on a regular basis to determine appropriate content, relevance, and process for courses. These needs assessments should obtain information from several sources such as potential participants, researchers, employers and patients. Evaluation of continuing education experiences for dental hygienists must go beyond the 'happiness ratings'. The impact upon practice and patient health must be investigated.**

- More scientific rigor is needed in the planning, implementing, and evaluating of formal continuing education experiences for dental hygienists if they are going to be linked to competent practice and quality assurance.

7. **Continuing education providers should conduct needs assessments *at***

the time of registration **for formal education courses in order to refine the content of the courses they sponsor.**

- The content of material presented during formal education courses is important to registrants. A needs assessment at the time of registration for a course that registrants have already indicated an interest in, would allow for greater relevance in course information.

8. **Whenever possible, the providers of dental hygiene continuing education learning opportunities must present and discuss the design of the research (the methodology) so that dental hygienists can come to recognize the possibilities for performing research and they develop skills in interpreting research findings based upon a more complete understanding of the research process.**

   - Continuing education is the link between current knowledge and research/new knowledge. More attention should be paid to the scientific process that results in any discovery or change.

9. **Courses should be offered that focus on the learning process so that dental hygienists become more aware of how they learn and the delivery method that best suits them. Professional associations must reward dental hygienists for self directed planning of their learning or provide support services that counsel dental hygienists who are unclear of their learning needs.**

   - It is the dental hygienists professional responsibility to remain current

with knowledge but some dental hygienists may not be aware of how they best assimilate information.

10. **It is the responsibility of curriculum planners in dental hygiene programs to ensure that courses incorporate the development of critical thinking skills and specifically address the critical appraisal of research. Continuing education providers also need to pay attention to critical thinking skill development when designing educational activities.**

    - Dental hygienists are self-directed learners and, as such, need skills in the critical appraisal of research.

11. **Providers of continuing education opportunities for dental hygienists, such as educational institutions and professional associations, should offer content related to research on the latest products, techniques to stay current, the impact of alternative medicine on dental hygiene care and the latest in prevention: products and techniques. Dental hygiene programs in Canada should consider content that explores the impact of alternative medicine on dental hygiene care.**

12. **Continuing education providers should regularly offer content that considers the standards for practice found within the *Dental Hygiene: Definition and Scope (C.D.H.A., 1995)* document.**

13. **The demographic profile of registrants such as year of graduation, age,**

and formal education completed should be considered when planning formal educational activities.

- Age, formal education completed and community of residence influence preference for specific learning methods. Age and year of graduation influence content needs.

14. **Continuing education providers should invite all members of the dental team and members of other professions to continuing education courses for dental hygienists.**

- Dental hygienists prefer to learn through direct contacts with colleagues and other professionals. Sharing continuing education experiences builds cohesion.

Suggestions for Future Research

1. Other Provinces in Canada could conduct a needs assessment of dental hygienists within their boundaries to determine their learning needs. By design, a new study should investigate non respondents as well as respondents to determine if there is a significant difference in their learning needs.
2. It is suggested that further research be undertaken to determine the effects of dental hygienists learning through print materials.
3. It is suggested that research be undertaken to determine the effectiveness of formal continuing education courses for dental hygienists by examining

patient outcomes.

4. It is suggested that a needs assessment be undertaken to determine the specific learning needs of dental hygienists with respect to their use of the computer.
5. It is recommended that the content needs of dental hygienists be further investigated to gain insight into the reason for age related differences.
6. It is recommended that the Canadian Dental Hygienists' Association undertake research to determine the demographic profile of dental hygienists in Canada every five years.

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Appendix A

Survey

SURVEY TO ASSESS THE LEARNING NEEDS OF DENTAL HYGIENISTS: CONTENT AND DELIVERY

This survey has been designed to determine your continuing professional education needs as a dental hygienist. The survey has three sections. The first section asks questions concerning how you like to learn, the second section asks questions concerning what you would like to learn about and the final section asks for demographic information.

SECTION I: LEARNING SOURCES

When learning, each one of us seeks information from different sources. The questions in this section ask you to explore your preferences for specific learning methods when engaged in continuing education activities. Each question has specific instructions. Some of the questions require you to rate your preferences on a continuous scale.

EXAMPLE:
Circle the number on the scale which best describes your preference for using a learning method:

	Learning method:	Least prefer		↔	Most prefer	No Preference
0.0	animated cartoons	1	2	(3)	4	5

If you prefer to learn from animated cartoons, but it isn't your most preferred method, you would circle 3 above.

1.0 Please indicate the learning method(s) you currently use with a check (√):

- ❑ print materials (i.e. professional journals, professional newsletters, text books, magazines, consumer reports, promotional literature)
- ❑ direct contact with professionals, colleagues (i.e. staff meetings, committee work, Email patient referrals, formal and informal conversations,)
- ❑ formal educational activities (i.e. study clubs, professional conventions, professional activities, university /community college sponsored on-site courses, on-line courses, distance learning courses)
- ❑ non print materials (i.e. audiotapes, videotapes, internet, computer assisted instruction, CD ROM)
- ❑ other (specify) _____

2.0 Circle the number on the scale which describes your preference for using an identified learning method:

Learning method:	*Least prefer* ↔			*Most prefer*	*No preference*
print materials	1	2	3	4	5
contact with other professionals	1	2	3	4	5
formal educational activities	1	2	3	4	5
non print materials	1	2	3	4	5
other	1	2	3	4	

(specify) _____

3.0 **The following series of questions refer to your use of PRINT MATERIALS.**

3.1 **Circle the number under the column which best describes the frequency you use print materials:**

Frequency of use:	*daily*	*weekly*	*monthly*	*yearly*	*Don't use*
professional journals	1	2	3	4	5
professional newsletters	1	2	3	4	5
text books	1	2	3	4	5
magazines	1	2	3	4	5
consumer reports	1	2	3	4	5
promotional materials	1	2	3	4	5
other	1	2	3	4	

(specify)_____

3.2 **Check to indicate the location(s) of use for print materials:** home ❑ office ❑

3.3 **Please identify the publications that you routinely read:**

_____

_____

3.4 **Rate your motivation for using print materials with a circle on the following continuum:**

Motivational factor:	*Low motivator*	↔	*High Motivator*		*Not a factor*
cost	1	2	3	4	5
convenience	1	2	3	4	5
time	1	2	3	4	5
interest	1	2	3	4	5
accessibility	1	2	3	4	5
quality	1	2	3	4	5
other	1	2	3	4	

(specify) _____

3.5 Rate the obstacles you face when using print materials by circling a number on the scale:

Obstacles:	*Small obstacle*	↔	*Big obstacle*		*Not an obstacle*
costly	1	2	3	4	5
convenience	1	2	3	4	5
complexity of information	1	2	3	4	5
accessibility	1	2	3	4	5
time	1	2	3	4	5
quality	1	2	3	4	5
other	1	2	3	4	
(specify) _____					

4.0 The following questions refer to the DIRECT CONTACT YOU HAVE WITH COLLEAGUES AND OTHER PROFESSIONALS:

4.1 Indicate the frequency with which you engage in direct contact with colleagues and other professionals by circling a number on the scale below:

Frequency:	*Low frequency*	↔	*High frequency*		*Do not use*
staff meetings	1	2	3	4	5
committee work	1	2	3	4	5
informal discussions	1	2	3	4	5
email	1	2	3	4	5
patient referrals	1	2	3	4	5
other	1	2	3	4	
(specify)_____					

4.2 Rate those factors which motivate your use of direct contact with colleagues by circling a number on the scale:

Motivator:	*Low motivator*	↔	*High motivator*		*Not a factor*
time saved	1	2	3	4	5
accessibility	1	2	3	4	5
reliability of information exchanged	1	2	3	4	5
stimulation	1	2	3	4	5
other	1	2	3	4	
(specify)_____					

4.3 Rate those factors which represent obstacles for using direct contact:

Obstacle:	*Small obstacle*	↔	*Big obstacle*		*Not a factor*
time spent	1	2	3	4	5
accessibility	1	2	3	4	5
reliability of information exchanged	1	2	3	4	5
stimulation	1	2	3	4	5
other	1	2	3	4	
(specify)_____					

5.0 **The following questions refer to FORMAL EDUCATIONAL ACTIVITIES:**

5.1 **Circle the number in the column which corresponds to the amount you engage in formal educational activities:**

Frequency of use:	*daily*	*weekly*	*monthly*	*yearly*	*Don't use*
study Clubs	1	2	3	4	5
professional conventions	1	2	3	4	5
professional seminars, activities	1	2	3	4	5
university/College sponsored courses	1	2	3	4	5
community sponsored courses	1	2	3	4	5
distance learning courses (computer or correspondence)	1	2	3	4	5
other (specify)_____	1	2	3	4	

5.2 **Rate what motivates you to participate in formal educational activities by circling the number on the scale:**

Motivator:	*Low motivator*	↔	*High motivator*		*Not a factor*
cost	1	2	3	4	5
accessibility	1	2	3	4	5
time away from work	1	2	3	4	5
accommodation	1	2	3	4	5
socialization	1	2	3	4	5
other (specify)_____	1	2	3	4	

5.3 **Rate the obstacles which keep you from registering for formal educational activities by circling the number on the scale:**

Obstacle:	*Small obstacle*	↔	*Big obstacle*		*Not a factor*
cost	1	2	3	4	5
accessibility	1	2	3	4	5
time away from work	1	2	3	4	5
accommodation	1	2	3	4	5
socialization	1	2	3	4	5
other (specify)_____	1	2	3	4	

5.4 **Rate the learning strategies you prefer when engaging in formal educational activities by circling the number on the continuous scale:**

Strategies	*Least prefer*	↔	*Most prefer*		*No preference*
lecture	1	2	3	4	5
interactive discussion	1	2	3	4	5
workshop	1	2	3	4	5
group activity	1	2	3	4	5
panel discussion	1	2	3	4	5
self paced study	1	2	3	4	5
individualized study	1	2	3	4	5

6.0 **The following questions refer to your use of NON PRINT MATERIALS:**

6.1 **Circle the number in the column which corresponds to the frequency with which you use non print materials:**

Frequency of use:	*daily*	*weekly*	*monthly*	*yearly*	*Don't use*
audio tapes	1	2	3	4	5
video tapes	1	2	3	4	5
computer assisted learning	1	2	3	4	5
internet	1	2	3	4	5
other	1	2	3	4	

(specify)_____

6.2 **Rate what motivates you to use non print materials by circling the number on the scale:**

Motivator:	*Low motivator*	↔	*High motivator*		*Not a factor*
cost	1	2	3	4	5
availability of materials	1	2	3	4	5
knowledge as to what's available	1	2	3	4	5
convenience	1	2	3	4	5
reliability of information	1	2	3	4	5
access to information	1	2	3	4	5
other	1	2	3	4	

(specify)_____

6.3 **Rate the obstacles you face when using non print materials by circling the number on the scale below:**

Obstacle:	*Small obstacle*	↔	*Big obstacle*		*Not a factor*
cost	1	2	3	4	5
availability of materials	1	2	3	4	5
knowledge as to what is available	1	2	3	4	5
convenience	1	2	3	4	5
reliability of information	1	2	3	4	5
access to information	1	2	3	4	5
other	1	2	3	4	

(specify)_____

7.0 **Indicate why you pursue continuing education opportunities on the following scale:**

Reason for pursuing:	*Low importance*	↔	*High importance*		*Not a factor*
need to increase understanding	1	2	3	4	5
desire to remain competent	1	2	3	4	5
continuing education points	1	2	3	4	5
gain advanced credentials	1	2	3	4	5
self improvement	1	2	3	4	5
self esteem	1	2	3	4	5
social contact	1	2	3	4	5
economic need	1	2	3	4	5
value for learning	1	2	3	4	5
other	1	2	3	4	

(specify)_____

SECTION II: CONTENT NEEDS

This section is designed around the baseline abilities defined in the C.D.H.A. document *Dental Hygiene: Definition and Scope.* It is recognized that competence is a continuous process and your learning needs may change throughout your professional career. In this section, you are asked to self assess your personal learning needs in relation to specific topic categories. Each topic category is followed by a number of potential professional development offerings. You are asked to identify all, some or none of the course titles you would prefer to have available.

