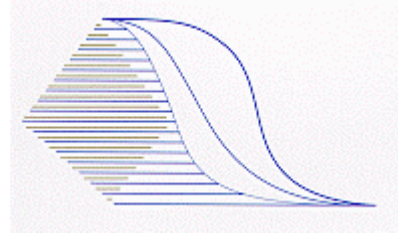


Centre for Health Services and Policy Research



An Overview of the Audiology Workforce in British Columbia: Issues and Information Gaps

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THE UNIVERSITY OF BRITISH COLUMBIA

**An Overview of the Audiology Workforce in British Columbia:
Issues and Information Gaps**

HHRU 02:1

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Forward

The Health Human Resources Unit (HHRU) was established as a demonstration project by the British Columbia Ministry of Health in 1973. Since that time, the Unit has continued to be funded on an ongoing basis (subject to annual review) as part of the Centre for Health Services and Policy Research. The Unit undertakes a series of research studies that are relevant to health human resources management and to public policy decisions.

The HHRU's research agenda is determined through discussions of key current issues and available resources with the senior staff of the Ministry of Health. Various health care provider groups participate indirectly, through on-going formal and informal communications with Ministry of Health officials and with HHRU researchers.

Three types of research are included in the Unit's research agenda. In conjunction with professional licensing bodies or associations, the HHRU maintains the Cooperative Health Human Resources Database. The Unit uses these data to produce regular status reports that provide a basis for in-depth studies and for health human resources planning. The Unit undertakes more detailed analyses bearing on particular health human resources policy issues and assesses the impact of specific policy measures, using secondary analyses of data from the Cooperative Database, data from the administrative databases maintained under the HIDU, or primary data collected through surveys. The HHRU also conducts specific projects pertaining to the management of health human resources at local, regional and provincial levels.

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Glossary of Abbreviations

AuD	Doctor of Audiology
ABR	Auditory brainstem response
ASHA	American Speech-Language Hearing Association
BCASLPA	BC Association of Speech-Language Pathologists and Audiologists
BCATA	BC Audiometric Technician's Association
BCGEU	BC Government Employee's Union
CAA	Canadian Audiology Association
CASLPA	Canadian Association of Speech-Language Pathologists and Audiologists
CEU	Continuing education units
CUPE	Canadian Union of Public Employees
ENT	Ears, nose, and throat specialist (an otolaryngologist)
FM System	An "assistive learning device" consisting of a transmitter microphone used by the speaker and a receiver used by the listener
FTE	Full time equivalent
HA	Health Authority
HEU	Hospital Employees' Union
HIDU	Health Information Development Unit (within the Centre for Health Services and Policy Research, The University of BC)
HSA	Health Sciences Association
HHRU	Health Human Resources Unit (within the Centre for Health Services and Policy Research, The University of BC)
HISSBC	Hearing Instrument Specialist's Society of BC
HPC	Health Professions Council
OAE	Otoacoustic emissions
SLP	Speech-Language Pathologist
WCB	Workers' Compensation Board

Executive Summary

This study was undertaken in response to a request made by the BC Ministry of Health Planning for “information on supply/demand/production/recruitment/retention and access to Audiologist services, to inform health planning and health human resource implementation activities” in the province, as “audiologists have been identified as experiencing supply/demand imbalances.”¹ Currently available data was obtained and assessed, and some primary data was collected through a small survey of audiologists and through consultations with a number of experts.

A needs-based approach to health workforce planning was used; a step-wise process involving assessing the burden of illness in a target population, translating health deficits into health care services or task requirements, identifying alternative mixes of inputs (human and non-human), comparing human resources requirements against currently available skills to determine net requirements.²

This report includes a brief summary of the epidemiology of hearing loss, followed by discussion on regulation, education, supply (including recruitment/retention), and demand.

Hearing loss is increasing overall. While some causes of hearing loss have been significantly reduced, such as workplace noise³, hearing loss has accompanied many recent medical advances. For example, the decreased mortality rate of premature babies has produced survivors with hearing loss and other disorders; newer medications are sometimes ototoxic; increasing our lifespan generally has increased the type of hearing loss associated with aging; and the “baby boomers” are getting older.

Regulation for the audiology workforce is complex. Several regulators exist, and their jurisdiction depends upon the setting and types of services rendered. Association membership is voluntary for many audiologists, and therefore, an accurate “headcount” of audiologists, and work-related data about most of them, cannot be obtained. The recommendations by The Health Professions Council to establish a self-regulatory College would address this issue.⁴ These recommendations are currently pending cabinet approval.⁵

There are three universities in Canada that offer audiology programs to a small number of students (Dalhousie: 8 seats, UBC: 8 seats, and Western: approximately 15 seats). The number of applicants to each program considerably exceeds places available. Graduates from all three universities sometimes move to other provinces. The UBC audiology program size needs to be aligned with provincially identified audiology workforce needs.