EXAMPLE:

0.0 Nutrition	Check (√) if this is a learning need:
Diet counseling for the dental hygiene client	☑
Proper nutrition and oral health	☐
Networking with dietitians for better client health	☑

If you need to learn more about the process of diet counseling but you know enough about or attended a course on proper nutrition within the past year, only the above boxes would be checked.

8.0 Dental hygiene responsibilities:	Check (√) if this is a learning need:
The evolving role of the dental hygienist	☐
The ethics of dental hygiene practice	☐
Guidelines for employment contracts	☐

Check (✓) if this is a learning need:

Dental hygiene responsibilities continued:

- Health care policies ☐
- Health promotion policies ☐
- Research opportunities for the dental hygienist ☐
- Optimal use of dental hygiene skills ☐
- Other (specify) _____

9.0 Participative decision making

- Guidelines for client referrals ☐
- Advanced periodontal therapies ☐
- Effective educational techniques/strategies ☐
- Networking to improve patient care ☐
- Strategies for developing research activities ☐
- Negotiating change ☐
- Effective team participation ☐
- Other (specify) _____

10.0 Support and resource requirements

- Current infection control protocols ☐
- CPR and first aid certification ☐
- Environmental/occupational hazards ☐
- The impact of alternative medicine on dental hygiene care ☐
- Using the consultative process to develop policies ☐
- Research projects that use client information ☐
- The ethics of dental hygiene practice ☐
- Other (specify)_____

11.0 Maintaining professional competence

- Mentorship and how it can help you ☐
- Skill workshops to enhance your efficiency ☐
- Techniques to stay current ☐
- The direction of dental hygiene education in Canada ☐
- Research on the latest products ☐
- Guidelines for building a study group ☐
- Other (specify) _____

12.0 Information management

- Dental hygiene practice and the law ☐
- Dental hygiene diagnostic tools ☐
- Computers and dental hygiene practice ☐
- The world wide web and its impact upon dental hygiene practice ☐
- Designing health promotion programs for dental hygiene clients ☐
- Building effective recall systems ☐
- Protection of client privacy ☐
- How to interpret research findings ☐
- Other (specify) _____

Check (√) if this is a learning need:

13.0 Practicing professionally

- Dental hygiene career alternatives ☐
- The business side of dental hygiene practice ☐
- Learning to listen to what the client needs ☐
- The ethics of shortcuts ☐
- Standards for dental hygiene practice ☐
- Asking personal medical questions ☐
- A synopsis of current research in dental hygiene ☐
- Other (specify) _____

14.0 Individualizing Services

- Social, cultural and environmental factors influencing dental hygiene practice ☐
- Human rights in health care ☐
- Multicultural health issues ☐
- Skills in being an effective client advocate ☐
- Social science research and its implications for dental hygiene practice ☐
- Other (specify) _____

15.0 Assessment

- Treating high risk clients ☐
- Managing dental phobias and fears ☐
- Identifying determinants of health ☐
- Dental hygiene diagnosis: the skills and the tools ☐
- Identifying research limitations ☐
- Defining the problem through co-discovery ☐
- Securing informed consent ☐
- Other (specify) _____

16.0 Planning-Client Participation

- The latest in dental treatment options: materials and techniques ☐
- The latest in prevention: products and techniques ☐
- How to plan systems around health issues ☐
- Marketing strategies ☐
- Teaching strategies that work ☐
- Motivational techniques ☐
- Other (specify) _____

17.0 Implementation -Client/Clinician Safety

- Occupational hazards and dental hygiene practice ☐
- Infectious diseases and dental hygiene practice ☐
- World wide disease trends ☐
- Hazardous wastes and dental hygiene practice ☐
- Infection control controversies ☐
- Other (specify) _____

Check (√) if this is a learning need:

18.0 Implementation-Equipment and Resource Selection

- Current technological options for dental hygiene practice ❑
- Alternative pain control methods ❑
- Electronic communication choices ❑
- Making good choices in a changing marketplace ❑
- Other (specify) _____

19.0 Implementation-Provision of Care

- Pain and anxiety management for the dental hygiene client ❑
- Current health promotion strategies ❑
- Current educational techniques/strategies ❑
- Standards for clinical research ❑
- What the research says about current clinical techniques ❑
- Matching your teaching to client learning ❑
- Developing hospital and nursing home in-services ❑
- Other (specify) _____

20.0 Evaluation-Ongoing

- The use of indices ❑
- Self evaluation and its impact upon dental hygiene practice ❑
- How to conduct surveys ❑
- Program evaluation-when and how to do it ❑
- Using client statistics to improve health ❑
- Client accountability ❑
- Other (specify) _____

21.0 Evaluation-Revision

- Strategies for improving operational processes ❑
- Statistical analysis explained ❑
- When and how to change a strategy ❑
- Risk management ❑
- Other (specify)_____

22.0 Evaluation-Outcomes

- How to tell if your clients are getting healthier ❑
- How to improve client satisfaction with dental hygiene care ❑
- Evaluating the impact of oral health initiatives ❑
- Analyzing and applying research findings to dental hygiene care ❑
- Methods for evaluating client knowledge ❑
- Other (specify) _____

SECTION III: DEMOGRAPHIC INFORMATION

This section contains questions about your educational background and your dental hygiene practice experience. Please check all that apply.

23.0 What year did you graduate as a dental hygienist?
❑ < 1970 ❑ 1971-1978 ❑ 1979-1986 ❑ 1987-1994 ❑ 1995-1998

24.0 Formal education completed: ❑ Diploma/certificate
❑ Bachelor degree
❑ Master degree
❑ Other (specify) _____

25.0 Current employment:
❑ Full time (≥ 4 days /week) ❑ Part time (< 4 days/week)

❑ Private dental practice: ❑ general practice
❑ specialty practice
❑ Public /Community Health
❑ Post secondary educational institution
❑ Hospital
❑ Administration/Management
❑ Research
❑ Other (specify)_____

26.0 Size of the community in which you:

practice:
❑ Rural (<5000 people)
❑ Urban 1 (>5000-10,000 people)
❑ Urban 2 (>10,000-<100,000 people)
❑ Urban 3 (>100,000 people)

live:
❑ Rural (<5000 people)
❑ Urban 1 (>5000-10,000 people)
❑ Urban 2 (>10,000-<100,000)
❑ Urban 3 (>100,000)

27.0 Province in which you currently practice: ❑ Alberta ❑ Ontario

28.0 Age: ❑ <25 years ❑ 25 - 30 years ❑ 31-40 years ❑ 41 - 50 years ❑ >50 years

✧ THANK YOU FOR YOUR VALUABLE INPUT ✧

Appendix B

Letter to Panel of Experts

To: Panel of Experts Date: June 1, 1998

From: Marg Wilson

Re: Content validation of survey research

Thank you so much for agreeing to be part of a panel of dental hygienists willing to verify the content of a survey that will contribute to research on the continuing education needs of dental hygienists.

As you know, I have been a graduate student in the Master of Education program at the University of Alberta for the past three years and I am currently completing my thesis which is entitled, The Learning Needs of Dental Hygienists: Content and Delivery.

My research includes a survey which has three sections. In the first section, dental hygienists will be asked to rate their preferences for different learning methods. How they like to learn and why they pursue continuing education activities will be explored. In the second section, dental hygienists will be asked to identify those topics they would like to hear more about. The topic areas within this section come from the document, Dental Hygiene: Definition and Scope (1998), and are based on the beginning competencies for practicing dental hygienists. In the third section of the survey, demographic information will be sought.

Your assistance is being sought to validate the content in the second section of the survey. When I originally designed this research, to gain insight into the content needs of practicing dental hygienists, I took out ads in the C.D.H.A. Probe, the A.D.H.A. Probe and the B.C.D.H.A. Newsletter. In the ads I asked dental hygienists to send me their problems of practice. My thinking was that problems of practice could provide insight into the continuing education needs of dental hygienists and I could use the information as a framework for the second section of my survey. I did not receive any written responses to the ads so I am looking to validate the content using an alternative method.

Another research technique for validation of content involves consultation with a panel of experts. For this technique to be accepted by the research community, I need you to **understand how I arrived at the content and comment on the process and end product.** To facilitate your understanding I have enclosed:

1. Information on the considerations I made to arrive at the survey questions
2. Structure Criteria and Standards from Dental Hygiene: Definition and Scope document
3. The proposed continuing education offerings for the survey

My time line for this request is tight. If you could provide me with feedback before Friday, June 5, 1998 by phone (492-4453 wk or 436-7320 hm) or preferably in writing, I would be most grateful.

Thank you.

How the survey questions were created:

1. Continuing education topics are often very trendy and soon become 'stale dated'. What was hot in 1995 is not necessarily an issue in 1998. Change is occurring rapidly for our profession but content for continuing professional education (CE) courses must be linked to competency in practice and the future direction of the profession.

2. In 1995 the Canadian Dental Hygiene Association distributed the Dental Hygiene: Definition and Scope booklet. This validated document (Keenan, 1995) identified 15 criteria (key variables) and the standards expected of the practicing dental hygienist. These criteria were used as the template for the major headings or questions within the survey.

3. Under each heading in the survey, a number of possible continuing education topic choices are listed. These topic choices were arrived at by grouping the standards discussed under each criterion.

EXAMPLE:

5. **Information management** (this corresponds to Criterion #5 which charges the dental hygienist to ensure or promote that the practice environment provides systems to manage information).
   The choices listed include:
   - **Dental hygiene practice and the law** (considers standard 5.1 and 5.1.6)
   - **Dental hygiene diagnosis** (considers standards 5.1.1 → 5.1.5)
   - **Computers and dental hygiene practice** (considers standard 5.1 + 5.2)
   - **Designing health promotion programs for dental hygiene clients** (considers 5.1)
   - **The world wide web and its impact upon dental hygiene practice** (considers 5.1 + 5.2)
   - **How to interpret research findings -- what is valid and what isn't** (considers 5.2)

4. The list of choices under each topic is not exhaustive. What I was trying to produce were choices that considered each of the 5 roles that have been defined for the dental hygienist: clinical therapist, health promoter, educator, administrator, and researcher.

5. At the end of each question or topic, there is an opportunity for the respondent to identify their personal choice. This allows for qualitative data to be gathered and it will be examined to determine if any themes occur.

6. When you are reviewing the survey questions, please let me know what you think of the process I used to come up with the possible topics and if you agree or disagree with the topics themselves.

Thank you.

Appendix C

Cover Letter for Pilot Survey

To: Pilot Survey Volunteers

From: Marg Wilson

Re: Content validation of survey

Thank you so much for agreeing to participate with a pilot study designed to verify the content of a survey that will contribute to research on the continuing education needs of dental hygienists.

As you know, I have been a graduate student in the Master of Education program at the University of Alberta for the past three years and I am currently completing my thesis which is entitled, The Learning Needs of Dental Hygienists: Content and Delivery.

My research includes a survey which has three sections. In the first section, dental hygienists are asked to rate their preferences for different learning methods. How they like to learn and why they pursue continuing education activities is also explored. In the second section, dental hygienists are asked to identify those topics for which they have a learning need. In the third section of the survey, demographic information is sought.

Your assistance with validation of the content of this survey is very important. This process will require approximately 45 minutes of your time and asks that you:

1. **Complete the survey and time yourself**
2. **Return to the survey and answer the following questions**

◆Re: Layout

- ⇨Is there enough space provided to answer the questions asked? If not, where would you change the layout to make the document more user friendly?
- ⇨Is the font size big enough for comfortable reading?

◆Re: Format

- ⇨Are the directions clear? If not, please indicate the survey question(s) number that has you confused.
- ⇨Do the examples provided give you a clear understanding of how the questions should be answered? If not, please indicate the example that is unclear.

◆Re: Content

- ⇨Are there any statements that you find confusing? If so, please indicate which ones.
- ⇨Are there any phrases that you are uncertain of the meaning? If so, please indicate which ones.

A sheet has been provided for your input. Please FAX this sheet back to me at (403) 492 8552 by noon on Wednesday, June 10, 1998 or phone me at (403) 492 4453 and verbally share your thoughts.

I recognize that my time line for this request is very tight but I feel pressured to mail this out in June before people go into 'summer mode'. THANK YOU SO MUCH!

PILOT SURVEY
CONTENT VALIDATION

1. LENGTH OF TIME TO COMPLETE: _____

2. LAYOUT:
   IS THERE ENOUGH SPACE? ☐ YES ☐ NO
   IF NO, PLEASE ELABORATE:

   IS THE FONT SIZE ADEQUATE? ☐ YES ☐ NO
   COMMENTS:

3. FORMAT:
   ARE THE DIRECTIONS CLEAR? ☐ YES ☐ NO
   IF NO, PLEASE INDICATE THE QUESTION NUMBER AND CONCERN:

   DO THE EXAMPLES CLARIFY OR CONFUSE THE DIRECTIONS?

4. CONTENT:
   ARE THERE ANY CONFUSING STATEMENTS? ☐ YES ☐ NO
   IF YES, PLEASE INDICATE THE QUESTION NUMBER AND WHY YOU FOUND IT CONFUSING:

   ARE THERE ANY PHRASES THAT HAVE UNCLEAR MEANING? ☐YES ☐NO
   IF YES, PLEASE INDICATE THE QUESTION NUMBER AND WHY YOU FOUND IT CONFUSING:

5. GENERAL COMMENTS?
   ANY AND ALL OF YOUR REFLECTIONS ARE APPRECIATED:

Appendix D

Cover Letter for Survey

Marg Wilson, Dental Hygienist
4304 123 street
Edmonton, Alberta T6J 1Z8

June 12, 1998

Dear Colleague:

I am employed at the University of Alberta in the Faculty of Medicine and Oral Health Sciences in the Dental Hygiene Program as an associate clinical professor. For the past three years I have also been a graduate student in the Master of Adult Education program, also at the University of Alberta. I am currently completing my thesis which is entitled: The Learning Needs of Dental Hygienists: Content and Delivery.

My research includes the enclosed survey which is being mailed to registered dental hygienists in Alberta and Ontario. Your name was selected randomly from a list of all the dental hygienists those Provinces. Your participation in this study is voluntary. All responses will remain completely anonymous and only grouped data will be reported.

Your response to this survey is extremely important. Your opinions and those of your colleagues will be used as the foundation for planning effective continuing professional education programs for dental hygienists in Canada. Please take the time to complete the survey and return it by July 10, 1998 in the envelope provided.

I sincerely appreciate your cooperation in supporting this study. If you have any questions about the survey or the study itself, please do not hesitate to contact me by calling : (403) 492 4453 during the day or (403) 436 7320 in the evenings. My Email address is mpwilson@gpu.srv.ualberta.ca and my FAX number is (403) 492 8552.

Please accept a "thank you" in advance for your participation. I look forward to receiving your survey.

Sincerely,

Marg Wilson

Margaret Wilson, Dip. D H Ed., M.Ed. (Candidate)

Appendix E

Follow-up Letter to Survey

Marg Wilson, Dental Hygienist
4304 123 Street
Edmonton, Alberta T6J 1Z8

It is reliably predicted that our scientific and technical knowledge base, now doubling about every five to eight years, will soon begin to double every year in some fields. The rate of expansion in the quantity of facts, concepts and principles required for competent practice will differ among professions, depending upon the nature of the theories that underlie each.

From: Trends and Forces Reshaping Professional Practice (1993) in Educating Professionals by L. Curry, F. Wergin & Associates.

Dear Colleague,

Two weeks ago you were mailed a survey entitled: The Learning Needs of Dental Hygienists: Content and Delivery. Your response to this survey is very important. Your individual perspective, combined with input from your colleagues in Alberta and Ontario, will impact the planning of continuing professional education programs for dental hygienists in Canada. The development of relevant and effective learning opportunities for dental hygienists should keep our profession strong into the 21st century.

If you have not already done so, please give the survey your attention. It is very important that the results of this study reflect everyone's input. All responses will remain completely anonymous and only grouped data will be reported.

If you have already sent in your survey, thank you. Your participation is truly appreciated.

Sincerely,

Margaret Wilson, Dip D H., B Ed., M.Ed. (Candidate)

Appendix F

Structure Criteria and Standards from *Dental Hygiene: Definition and Scope*

Structure Criteria and Standards

Criterion 1: Dental Hygiene Responsibilities

The dental hygienist ensures or promotes that the practice environment[1] provides a description of the dental hygienist's responsibilities. The description outlines:

Responsibilities	Standards	
Clinical Therapy	1.1	human resources and client[2] care policies.
Health Promotion	1.1	human resources and client service/health promotion policies.
Education	1.1	human resources and educational policies.
Administration	1.1	human resources and management and healthcare policies.
Research	1.1	human resources and research policies.

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[1] "Practice environment" encompasses the physical, social and cultural factors within institutions, settings, communities. The practice environment is influenced by: legislation; regulatory and professional bodies; the public; employment philosophies and practices; research and technology.

[2] "Client" refers to an individual, family, group, community or organization accessing the professional services of a dental hygienist. "Client" may also include the client's advocate (e.g. the parent of a young child).

In the ADHA "Framework for Theory Development" (Vol. 67, May-June, 1993, *Journal of Dental Hygiene*) the following discussion clarifies the concept of client as used in this document:

"The concept of client refers to potential or actual recipients of dental hygiene care, and includes persons, families, groups, and communities of all ages, genders, socio-cultural, and economic states."

The term client has been selected as a paradigm concept because the term

- is broad, not limited to an individual, includes families, groups, and communities;
- implies wellness rather than illness;
- connotes prevention and health promotion rather than only treatment;
- implies an active rather than passive relationship with the provider; and
- is compatible with current trends that indicate consumers seek out cost-effective healthcare expertise.

Criterion 2: Participative Decision Making

The dental hygienist ensures or promotes that the practice environment provides opportunities for the dental hygienist to participate in decision making by:

Responsibilities	Standards	
Clinical Therapy	2.1	using a consultative process in developing policies affecting the members of the oral health team and the care they provide; and
	2.2	using a consultative process to make decisions regarding facilities, equipment, supplies and procedures.
Health Promotion	2.1	using a consultative process in developing policies affecting the members of the health promotion team and the programs they provide;
	2.2	using a consultative process to make decisions regarding clients, processes, and resources (facilities, equipment, supplies and procedures); and
	2.3	using a consultative process to develop policies to support healthy lifestyles/environments/ communities.
Education	2.1	using a consultative process in developing policies and curriculum which guide teachers/learners and teaching/learning activities;
	2.2	using a consultative process to make decisions regarding facilities, equipment, supplies and procedures; and
	2.3	using a consultative process to promote lifelong learning for teachers and learners.
Administration	2.1	using a consultative process in developing polices relating to program management;
	2.2	using a consultative process to make decisions regarding facilities, equipment, supplies and procedures; and
	2.3	using a consultative process to make staffing decisions according to needs, available positions and funding; staff according to needs, available positions and funding.
Research	2.1	using a consultative process in developing policies relating to research activities.

Criterion 3: Support and Resource Requirements

The dental hygienist ensures or promotes that the practice environment provides resources, including human resources, which support the dental hygienist to:

Responsibilities	Standards	
Clinical Therapy	3.1	maintain and apply current knowledge and skills;
	3.2	implement current universal infection control protocols;
	3.3	adhere to protocols which ensure physical safety and enable response in emergency situation;
	3.4	provide comprehensive dental hygiene care;
	3.5	ensure privacy/confidentiality;
	3.6	maintain records;
	3.7	access, assess and use technology/equipment; and
	3.8	discuss, plan and coordinate client care.
Health Promotion	3.1	maintain and apply current knowledge and skills;
	3.2	promote healthy lifestyle choices;
	3.3	act as a role model;
	3.4	provide oral health information;
	3.5	ensure privacy/confidentiality;
	3.6	access, assess and use technology/equipment; and
	3.7	discuss, plan and coordinate health promotion programs and activities.
Education	3.1	maintain and apply current knowledge and skills;
	3.2	act as a role model for learners;
	3.3	ensure privacy/confidentiality;
	3.4	access, assess and use technology/equipment;
	3.5	discuss, plan and coordinate educational programs and activities; and
	3.6	promote lifelong learning.
Administration	3.1	maintain and apply current knowledge and skills;
	3.2	implement current policies and protocols related to the position;
	3.3	ensure privacy/confidentiality;
	3.4	access, assess and use technology/equipment; and
	3.5	discuss, plan and coordinate activities.

Research	3.1	maintain and apply current knowledge and skills;
	3.2	implement current policies and protocols related to the research activity;
	3.3	ensure privacy/confidentiality;
	3.4	access, assess and use technology/equipment; and
	3.5	discuss, plan and coordinate research activities.

Criterion 4: Maintaining Professional Competence

The dental hygienist ensures or promotes that the practice environment assists the dental hygienist in maintaining professional competence in:

Responsibilities	Standards	
Clinical Therapy *Health Promotion* *Education* *Administration* *Research*	4.1	fostering the dental hygienist's participation in continuing education;
	4.2	providing opportunities to consult with colleagues;
	4.3	providing current knowledge of dental hygiene and other relevant content areas such as clinical dentistry; and
	4.4	encouraging practice consistent with the national practice standards.

Criterion 5: Information Management

The dental hygienist ensures or promotes that the practice environment provides systems to manage information which allow the dental hygienist to:

Responsibilities	Standards	
Clinical Therapy	5.1	provide effective, ongoing care through records which include:
		5.1.1 pertinent and current client demographic and psychographic information;
		5.1.2 pertinent and current medical/dental history;
		5.1.3 findings from intra and extra oral examinations and their interpretations;
		5.1.4 diagnostic tests such as radiographs and interpretations of results;
		5.1.5 the client's treatment record (overall treatment plan, treatment and counselling provided and treatment progress); and
		5.1.6 ensuring confidentiality of all records and appropriate release of information.

Health Promotion	5.1	develop, implement, evaluate and revise programs and activities which meet the needs and demands of the client.
Education	5.1	develop, implement, evaluate and revise programs which meet the needs and demands of the client.
Administration	5.1	maintain pertinent and current information relating to policies and protocols;
	5.2	ensure tracking and reporting mechanisms; and
	5.3	revise existing polices and/or develop new ones.
Research	5.1	conduct reviews of the literature;
	5.2	gather, record and analyze data appropriately; and
	5.3	meet criteria for ethical research.