Conclusions about supply and demand cannot be reached, as considerably more and better data is required than what is currently available. It appears as though the current supply of BC audiologists consists of an older workforce, mainly educated in the US, and unevenly distributed throughout the province. Most audiologists appear to work in the private sector, as the public sector does not provide many of the services which patients

require. One firm conclusion of this study, however, is that there is much we don't know about the supply and deployment of the audiology workforce because data, information, and knowledge are often anecdotal, usually incomplete, and may be misleading.

There are numerous gaps in basic information that require considerably more research. Three fundamental requirements for a rational approach to audiology workforce planning which are missing are: a mechanism to obtain accurate data, a systematic assessment of various international models of care, and the alignment of the UBC audiology program to meet the needs of the province. This would enable the implementation of an evidence-based plan for British Columbia.

1. Introduction and Study Approach

1.1 Introduction

This study was undertaken by the Health Human Resources Unit, Centre for Health Services and Policy Research, The University of British Columbia, in response to a request made by the BC Ministry of Health Planning for “information on supply/demand/production/recruitment/retention and access to Audiologist services, to inform health planning and health human resource implementation activities” in the province, as “audiologists have been identified as experiencing supply/demand imbalances.”¹

A reference group comprising representatives from The Ministry of Health Planning (three from the Strategic Planning and Nursing Directorate, two consultants in the ministry who are audiologists, and the Ministry consultant from the Board of Hearing Aid Dealers and Consultants) was identified as a liaison for the research project.

The Health Human Resources Unit has not in the past undertaken a study of audiologists. This study is, therefore, a first attempt to examine issues related to the supply of and demand for audiology personnel.

Often, counting the number of trained personnel and estimating population:personnel ratios is regarded as workforce planning. However, as we have previously stated, “The purpose of health human resources management and planning activities is to identify and achieve the optimal number, mix and distribution of personnel, at a cost society is able to afford. It is not simply establishing the required number of physicians, nurses, pharmacists, or technologists, etc.; it is establishing the numbers in each of these and other groups, given the most cost-effective and appropriate mix of required personnel and their equitable geographic distribution based on varying service needs.”²

A needs-based approach to health workforce planning was used; a step-wise process involving assessing the burden of illness in a target population, translating health deficits into health care services or task requirements, identifying alternative mixes of inputs (human and non-human), comparing human resources requirements against currently available skills to determine net requirements.²

In order to examine the issues related to the supply of and demand for audiology personnel in the above context, this report will first provide a brief summary of the epidemiology of hearing loss, followed by discussion on regulation, education, supply (including recruitment/retention), and demand. As the time-frame for the study was very limited, data were obtained from multiple sources in order to capture as broad a picture as possible. Necessarily, numerous topics were not explored in depth, but the key issues have been identified and briefly discussed.

In addition to collecting secondary data from previous research (e.g., Statistics Canada, professional association studies, submissions to The Health Professions Council), this report includes new data obtained by a telephone survey, and by consulting experts.

1.2 Expert Consultations

Two separate approaches were used to solicit new information on salient issues in supply and demand, to complement the secondary analyses of available data. Expert opinion consultations were completed with 14 individuals. They were identified as ‘experts’ because they had specialized knowledge about one or more topics pertinent to audiology workforce planning and management. Unstructured face-to-face or telephone interviews were carried out. On average, these lasted about one hour and consisted of acquiring an overview of current issues in audiology. Consultations were conducted with several experts in each of the following categories: Academics/Educators, Regulators, Provincial Professional Associations (including paraprofessional associations), and a Miscellaneous Group (e.g., The Workers’ Compensation Board). Consumer group input was extrapolated from documents of The Health Professions Council of BC, which just concluded an extensive review of audiologists and hearing instrument specialists, including lengthy consultations with many consumer groups. It is important to note that due to time limitations, only provincial experts were consulted, and other national and international experts, such as The Canadian Association of Speech-Language Pathologists and Audiologists⁶, The Canadian Academy of Audiology⁷, The Canadian Hearing Instrument Practitioners Society⁸, and the International Hearing Society⁹ were not contacted.

1.3 Telephone Survey

The second approach for obtaining new information was a telephone survey of audiologists and their employers. A randomised, stratified, telephone survey was selected as the best method to contact audiologists and their employers, given the 4 month time limitation of this project, the large number of potential respondents, the length of time required to obtain approval of the UBC Behavioural Research Ethics Board, the desire to select a representative sample of participants, and the complexity of the issues (which lend themselves better to a two-way conversation rather than in a self-administered survey).