Process Criteria and Standards

Criterion 6: Practising Professionally

The dental hygienist practises professionally by:

Responsibilities	Standards
Clinical Therapy *Health Promotion* *Education* *Administration* *Research*	6.1 adhering to provincial or territorial dental hygiene licensing and other pertinent regulations/codes; 6.2 supporting the professional associations through personal membership; 6.3 adhering to CDHA *Practice Standards;* 6.4 adhering to the CDHA *Code of Ethics:* 6.5 accessing and utilizing current research based knowledge through analyzing and interpreting the literature and other resources; 6.6 pursuing continuing education; 6.7 managing career development; and 6.8 consulting with experts as required.

Criterion 7: Individualizing Services

The dental hygienist individualizes services based on client needs and the practice environment by:

Responsibilities	Standards
Clinical Therapy *Health Promotion* *Education* *Administration* *Research*	7.1 analyzing the job requirements in terms of the five key areas of responsibility; 7.2 selecting and implementing activities reflecting these requirements; 7.3 reviewing and revising these activities at intervals; 7.4 seeking information required for understanding of social, cultural, personal and environmental factors; 7.5 adhering to codes that define and protect human rights and freedoms; 7.6 communicating and cooperating with human resources such as: dental healthcare professionals, other professionals, government agencies, external agencies, and clients; and 7.7 sharing expertise with colleagues and seeking their input as required.

Criterion 8: Assessment

The dental hygienist performs an assessment by:

Responsibilities	Standards
Clinical Therapy	8.1 collecting required baseline personal and clinical information using interview, observation, palpation, instrumentation, and record review techniques;
	8.2 reviewing and updating previously collected information;
	8.3 assessing the history and condition of the client to determine whether special precautions are necessary;
	8.4 assessing the current medical status of all clients to determine those who are at high risk for emergency situations and oral disease;
	8.5 assessing and monitoring a client's anxieties, fears and emotions; and
	8.6 critically analyzing the available data to determine the client's present and future need for oral healthcare.
Health Promotion	8.1 identifying, verifying and responding to the health promotion needs of the client;
	8.2 collecting baseline information to substantiate and direct program or activity development;
	8.3 reviewing and updating previously collected information; and
	8.4 analyzing information against established determinants of health and health outcome measures to determine program/activity priorities.
Education	8.1 collecting, analyzing and interpreting required information;
	8.2 reviewing and updating previously collected information;
	8.3 defining problem, cause and effect through co-discovery with the client;
Administration	8.1 collecting and analyzing required information; and
	8.2 interpreting, managing and updating information as required.
Research	*The dental hygienist identifies a research question by:*
	8.1 identifying resources that may be helpful in selecting a research topic;
	8.2 conducting appropriate reviews of the literature;

8.3 identifying and utilizing guidelines for effective research problem/question formulation; and

8.4 stating the hypothesis of the research question or identifying the nature of qualitative research.

Criterion 9: Planning—Client Participation

The dental hygienist ensures the client is an active participant in developing a plan by:

Responsibilities	Standards
Clinical Therapy	9.1 identifying with the client's his/her personal oral health priorities;
	9.2 obtaining or reconfirming the client's consent;
	9.3 discussing oral hygiene treatment priorities and procedures with the client including their integration with the overall treatment plan;
	9.4 reaching mutual agreement regarding desired oral health outcomes (goals) with client interests having highest priority; and
	9.5 developing a plan acceptable to the client:
	9.5.1 identifying specific short-and long-term oral health goals toward which the plan of care is directed;
	9.5.2 identifying how these oral health goals will be measured;
	9.5.3 identifying appropriate dental hygiene interventions for the dental hygiene treatment plan;
	9.5.4 discussing the dental hygiene treatment plan including costs with the client and appropriate members of the health team;
	9.5.5 determining what dental hygiene care will be provided during each dental hygiene appointment;
	9.5.6 ensuring that appointments for dental hygiene care are scheduled at intervals and for suitable duration; and
	9.5.7 including education (see Education 9.4.5 to 9.4.8).
Health Promotion	9.1 determining priorities with the client;
	9.2 developing short-and long-term program goals and objectives with the client;
	9.3 reaching mutual agreement regarding desired outcomes with client interests having highest priority;
	9.4 consulting with other health professionals to ensure an integrated plan;

9.5 advocate programming consistent with state priorities;

9.6 developing programs within the limitations of existing resources; and

9.7 developing a program acceptable to the client:

9.7.1 using a systems approach for program planning;

9.7.2 developing target marketing strategies for health promotion initiatives;

9.7.3 identifying specific short-and long-term oral health goals (consistent with the mutually agreed-upon outcomes) toward which the plan of care is directed;

9.7.4 documenting process and outcome measures to ensure that records are available;

9.7.5 designing a plan which considers factors such as client literacy and age level and builds on strengths;

9.7.6 ensuring that development proceeds in a culturally/multiculturally appropriate manner; and

9.7.7 including education (see Education 9.4.5 to 9.4.8).

Education

9.1 selecting teaching strategies appropriate for the client's needs and interests;

9.2 considering available resources and the suitability of the learning environment including such variables as group size and time;

9.3 reaching mutual agreement regarding desired outcomes with client interests having highest priority; and

9.4 developing a plan acceptable to the client:

9.4.1 identifying specific short-and long-term goals;

9.4.2 establishing priorities and the components of the plan;

9.4.3 determining a sequence for activities;

9.4.4 determining how goal achievement will be measured;

9.4.5 identifying desired goals for oral health education;

9.4.6 identifying how these goals will be measured;

9.4.7 choosing educational processes, motivational techniques and educational materials suitable for the client (that is, identifying how the goals will be met); and

9.4.8 determining suitable timing for oral health education.

Administration	9.1	obtaining input from appropriate client representatives;
	9.2	identifying and discussing priorities;
	9.3	reaching mutual agreement regarding desired outcome with client interests having highest priority; and
	9.4	developing a plan acceptable to the client:
		9.4.1 identifying specific short-and long-term goals;
		9.4.2 establishing priorities and the components of the plan;
		9.4.3 determining a sequence for activities; and
		9.4.4 determining how goal achievement will be measured.
Research	9.1	obtaining informed consent from subjects involved in clinical trials following discussion of risks, benefits, rights and choices; and
	9.2	developing a research project acceptable to the client:
		9.2.1 designing the research study; and
		9.2.2 identifying needs and resources.

Criterion 10: Implementation—Client/Clinician Safety

The dental hygienist ensures client, co-worker and personal safety by:

Responsibilities	**Standards**
Clinical Therapy	10.1 practising current universal infection control procedures including:
	10.1.1 using barrier techniques such as disposable gloves, face masks and acceptable clothing;
	10.1.2 protecting the clinician's and client's eyes with safety glasses;
	10.1.3 using an acceptable method to wash and dry hands before gloving and after removing gloves;
	10.1.4 ensuring that scientifically recognized sterilization and disinfection techniques are practised and monitored;
	10.1.5 using disposable supplies only once;
	10.1.6 avoiding cross-contamination by strictly adhering to aseptic technique;
	10.1.7 ensuring equipment and resources are functional and meet all safety standards through regular inspection/testing; and
	10.1.8 maintaining up-to-date immunization records.

10.2 ensuring the provision of care in emergency situations by:

10.2.1 knowing the practice site's emergency protocols;

10.2.2 knowing the location of emergency supplies and oxygen; and

10.2.3 maintaining current certification in cardiopulmonary resuscitation and basic first aid.

10.3 ensuring safe management of hazardous wastes.

The dental hygienist ensures the client is an active participant in developing a plan by:

Responsibilities	Standards
Health Promotion *Education* *Administration* *Research*	10.1 knowing and communicating and applying as appropriate current universal infection control procedures and other techniques to ensure safety; 10.2 ensuring the practice setting meets all legal requirements for workplace health and safety; 10.3 ensuring the provision of care in emergency situations by: 10.3.1 knowing the practice site's emergency protocols; 10.3.2 knowing the location of emergency supplies and oxygen; and 10.3.3 maintaining current certification in cardiopulmonary resuscitation and basic first aid; and 10.4 promoting and ensuring safe management of hazardous wastes.

Criterion 11: Implementation—Equipment and Resource Selection

The dental hygienist selects suitable equipment and resources by:

Responsibilities	Standards
Clinical Therapy *Health Promotion* *Education* *Administration* *Research*	11.1 knowing the current technological options; and 11.2 selecting the best options for the situation.

Criterion 12: Implementation—Provision of Care

The dental hygienist provides dental hygiene services by:

Responsibilities	Standards
Clinical Therapy	12.1 reviewing and validating the dental hygiene treatment plan;
	12.2 performing dental hygiene procedures, avoiding unnecessary procedures; and
	12.3 managing client pain and/or anxiety by:
	12.3.1 discussing options for control of pain and anxiety with the client;
	12.3.2 reassuring the client as appropriate;
	12.3.3 selecting and providing clinical techniques for control of pain and anxiety[3]; and
	12.4 recommending self-care procedures.
Health Promotion	12.1 implementing and monitoring strategies to promote health and self-care;
	12.2 providing dental hygiene expertise within a multi-disciplinary team;
	12.3 implementing the plan developed making revisions as necessary; and
	12.4 using current health promotion techniques.
Education	12.1 implementing current educational strategies based on established principles;
	12.2 ensuring client access to information and/or resources;
	12.3 implementing the plan developed making revisions as necessary; and
	12.4 using current educational techniques.
Administration	12.1 implementing the job description; and
	12.2 advocating for changes in the job description to more effectively meet needs in target areas.
Research	12.1 conducting research according to accepted research protocols.

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[3] In the case of local anaesthetic, "provides" means either administration by the dental hygienist or a request that the dentist administer the anaesthetic depending upon provincial or territorial regulations.

Criterion 13: Evaluation

The dental hygienist incorporates ongoing evaluation by:

Responsibilities	Standards
Clinical Therapy	13.1 discussing processes and outcomes of care with the client(s), colleagues and others respecting confidentiality;
	13.2 discussing the client's perceptions of changes in oral health;
	13.3 using indices, instrumentation and observation to assess the presence of disease and changes in oral health status and plaque control; and
	13.4 using continuous self-evaluation to ensure adherence to practice standards.
Health Promotion	13.1 discussing processes and outcomes with the client(s), colleagues and others;
	13.2 supporting and promoting coalitions between special population groups and health professionals; and
	13.3 using continuous self-evaluation to ensure adherence to practice standards.
Education	13.1 discussing processes and outcomes with the client(s), colleagues and others;
	13.2 discussing or surveying to evaluate the client's perceptions of changes;
	13.3 using indices, instruments and observations to assess changes and current results; and
	13.4 using continuous self-evaluation to ensure adherence to practice standards.
Administration	13.1 discussing processes and outcomes with the client(s), colleagues and others;
	13.2 discussing or surveying to evaluate the client's perceptions of changes;
	13.3 using indices, instruments and observations to assess changes and current results; and
	13.4 using continuous self-evaluation to ensure adherence to practice standards.
Research	13.1 monitoring results in relation to expected outcomes;
	13.2 comparing results with other published studies;
	13.3 consulting with colleagues/subjects; and
	13.4 using continuous self-evaluation to ensure adherence to practice standards.

Criterion 14: Evaluation

The dental hygienist makes revisions based upon evaluation findings byp:

Responsibilities	Standards
Clinical Therapy	14.1 discussing proposed revised treatment plans with other healthcare professionals; and
	14.2 discussing proposed revised treatment plans and/or referrals with the client.
Health Promotion	14.1 using current data collection techniques, discussion, questioning and observation;
Education	
Administration	14.2 modifying initiatives and evaluating programs based on outcome measures, changing needs and new information; and
	14.3 assessing the client satisfaction with the program/activity.
Research	14.1 identifying further research requirements or questions.

Outcome Criteria and Standards

Criterion 15

The dental hygienist evaluates outcomes in terms of specified goals and timelines by:

Responsibilities	Standards
Clinical Therapy	15.1 evaluating the client's oral health status according to the dental hygiene treatment plan which has been developed as part of a comprehensive treatment plan;
	15.2 comparing the results of the client's self-care efforts with the specified short-and long-term goals, using indices or other assessment methods;
	15.3 evaluating services provided according to the specified dental hygiene treatment plan and dental hygiene practice standards;
	15.4 assessing the client's satisfaction with the oral hygiene care received, using discussion, questioning and observation;
	15.5 assessing the client's satisfaction with her/his oral health status, using discussion, questioning and observation;
	15.6 reviewing records to determine effectiveness of care over time;
	15.7 assessing how improved oral health contributes to the client's health status; and
	15.8 determining the needs of further care.
Health Promotion	15.1 evaluating the effectiveness of health promotion processes and activities according to specified short-and long-term goals;
	15.2 assessing client response using discussion, questioning, observation and other information;
	15.3 assessing the client's satisfaction with the services received using data collection instruments and processes;
	15.4 evaluating the impact of oral health initiatives against program indicators, specific targets or baseline data; and
	15.5 determining the need for program additions, revisions and deletions.
Education	15.1 evaluating the client's knowledge with specified educational goals, using data collection, discussion, questioning and observation;

15.2 comparing the client's knowledge with the specified educational goals, using data collection instruments and processes;

15.3 assessing the client's satisfaction with the knowledge acquired and results achieved using discussion, questioning and observation; and

15.4 determining the need for additional knowledge and alternative educational strategies.

Administration

15.1 evaluating processes and outcomes according to established policies, procedures and plans;

15.2 assessing stakeholders' satisfaction using discussion, questioning and observation;

15.3 reviewing operational processes to determine effectiveness and efficiency in terms of established goals, targets and timelines; and

15.4 determining strategic and/or operational planning requirements.

Research

15.1 seeking critiques from appropriate sources;

15.2 reporting or publishing results; and

15.3 analyzing and applying research findings to the dental hygiene process of care.

Appendix G

Content Needs (Alberta and Ontario) Influenced by Age

SECTION II: CONTENT NEEDS (ALBERTA)

Identification of Potential Professional Development Offerings by Age

	30 or younger (n=84)		31 - 40 (n=123)		41 or older (n=84)		Chi-square	Prob.
	f	%	f	%	f	%		
Dental hygiene responsibilities:								
The evolving role of the dental hygienist	58	69.0	79	64.2	58	69.0	0.74	.689
The ethics of dental hygiene practice	42	50.0	60	48.8	42	50.0	0.04	.979
Guidelines for employment contracts	62	73.8	77	62.6	48	57.1	5.54	.065
Health care policies	40	47.6	53	43.1	42	50.0	1.03	.597
Health promotion policies	39	46.4	46	37.4	30	35.7	2.40	.301
Research opportunities for the dental hygienist	38	45.2	61	49.6	33	39.3	2.15	.341
Optimal use of dental hygiene skills	59	70.2	89	72.4	62	73.8	0.27	.873
Participative decision making:								
Guidelines for client referrals	37	44.0	54	43.9	35	41.7	0.13	.938
Advanced periodontal therapies	69	82.1	88	71.5	67	79.8	3.67	.160
Effective educational techniques/strategies	48	57.1	73	59.3	58	69.0	2.98	.225
Networking to improve patient care	48	57.1	75	61.0	44	52.4	1.51	.470
Strategies for developing research activities	19	22.6	45	36.6	21	25.0	5.70	.058
Negotiating change	39	46.4	60	48.8	43	51.2	0.38	.826
Effective team participation	40	47.6	57	46.3	48	57.1	2.57	.277

(continued)

	30 or younger (n=84)		31 - 40 (n=123)		41 or older (n=84)		Chi-square	Prob.
	f	%	f	%	f	%		
Support and resource requirements:								
Current infection control protocols	53	63.1	75	61.0	57	67.9	1.04	.594
CPR and first aid certification	46	54.8	60	48.8	55	65.5	5.71	.058
Environmental/occupational hazards	48	57.1	75	61.0	41	48.8	3.03	.220
The impact of alternative medicine on dental hygiene care	67	79.8	107	87.0	70	83.3	1.94	.379
Using the consultative process to develop policies	24	28.6	35	28.5	25	29.8	0.05	.977
Research projects that use client information	28	33.3	46	37.4	23	27.4	2.28	.319
The ethics of dental hygiene practice	32	38.1	50	40.7	33	39.3	0.14	.933
Maintaining professional competence:								
Mentorship and how it can help you	31	36.9	47	38.2	33	39.3	0.10	.951
Skill workshops to enhance your efficiency	67	79.8	70	56.9	53	63.1	12.36	.002**
Techniques to stay current	75	89.3	96	78.0	73	86.9	5.45	.065
The direction of dental hygiene education in Canada	40	47.6	47	38.2	33	39.3	2.00	.369
Research on the latest products	78	92.9	103	83.7	73	86.9	4.04	.133
Guidelines for building a study group	24	28.6	35	28.5	18	21.4	1.58	.454
Information management:								
Dental hygiene practice and the law	48	57.1	71	57.7	38	45.2	3.61	.164
Dental hygiene diagnostic tools	56	66.7	67	54.5	54	64.3	3.71	.157
Computers and dental hygiene practice	53	63.1	79	64.2	56	66.7	0.25	.883

(continued)

	30 or younger (n=84)		31 - 40 (n=123)		41 or older (n=84)		Chi-	
	f	%	f	%	f	%	square	Prob.
The world wide web and its impact upon dental hygiene practice	49	58.3	75	61.0	47	56.0	0.53	.768
Designing health promotion pro-grams for dental hygiene clients	46	54.8	65	52.8	37	44.0	2.27	.322
Building effective recall systems	50	59.5	60	48.8	36	42.9	4.86	.088
Protection of client privacy	25	29.8	36	29.3	21	35.0	0.60	.739
How to interpret research findings	31	36.9	55	44.7	30	35.7	2.11	.347
Practicing professionally:								
Dental hygiene career alternatives	61	72.6	91	74.0	51	60.7	4.51	.105
The business side of dental hygiene practice	57	67.9	73	59.3	39	46.4	8.09	.018*
Learning to listen to what the client needs	42	50.0	54	43.9	48	67.1	3.52	.172
The ethics of shortcuts	28	33.3	45	36.6	21	25.0	3.19	.202
Standards for dental hygiene practice	38	45.2	55	44.7	38	45.2	0.01	.996
Asking personal medical questions	44	52.4	55	44.7	31	36.9	4.09	.130
A synopsis of current research in dental hygiene	40	47.6	76	61.8	47	56.0	4.07	.131
Individualizing services:								
Social, cultural and environmental factors influencing dental hygiene practice	42	50.0	70	56.9	46	54.8	0.970	.616
Human rights in health care	25	29.8	36	29.3	19	22.6	1.45	.485
Multicultural health issues	33	39.3	47	38.2	33	39.3	0.03	.983

(continued)

	30 or younger (n=84)		31 - 40 (n=123)		41 or older (n=84)		Chi-	
	f	%	f	%	f	%	square	Prob.
Skills in being an effective client advocate	38	45.2	50	40.7	33	39.3	0.69	.710
Social science research and its implication for dental hygiene practice	29	34.5	47	38.2	30	35.7	0.32	.853
Assessment:								
Treating high risk clients	58	69.0	84	68.3	55	65.5	0.28	.870
Managing dental phobias and fears	63	75.0	71	57.7	51	60.7	7.09	.028*
Identifying determinants of health	37	44.0	53	43.1	42	50.0	1.04	.594
Dental hygiene diagnosis: the skills and the tools	52	61.9	60	48.8	48	57.1	3.71	.157
Identifying research limitations	17	20.2	39	31.7	16	19.0	5.54	.063
Defining the problem through co-discovery	16	19.0	36	29.3	19	22.6	1.04	.219
Securing informed consent	24	28.6	37	30.1	25	29.8	0.06	.972
Planning-Client participation:								
The latest in dental treatment options: materials and techniques	69	82.1	101	82.1	61	72.6	3.17	.205
The latest in prevention: products and techniques	78	92.9	102	82.9	68	81.0	6.29	.043*
How to plan systems around health issues	21	25.0	39	31.7	21	25.0	1.58	.454
Marketing strategies	33	39.3	40	32.5	31	36.9	1.07	.587
Teaching strategies that work	50	59.5	70	56.9	48	57.1	0.16	.925
Motivational techniques	64	76.2	85	69.1	56	66.7	2.06	.358
Implementation-Client/Clinician Safety:								
Occupational hazards and dental hygiene practice	55	65.5	71	57.7	54	64.3	1.56	.437

(continued)

	30 or younger (n=84)		31 - 40 (n=123)		41 or older (n=84)		Chi-	
	f	%	f	%	f	%	square	Prob.
Infectious diseases and dental hygiene practice	58	69.0	77	62.6	57	67.9	1.11	.575
World wide disease trends	44	52.4	61	49.6	41	48.8	0.24	.886
Hazardous wastes and dental hygiene practice	48	57.1	62	50.4	50	59.5	1.90	.387
Infection control controversies	65	77.4	88	71.5	59	70.2	1.29	.523
Implementation-Equipment and Resource Selection:								
Current technological options for dental hygiene practice	60	71.4	86	69.9	58	69.0	0.12	.943
Alternative pain control methods	63	75.0	91	74.0	56	66.7	1.77	.413
Electronic communication choices	22	26.2	48	39.0	18	21.4	8.27	.016*
Making good choices in a changing marketplace	28	33.3	67	54.5	39	46.4	9.11	.011*
Implementation-Provision of Care:								
Pain and anxiety management for the dental hygiene client	63	75.0	83	67.5	55	65.5	2.08	.353
Current health promotion strategies	39	46.4	49	39.8	39	46.4	1.26	.533
Current educational techniques/ strategies	44	52.4	58	47.2	34	40.5	2.41	.299
Standards for clinical research	17	20.2	37	30.1	12	14.3	7.63	.022*
What the research says about current clinical techniques	40	47.6	65	52.8	41	48.8	0.63	.729
Matching your teaching to client learning	39	46.4	59	49.0	39	46.4	0.07	.967
Developing hospital and nursing home in-services	29	34.5	49	39.8	41	48.8	3.64	.162

(continued)

	30 or younger (n=84)		31 - 40 (n=123)		41 or older (n=84)		Chi-	
	f	%	f	%	f	%	square	Prob.
Evaluation-Ongoing:								
The use of indices	20	23.8	37	30.1	24	28.6	1.03	.599
Self evaluation and its impact upon dental hygiene practice	42	50.0	54	43.9	38	45.2	0.78	.678
How to conduct surveys	11	13.1	30	24.4	16	19.0	4.20	.123
Program evaluation - when and how to do it	19	22.6	36	29.3	26	31.0	1.71	.425
Using client statistics to improve health	24	28.6	46	37.4	28	33.3	1.76	.414
Client accountability	29	34.5	48	39.0	33	39.3	0.54	.762
Evaluation-Revision:								
Strategies for improving operational processes	34	40.5	47	38.2	32	38.1	0.13	.935
Statistical analysis explained	14	16.7	31	25.5	19	22.6	2.22	.330
When and how to change a strategy	23	27.4	45	36.6	30	35.7	2.16	.340
Risk management	28	33.3	43	35.0	35	41.7	1.44	.486
Evaluation-Outcomes:								
How to tell if your clients are getting healthier	62	73.8	64	52.0	51	60.7	10.18	.006**
How to improve client satisfaction with dental hygiene care	70	83.3	89	72.4	62	73.8	3.77	.152
Evaluating the impact of oral health initiatives	36	42.9	43	35.0	35	41.7	1.62	.445
Analyzing and applying research findings to dental hygiene care	31	36.9	53	43.1	35	41.7	0.82	.662
Methods for evaluating client knowledge	41	48.8	57	46.3	45	53.6	1.05	.592

* significant at the .05 level, ** significant beyond the .01 level

SECTION II: CONTENT NEEDS (ONTARIO)

Identification of Potential Professional Development Offerings by Age

	30 or younger (n=80)		31 - 40 (n=95)		41 or older (n=75)		Chi-	
	f	%	f	%	f	%	square	Prob.
Dental hygiene responsibilities:								
The evolving role of the dental hygienist	54	67.5	65	68.4	50	66.7	0.06	.971
The ethics of dental hygiene practice	47	58.8	48	50.5	40	53.3	1.21	.547
Guidelines for employment contracts	58	72.5	63	66.3	39	52.0	7.37	.025*
Health care policies	44	55.0	48	50.5	38	50.7	0.43	.809
Health promotion policies	32	40.0	32	33.7	30	40.0	1.01	.604
Research opportunities for the dental hygienist	38	47.5	54	56.8	26	34.7	8.39	.015*
Optimal use of dental hygiene skills	59	73.8	66	69.5	51	68.0	0.68	.713
Participative decision making:								
Guidelines for client referrals	31	38.8	34	35.8	18	24.0	4.39	.111
Advanced periodontal therapies	60	75.0	67	70.5	51	68.0	0.97	.617
Effective educational techniques/strategies	44	55.0	54	56.8	39	52.0	0.40	.819
Networking to improve patient care	38	47.5	55	57.9	36	48.0	2.44	.295
Strategies for developing research activities	20	25.0	33	34.7	15	20.0	4.88	.087
Negotiating change	27	33.8	45	47.4	30	40.0	3.38	.185
Effective team participation	37	46.3	47	49.5	40	53.3	0.78	.678

(continued)

	30 or younger (n=80)		31 - 40 (n=95)		41 or older (n=75)		Chi-	
	f	%	f	%	f	%	square	Prob.
Support and resource requirements:								
Current infection control protocols	44	55.0	57	60.0	40	53.3	0.85	.653
CPR and first aid certification	40	50.0	44	46.3	31	41.3	1.18	.555
Environmental/occupational hazards	41	51.3	50	52.6	43	57.3	0.64	.728
The impact of alternative medicine on dental hygiene care	63	78.8	69	72.6	57	76.0	0.89	.640
Using the consultative process to develop policies	16	20.0	25	26.3	14	18.7	1.68	.431
Research projects that use client information	22	27.5	31	32.6	18	24.0	1.58	.453
The ethics of dental hygiene practice	37	46.3	35	36.8	27	36.0	2.17	.338
Maintaining professional competence:								
Mentorship and how it can help you	25	31.3	32	33.7	30	40.0	1.38	.502
Skill workshops to enhance your efficiency	57	71.3	59	62.1	49	65.3	1.66	.437
Techniques to stay current	61	76.3	73	76.8	62	82.7	1.20	.550
The direction of dental hygiene education in Canada	43	53.8	57	60.0	35	46.7	3.01	.222
Research on the latest products	63	78.8	67	70.5	62	82.7	3.71	.157
Guidelines for building a study group	19	23.8	28	29.5	14	18.7	2.71	.258
Information management:								
Dental hygiene practice and the law	50	62.5	49	51.6	41	54.7	2.19	.334
Dental hygiene diagnostic tools	49	61.3	48	50.5	49	65.3	4.17	.124
Computers and dental hygiene practice	41	51.3	58	61.1	41	54.7	1.78	.411

(continued)

	30 or younger (n=80)		31 - 40 (n=95)		41 or older (n=75)		Chi-	
	f	%	f	%	f	%	square	Prob.
The world wide web and its impact upon dental hygiene practice	43	53.8	54	56.8	40	53.3	0.26	.878
Designing health promotion pro-grams for dental hygiene clients	27	33.8	44	46.3	36	48.0	4.04	.133
Building effective recall systems	42	52.5	46	48.4	30	40.0	2.53	.282
Protection of client privacy	23	28.8	22	23.2	20	26.7	0.73	.693
How to interpret research findings	29	36.3	39	41.1	28	37.3	0.47	.789
Practicing professionally:								
Dental hygiene career alternatives	60	75.0	59	62.1	49	65.3	3.53	.172
The business side of dental hygiene practice	40	50.0	46	48.4	33	44.0	0.60	.740
Learning to listen to what the client needs	37	46.3	40	42.1	42	56.0	3.34	.189
The ethics of shortcuts	32	40.0	20	21.1	19	25.3	7.98	.018*
Standards for dental hygiene practice	35	43.8	40	42.1	29	38.7	0.43	.801
Asking personal medical questions	44	55.0	39	41.1	39	52.0	3.84	.147
A synopsis of current research in dental hygiene	39	48.8	47	49.5	40	53.3	0.38	.828
Individualizing services:								
Social, cultural and environmental factors influencing dental hygiene practice	39	48.8	46	48.4	36	48.0	0.01	.996
Human rights in health care	26	32.5	27	28.4	30	40.0	2.54	.281
Multicultural health issues	31	38.8	33	34.7	33	44.0	1.51	.470

(continued)

	30 or younger (n=80)		31 - 40 (n=95)		41 or older (n=75)		Chi-	
	f	%	f	%	f	%	square	Prob.
Skills in being an effective client advocate	27	33.8	31	32.6	31	41.3	1.54	.462
Social science research and its implication for dental hygiene practice	26	32.5	28	29.5	23	30.7	0.19	.911
Assessment:								
Treating high risk clients	55	68.8	64	67.4	54	72.0	0.44	.804
Managing dental phobias and fears	54	67.5	51	53.7	37	49.3	5.90	.053
Identifying determinants of health	29	36.3	43	45.3	32	42.7	1.51	.470
Dental hygiene diagnosis: the skills and the tools	43	53.8	44	46.3	41	54.7	1.48	.478
Identifying research limitations	15	18.8	21	22.1	14	18.7	0.42	.810
Defining the problem through co-discovery	14	17.5	20	21.1	23	30.7	3.98	.137
Securing informed consent	27	33.8	28	29.5	21	28.0	0.66	.718
Planning-Client participation:								
The latest in dental treatment options: materials and techniques	60	75.0	60	63.2	55	73.3	3.43	.180
The latest in prevention: products and techniques	60	75.0	68	71.6	57	76.0	0.48	.785
How to plan systems around health issues	19	23.8	26	27.4	21	28.0	0.439	.803
Marketing strategies	25	31.3	32	33.7	31	41.3	1.86	.394
Teaching strategies that work	40	50.0	52	54.7	46	61.3	2.03	.362
Motivational techniques	48	60.0	61	64.2	49	65.3	0.54	.764
Implementation-Client/Clinician Safety:								
Occupational hazards and dental hygiene practice	51	63.8	50	52.6	51	68.0	4.58	.101

(continued)

	30 or younger (n=80)		31 - 40 (n=95)		41 or older (n=75)		Chi-	
	f	%	f	%	f	%	square	Prob.
Infectious diseases and dental hygiene practice	58	72.5	60	63.2	51	68.0	1.75	.418
World wide disease trends	47	58.8	52	54.7	48	64.0	1.49	.474
Hazardous wastes and dental hygiene practice	40	50.0	53	55.8	39	52.0	0.61	.736
Infection control controversies	51	63.8	62	65.3	57	76.0	3.30	.192
Implementation-Equipment and Resource Selection:								
Current technological options for dental hygiene practice	45	56.3	60	63.2	46	61.3	0.90	.637
Alternative pain control methods	55	68.8	57	60.0	39	52.0	4.58	.101
Electronic communication choices	24	30.0	25	26.3	18	24.0	0.73	.696
Making good choices in a changing marketplace	28	35.0	28	29.5	37	49.3	7.25	.027*
Implementation-Provision of Care:								
Pain and anxiety management for the dental hygiene client	50	62.5	59	62.1	38	50.7	2.91	.234
Current health promotion strategies	24	30.0	29	30.5	24	32.0	0.08	.962
Current educational techniques/ strategies	29	36.3	39	41.1	29	38.7	0.42	.809
Standards for clinical research	19	23.8	23	24.2	14	18.7	0.89	.642
What the research says about current clinical techniques	28	35.0	33	34.7	33	44.0	1.85	.396
Matching your teaching to client learning	29	36.3	37	38.9	34	45.3	1.40	.498
Developing hospital and nursing home in-services	40	50.0	49	51.6	38	50.7	0.04	.978

(continued)

	30 or younger (n=80)		31 - 40 (n=95)		41 or older (n=75)		Chi-square	Prob.
	f	%	f	%	f	%		
Evaluation-Ongoing:								
The use of indices	24	30.0	27	28.4	13	17.3	4.10	.129
Self evaluation and its impact upon dental hygiene practice	25	31.3	38	40.0	28	37.3	1.49	.475
How to conduct surveys	15	18.8	23	24.2	10	13.3	3.28	.194
Program evaluation - when and how to do it	16	20.0	25	26.3	14	18.7	1.68	.431
Using client statistics to improve health	26	32.5	27	28.4	13	17.3	5.12	.077
Client accountability	26	32.5	35	36.8	21	28.0	1.50	.472
Evaluation-Revision:								
Strategies for improving operational processes	25	31.3	33	34.7	23	30.7	0.39	.824
Statistical analysis explained	13	16.3	19	20.0	11	14.7	0.91	.636
When and how to change a strategy	21	26.3	28	29.5	22	29.3	0.27	.874
Risk management	20	25.0	35	36.8	22	29.3	2.96	.227
Evaluation-Outcomes:								
How to tell if your clients are getting healthier	44	55.0	41	43.2	45	60.0	5.21	.074
How to improve client satisfaction with dental hygiene care	56	70.0	57	60.0	53	70.0	2.80	.247
Evaluating the impact of oral health initiatives	20	25.0	27	28.5	23	30.7	0.63	.729
Analyzing and applying research findings to dental hygiene care	31	38.8	37	38.9	23	30.7	1.55	.462
Methods for evaluating client knowledge	30	37.5	47	49.5	39	52.0	3.89	.143

* significant at the .05 level, ** significant beyond the .01 level

Appendix H

Content Needs (Alberta and Ontario) Influenced by Year of Graduation

SECTION II: CONTENT NEEDS (ALBERTA)

Identification of Potential Professional Development Offerings by Year of Graduation

	1978 or before (n=70)		1979 - 1986 (n=69)		1987 - 1994 (n=96)		1995 - 1998 (n=56)		Chi-square	Prob.
	f	%	f	%	f	%	f	%		
Dental hygiene responsibilities:										
The evolving role of the dental hygienist	45	64.3	49	71.0	59	61.5	42	75.0	3.75	.290
The ethics of dental hygiene practice	36	51.4	33	47.8	47	49.0	28	50.0	0.20	.978
Guidelines for employment contracts	38	54.3	41	59.4	66	68.8	42	75.0	7.46	.059
Health care policies	34	48.6	25	36.2	47	49.0	29	51.8	3.95	.267
Health promotion policies	27	38.6	20	29.0	41	42.7	27	48.2	5.50	.138
Research opportunities for the dental hygienist	28	40.0	31	44.9	47	49.0	26	46.4	1.35	.717
Optimal use of dental hygiene skills	50	71.4	46	66.7	73	76.0	41	73.2	1.79	.617
Participative decision making:										
Guidelines for client referrals	30	42.9	25	36.2	43	44.8	28	50.0	2.53	.469
Advanced periodontal therapies	50	71.4	47	68.1	80	83.3	47	83.9	8.00	.046*
Effective educational techniques/strategies	49	70.0	42	60.0	54	56.3	34	60.7	3.34	.343
Networking to improve patient care	42	60.0	36	52.2	58	60.4	31	55.4	1.41	.702
Strategies for developing research activities	20	28.6	24	34.8	25	26.0	16	28.6	1.50	.681
Negotiating change	35	50.0	32	46.4	44	45.8	31	55.4	1.51	.681
Effective team participation	40	57.1	26	37.7	53	55.2	26	46.4	6.99	.072

(continued)

	1978 or before (n=70)		1979 - 1986 (n=69)		1987 - 1994 (n=96)		1995 - 1998 (n=56)		Chi-square	Prob.
	f	%	f	%	f	%	f	%		
Support and resource requirements:										
Current infection control protocols	47	67.1	39	56.5	66	68.8	33	58.9	3.49	.322
CPR and first aid certification	43	61.4	34	49.3	59	61.5	25	44.6	6.13	.106
Environmental/occupational hazards	35	50.0	45	65.2	57	59.4	27	48.2	5.24	.155
The impact of alternative medicine on dental hygiene care	57	81.4	64	92.8	81	84.4	42	75.0	8.08	.044*
Using the consultative process to develop policies	20	28.6	14	20.3	33	34.4	17	30.4	4.08	.252
Research projects that use client information	22	31.4	22	31.9	33	34.4	20	35.7	0.37	.947
The ethics of dental hygiene practice	29	41.4	23	33.3	40	41.7	23	41.1	1.47	.688
Maintaining professional competence:										
Mentorship and how it can help you	26	37.1	23	33.3	40	41.7	22	39.3	1.25	.741
Skill workshops to enhance your efficiency	42	60.0	28	40.6	71	74.0	49	87.5	36.03	.000**
Techniques to stay current	57	81.4	53	76.8	83	86.5	51	91.1	5.58	.134
The direction of dental hygiene education in Canada	28	40.0	25	36.2	39	40,6	28	50.0	2.53	.470
Research on the latest products	60	85.7	62	89.9	83	86.5	49	97.5	0.65	.885
Guidelines for building a study group	14	20.0	16	23.2	30	31.3	17	30.4	3.50	.321
Information management:										
Dental hygiene practice and the law	31	44.3	35	50.7	56	58.3	35	62.5	5.33	.149
Dental hygiene diagnostic tools	45	64.3	33	47.8	60	62.5	39	69.6	7.12	.068
Computers and dental hygiene practice	48	68.6	45	65.4	57	59.4	38	67.9	1.89	.595

(continued)

	1978 or before (n=70)		1979 - 1986 (n=69)		1987 - 1994 (n=96)		1995 - 1998 (n=56)		Chi-	
	f	%	f	%	f	%	f	%	square	Prob.
The world wide web and its impact upon dental hygiene practice	43	61.4	42	60.9	50	52.1	36	64.3	2.79	.424
Designing health promotion programs for dental hygiene clients	35	50.0	31	44.9	52	54.2	30	53.6	1.58	.664
Building effective recall systems	26	37.1	29	42.0	54	56.3	37	66.1	13.83	.003**
Protection of client privacy	20	28.6	17	24.6	31	32.3	14	25.0	1.51	.680
How to interpret research findings	25	35.7	31	44.9	39	40.6	21	37.5	1.39	.707
Practicing professionally:										
Dental hygiene career alternatives	44	62.9	49	71.0	66	68.8	44	78.6	3.82	.281
The business side of dental hygiene practice	27	38.6	40	58.0	58	60.4	44	78.6	21.46	.000**
Learning to listen to what the client needs	40	57.1	27	39.1	53	55.2	24	42.9	6.87	.076
The ethics of shortcuts	17	24.3	21	30.4	35	36..5	21	37.5	3.69	.297
Standards for dental hygiene practice	31	44.3	29	42.0	44	45.8	27	48.2	0.52	.914
Asking personal medical questions	28	40.0	28	40.6	49	51.0	25	44.6	2.66	.447
A synopsis of current research in dental hygiene	40	57.1	41	59.4	52	54.2	30	53.6	0.63	.889
Individualizing services:										
Social, cultural and environmental factors influencing dental hygiene practice	37	52.9	40	58.0	52	54.2	29	51.8	0.58	.901
Human rights in health care	16	22.9	16	23.2	29	30.2	19	33.9	2.91	.406
Multicultural health issues	30	42.9	26	37.7	35	36.5	22	39.3	0.75	.863

(continued)

	1978 or before (n=70)		1979 - 1986 (n=69)		1987 - 1994 (n=96)		1995 - 1998 (n=56)		Chi-	
	f	%	f	%	f	%	f	%	square	Prob.
Skills in being an effective client advocate	27	38.6	21	30.4	46	47.9	27	48.2	6.49	.090
Social science research and its implication for dental hygiene practice	27	38.6	21	30.4	38	39.6	20	35.7	1.66	.646
Assessment:										
Treating high risk clients	48	68.6	48	69.6	60	62.5	41	73.2	2.10	.552
Managing dental phobias and fears	43	61.4	35	50.7	65	67.7	42	75.0	8.94	.030*
Identifying determinants of health	35	50.0	25	36.2	48	50.0	24	42.9	3.94	.268
Dental hygiene diagnosis: the skills and the tools	37	52.9	25	36.2	64	66.7	34	60.7	16.1	.001**
Identifying research limitations	15	21.4	19	27.5	24	25.0	14	25.0	0.71	.870
Defining the problem through co-discovery	15	21.4	17	24.6	26	27.1	13	23.2	0.76	.856
Securing informed consent	21	300	17	24.6	30	31.3	18	32.1	1.15	.766
Planning-Client participation:										
The latest in dental treatment options: materials and techniques	50	71.4	54	78.3	79	82.3	48	85.7	4.56	.207
The latest in prevention: products and techniques	57	81.4	56	81.2	84	87.5	51	91.1	3.74	.290
How to plan systems around health issues	17	24.3	17	24.6	31	32.3	16	28.6	1.75	.626
Marketing strategies	27	38.6	19	27.5	34	35.4	24	42.9	3.56	.314
Teaching strategies that work	42	60.0	32	46.4	61	63.5	33	58.9	5.12	.163
Motivational techniques	47	67.1	42	60.9	72	75.0	44	78.6	6.12	.106
Implementation-Client/Clinician Safety:										
Occupational hazards and dental hygiene practice	43	61.4	43	63.3	59	61.5	35	62.5	0.03	.999

(continued)

	1978 or before (n=70)		1979 - 1986 (n=69)		1987 - 1994 (n=96)		1995 - 1998 (n=56)		Chi-	
	f	%	f	%	f	%	f	%	square	Prob.
Infectious diseases and dental hygiene practice	48	68.6	44	63.8	60	62.5	40	71.4	1.63	.651
World wide disease trends	33	47.1	34	49.3	50	52.1	29	51.8	0.48	.924
Hazardous wastes and dental hygiene practice	40	57.1	38	55.1	53	55.2	29	51.8	0.37	.947
Infection control controversies	50	71.4	47	68.1	75	78.1	40	71.4	2.29	.513
Implementation-Equipment and Resource Selection:										
Current technological options for dental hygiene practice	45	64.3	48	69.6	71	74.0	40	71.4	1.85	.604
Alternative pain control methods	49	70.0	48	69.6	68	70.8	45	80.4	2.48	.479
Electronic communication choices	18	25.7	23	33.3	34	35.4	13	23.2	3.57	.312
Making good choices in a changing marketplace	33	47.1	38	55.1	46	47.9	17	30.4	8.17	.043*
Implementation-Provision of Care:										
Pain and anxiety management for the dental hygiene client	48	68.6	44	63.8	64	66.7	45	80.4	4.78	.189
Current health promotion strategies	34	48.6	25	36.2	38	39.6	30	53.6	5.12	.163
Current educational techniques/ strategies	32	45.7	29	42.0	48	50.0	27	48.2	1.11	.776
Standards for clinical research	14	20.0	18	26.1	20	20.8	14	25.0	1.10	.778
What the research says about current clinical techniques	29	41.4	33	47.8	57	59.4	27	48.2	5.66	.129
Matching your teaching to client learning	34	48.6	27	39.1	51	53.1	25	44.6	3.37	.338
Developing hospital and nursing home in-services	33	47.1	21	30.4	41	42.7	24	42.9	4.57	.206

(continued)

	1978 or before (n=70)		1979 - 1986 (n=69)		1987 - 1994 (n=96)		1995 - 1998 (n=56)		Chi-square	Prob.
	f	%	f	%	f	%	f	%		
Evaluation-Ongoing:										
The use of indices	19	27.1	22	31.9	28	29.2	12	21.4	1.86	.603
Self evaluation and its impact upon dental hygiene practice	32	45.7	27	39.1	44	45.8	31	55.4	3.29	.349
How to conduct surveys	17	24.3	14	20.3	19	19.8	7	12.5	2.94	.401
Program evaluation - when and how to do it	23	32.9	20	29.0	26	27.1	12	21.4	2.13	.546
Using client statistics to improve health	25	35.7	22	31.9	34	35.4	17	30.4	0.64	.887
Client accountability	24	34.3	26	37.7	40	41.7	20	35.7	1.08	.782
Evaluation-Revision:										
Strategies for improving operational processes	30	42.9	23	33.3	36	37.5	24	42.9	1.82	.611
Statistical analysis explained	20	28.6	14	20.3	19	19.8	11	19.6	2.24	.524
When and how to change a strategy	25	35.7	25	36.2	34	35.4	14	25.0	2.44	.486
Risk management	29	41.4	21	30.4	32	33.3	24	42.9	3.22	.359
Evaluation-Outcomes:										
How to tell if your clients are getting healthier	45	64.3	29	42.0	61	63.5	42	75.0	15.59	.001**
How to improve client satisfaction with dental hygiene care	48	68.6	48	69.6	77	80.2	48	85.7	7.69	.053
Evaluating the impact of oral health initiatives	34	48.6	21	30.4	34	35.4	25	44.6	6.09	.107
Analyzing and applying research findings to dental hygiene care	29	41.4	25	36.2	43	44.8	22	39.3	1.30	.730
Methods for evaluating client knowledge	42	60.0	27	39.1	45	46.9	29	51.8	6.47	.091

* significant at the .05 level, ** significant beyond the .01 level

SECTION II: CONTENT NEEDS (ONTARIO)

Identification of Potential Professional Development Offerings by Year of Graduation

	1978 or before (n=55)		1979 - 1986 (n=53)		1987 - 1994 (n=94)		1995 - 1998 (n=48)		Chi-square	Prob.
	f	%	f	%	f	%	f	%		
Dental hygiene responsibilities:										
The evolving role of the dental hygienist	37	67.3	33	62.3	71	75.5	28	58.3	5.32	.150
The ethics of dental hygiene practice	32	58.2	23	43.4	55	58.5	25	52.1	3.62	.305
Guidelines for employment contracts	27	49.1	34	64.2	63	67.0	36	75.0	8.13	.043*
Health care policies	27	49.1	27	50.9	55	58.5	21	43.8	3.13	.373
Health promotion policies	19	34.5	20	37.7	36	38.3	19	39.6	0.32	.956
Research opportunities for the dental hygienist	18	32.7	26	49.1	48	51.1	26	54.2	6.31	.097
Optimal use of dental hygiene skills	39	70.9	34	64.2	71	75.5	32	66.7	2.51	.473
Participative decision making:										
Guidelines for client referrals	10	18.2	20	37.7	35	37.2	18	37.5	7.76	.051
Advanced periodontal therapies	37	67.3	31	58.5	69	73.4	41	85.4	9.92	.019*
Effective educational techniques/strategies	28	50.9	33	62.3	52	55.3	24	50.0	2.00	.573
Networking to improve patient care	26	47.3	34	64.2	48	51.1	21	43.8	5.01	.171
Strategies for developing research activities	10	18.2	23	43.4	25	26.6	10	20.8	9.90	.019*
Negotiating change	24	43.6	23	43.4	41	43.6	14	29.2	3.44	.329
Effective team participation	29	52.7	26	49.1	52	55.3	17	35.4	5.38	.146

(continued)

	1978 or before (n=55)		1979 - 1986 (n=53)		1987 - 1994 (n=94)		1995 - 1998 (n=48)		Chi-square	Prob.
	f	%	f	%	f	%	f	%		
Support and resource requirements:										
Current infection control protocols	30	54.5	32	60.4	54	57.4	25	52.1	0.82	.844
CPR and first aid certification	22	40.0	23	43.4	50	53.2	20	41.7	3.26	.353
Environmental/occupational hazards	28	50.9	31	58.5	55	58.5	20	41.7	4.33	.228
The impact of alternative medicine on dental hygiene care	43	78.2	40	75.5	70	74.5	36	75.0	0.28	.964
Using the consultative process to develop policies	11	20.0	14	26.4	26	27.7	4	8.3	8.81	.032*
Research projects that use client information	13	23.6	19	35.8	29	30.9	10	20.8	3.73	.292
The ethics of dental hygiene practice	19	34.5	22	41.5	40	42.6	18	37.5	1.11	.775
Maintaining professional competence:										
Mentorship and how it can help you	20	36.4	24	45.3	28	29.8	15	31.3	3.87	.276
Skill workshops to enhance your efficiency	35	63.6	31	58.5	61	64.9	38	79.2	5.51	.138
Techniques to stay current	45	81.8	42	79.2	76	80.9	33	68.8	3.17	.366
The direction of dental hygiene education in Canada	28	50.9	29	54.7	56	59.6	22	45.8	2.69	.441
Research on the latest products	44	80.0	42	79.2	67	71.3	39	81.3	2.60	.457
Guidelines for building a study group	8	14.5	21	39.6	23	24.5	9	18.9	10.09	.018*
Information management:										
Dental hygiene practice and the law	33	60.0	24	45.3	53	56.4	30	62.5	3.65	.302
Dental hygiene diagnostic tools	35	63.6	33	62.3	47	50.0	31	64.6	4.42	.220
Computers and dental hygiene practice	30	54.5	33	62.3	57	60.6	20	41.7	5.70	.127

(continued)

	1978 or before (n=55)		1979 - 1986 (n=53)		1987 - 1994 (n=94)		1995 - 1998 (n=48)		Chi-	
	f	%	f	%	f	%	f	%	square	Prob.
The world wide web and its impact upon dental hygiene practice	26	47.3	36	67.9	50	53.2	25	52.1	5.29	.152
Designing health promotion programs for dental hygiene clients	26	47.3	27	50.9	43	45.7	11	22.9	10.53	.014*
Building effective recall systems	19	34.5	24	45.3	50	53.2	25	52.1	5.50	.139
Protection of client privacy	14	25.5	13	24.5	27	28.7	11	22.9	0.67	.881
How to interpret research findings	24	43.6	20	37.7	37	39.4	15	31.3	1.74	.628
Practicing professionally:										
Dental hygiene career alternatives	35	63.6	33	62.3	65	69.1	35	72.9	1.78	.619
The business side of dental hygiene practice	22	40.0	29	54.7	46	48.9	22	45.8	2.49	.478
Learning to listen to what the client needs	32	58.2	25	47.2	48	51.1	14	29.2	9.71	.021*
The ethics of shortcuts	13	23.6	14	26.4	32	34.0	12	25.0	2.44	.486
Standards for dental hygiene practice	21	38.2	25	47.2	39	41.5	19	39.6	1.02	.797
Asking personal medical questions	26	47.3	27	50.9	48	51.1	21	43.8	0.83	.842
A synopsis of current research in dental hygiene	27	49.1	35	66.0	40	42.6	24	50.0	7.65	.054
Individualizing services:										
Social, cultural and environmental factors influencing dental hygiene practice	28	50.9	30	56.6	40	42.6	23	47.9	2.87	.413
Human rights in health care	26	47.3	18	34.0	27	28.7	12	25.0	7.07	.070
Multicultural health issues	25	45.5	27	50.9	27	28,7	18	37.5	8.43	.038*

(continued)

	1978 or before (n=55)		1979 - 1986 (n=53)		1987 - 1994 (n=94)		1995 - 1998 (n=48)		Chi-	
	f	%	f	%	f	%	f	%	square	Prob.
Skills in being an effective client advocate	24	43.6	22	41.5	32	34.0	11	22.9	6.01	.111
Social science research and its implication for dental hygiene practice	19	34.5	18	24.0	27	28.7	13	27.1	1.11	.775
Assessment:										
Treating high risk clients	40	72.7	33	62.3	70	74.5	30	62.5	3.73	.293
Managing dental phobias and fears	26	47.3	29	54.7	58	61.7	29	60.4	3.29	.349
Identifying determinants of health	25	45.5	25	47.2	41	43.6	13	27.1	5.54	.136
Dental hygiene diagnosis: the skills and the tools	28	50.9	27	50.9	48	51.1	25	52.1	0.02	.999
Identifying research limitations	11	20.0	12	22.6	21	22.3	6	12.5	2.42	.489
Defining the problem through co-discovery	16	29.1	17	32.1	17	18.1	7	14.6	6.85	.077
Securing informed consent	13	23.6	17	32.1	36	38.3	10	20.8	6.20	.102
Planning-Client participation:										
The latest in dental treatment options: materials and techniques	40	72.7	35	66.0	65	69.1	35	72.9	0.82	.846
The latest in prevention: products and techniques	41	74.5	35	66.0	71	75.5	38	79.2	2.47	.480
How to plan systems around health issues	15	27.3	17	32.1	25	26.6	9	18.8	2.42	.490
Marketing strategies	24	43.6	19	35.8	34	36.2	11	22.9	5.12	.163
Teaching strategies that work	34	61.8	32	60.4	50	53.2	22	45.8	3.41	.333
Motivational techniques	33	60.0	37	69.8	59	62.8	29	60.4	1.43	.698
Implementation-Client/Clinician Safety:										
Occupational hazards and dental hygiene practice	35	63.6	30	56.6	61	64.9	26	54.2	2.12	.549

(continued)

	1978 or before (n=55)		1979 - 1986 (n=53)		1987 - 1994 (n=94)		1995 - 1998 (n=48)		Chi-	
	f	%	f	%	f	%	f	%	square	Prob.
Infectious diseases and dental hygiene practice	38	69.1	31	58.5	71	75.5	29	60.4	5.92	.116
World wide disease trends	35	63.6	32	60.4	55	58.5	25	52.1	1.48	.687
Hazardous wastes and dental hygiene practice	29	52.7	31	58.5	51	54.3	21	43.8	2.35	.503
Infection control controversies	42	76.4	39	73.6	63	67.0	26	54.2	6.68	.083
Implementation-Equipment and Resource Selection:										
Current technological options for dental hygiene practice	34	61.8	36	67.9	55	58.5	26	54.2	2.24	.524
Alternative pain control methods	25	45.5	37	69.8	59	62.8	30	62.5	7.34	.062
Electronic communication choices	12	21.8	18	34.0	25	26.6	12	25.0	2.13	.546
Making good choices in a changing marketplace	28	50.9	23	43.4	29	30.9	13	27.1	8.99	.029*
Implementation-Provision of Care:										
Pain and anxiety management for the dental hygiene client	28	50.9	32	60.4	57	60.6	30	62.5	1.85	.603
Current health promotion strategies	16	29.1	20	37.7	29	30.9	12	25.0	2.02	.569
Current educational techniques/strategies	21	38.2	21	39.6	39	41.5	16	33.3	0.92	.820
Standards for clinical research	10	18.2	15	28.3	20	21.3	11	22.9	1.67	.643
What the research says about current clinical techniques	24	43.6	23	43.3	30	31.9	17	35.4	3.01	.390
Matching your teaching to client learning	26	47.3	24	45.3	38	40.4	12	25.0	6.59	.086
Developing hospital and nursing home in-services	26	47.3	28	52.8	47	50.0	26	54.2	0.60	.896

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	1978 or before (n=55)		1979 - 1986 (n=53)		1987 - 1994 (n=94)		1995 - 1998 (n=48)		Chi-	
	f	%	f	%	f	%	f	%	square	Prob.
Evaluation-Ongoing:										
The use of indices	8	14.5	16	30.2	23	24.5	17	35.4	6.87	.076
Self evaluation and its impact upon dental hygiene practice	21	38.2	20	37.7	35	37.2	15	31.3	0.71	.872
How to conduct surveys	7	12.7	13	24.5	19	20.2	9	18.8	2.62	.454
Program evaluation - when and how to do it	11	20.0	13	24.5	24	25.5	7	14.6	2.67	.445
Using client statistics to improve health	8	14.5	17	32.1	27	28.7	14	29.2	5.79	.123
Client accountability	19	34.5	19	35.8	30	31.9	14	29.2	0.62	.891
Evaluation-Revision:										
Strategies for improving operational processes	17	30.9	20	37.7	29	30.9	15	31.3	0.86	.835
Statistical analysis explained	10	18.2	11	20.8	13	13.8	9	18.8	1.36	.716
When and how to change a strategy	15	27.3	18	34.0	27	28.7	11	22.9	1.56	.669
Risk management	15	27.3	22	41.5	27	28.7	13	27.1	3.55	.315
Evaluation-Outcomes:										
How to tell if your clients are getting healthier	32	58.2	27	50.9	45	47.9	26	54.2	1.60	.659
How to improve client satisfaction with dental hygiene care	34	61.8	36	67.9	64	69.1	32	66.7	0.68	.877
Evaluating the impact of oral health initiatives	13	23.6	16	30.2	31	33.0	10	20.8	3.08	.380
Analyzing and applying research findings to dental hygiene care	17	30.9	23	43.4	29	30.9	22	45.8	4.90	.179
Methods for evaluating client knowledge	31	56.4	28	52.8	35	37.2	22	45.8	6.30	.098

* significant at the .05 level, ** significant beyond the .01 level