A list of audiologists working in private practice was obtained from the Board of Hearing Aid Dealers and Consultants.¹⁰ A list of audiologists working in the public sector, and the names of hospitals which employed audiologists were obtained from the Ministry of Health Planning.¹¹ The names of hospital employers and employees were obtained through the hospital departments. When more than one audiologist was identified as working in a particular hospital, the most senior one was selected. Letters were sent to all potential participants requesting that they call us (i.e., none were contacted initially by telephone, as per the UBC Behavioural Research Ethics Board).

The objective of the stratification was to obtain a mix of opinions from different settings, roles, types of services, and levels of services. The first level of stratification was by unique setting and role.

- Four hospitals were identified as employing audiologists. One employer and one employee were selected from each hospital (for a total of 8).
- Three public health coordinators were identified. All three were selected.

The second level of stratification, for the remaining names, was based upon the density of audiologists in each of the 1997 – 2001 health authorities (HA) in different settings.

Density was felt to reflect different demands/levels of service. The density was calculated by the number of audiologists per capita in each HA. No pattern to the HAs which had more audiologists per capita was found. Density was labelled as low, medium, and high. These terms do not reflect the desired density, only a density relative to each other. One name was removed from the list, as she had already been interviewed as an “expert” (see above). The other names were numbered consecutively, and the computer program Excel randomly generated numbers for selection.

- Public Health
 - Of 10 identified in low density HAs, 2 were selected.
 - Of 10 identified in medium density HAs, 2 were selected.
 - Of 6 identified in high density HAs, 2 were selected.
- Private Practice
 - Of 27 identified in low density HAs, 4 were selected.
 - Of 27 identified in medium density HAs, 4 were selected.
 - Of 26 identified in high density HAs, 4 were selected.
- Both (some work part-time in both settings)
 - Of 7 identified in low density HAs, 1 was selected.
 - Of 2 identified in medium density HAs, 1 was selected.
 - Of 3 identified in a high density HAs, 1 was selected.

A total of 32 names were selected (27%), and 6/32 responded (a 19% response rate). This low rate was partly due to the policy of the UBC Behavioural Research Ethics Board which prohibits telephone contact, the lack of time for a second mailing, and the timing itself: the busy pre-Christmas holiday period. Contacting other potential candidates outside of the specified randomised sample would have been a major methodological violation and therefore unethical. A larger sample size was considered initially, but rejected due to time and cost limitations.

Those that did respond, included at least one person who had worked in each setting at one time, and both rural and urban settings were represented. However, no one responded from a low density area; no one who was currently working in both public and private settings simultaneously, responded. These are caveats to be taken into consideration when interpreting study findings.

The survey focused on supply and demand issues. Four questions prompted discussion about supply and demand (including care for particular groups of patients, stages of care, and locations of care in their region); one question prompted discussion about continuing

education, and the final question was an open-ended general comment section (see Appendices I and II). On average, the telephone survey lasted approximately forty-five minutes. This was longer than the anticipated thirty minutes, as so many comments were added.

1.4 Secondary Data

Secondary data sources were numerous (see References). They comprised Statistics Canada reports, submissions to The Health Professions Council and their final report to the BC Ministry of Health, published data in Rollcall, unpublished data (BCASLPA provided special permission for us to access/analyse this unpublished data for this study), association websites, university websites, studies/reports provided by association presidents, a study conducted for the Operational Review Branch of the Ministry of Health in 1993, association surveys (i.e., CASLPA 2001, BCASLPA 1994, 1996, 2001, BCASLPA/UBC 1996), The Difficult-to-Fill Positions Survey, Healthcare Labour Adjustment Agency vacancy lists, data from the Cochrane Library, and a recent professional conference presentation.

The findings from the primary and secondary analyses will be presented as follows: first, an analysis of the secondary data, providing a quantitative picture covering the key issues – regulatory, education, supply and demand, which is then supplemented by the qualitative data from the primary analyses.

2. Epidemiology

2.1 Population at Risk

Hearing loss is common and can occur at any time during the life cycle. Nearly 10% of the adult population has some hearing loss. Between 30% and 35% of individuals over the age of 65 have a hearing loss of sufficient magnitude to require a hearing aid.¹² Up to 50% of community-based adults aged 75-79 years have some degree of audiometrically measured hearing loss. For the population living in long-term care facilities, this percentage is much higher.¹³ Statistics Canada reports the following number of persons with a hearing disability residing in households living in BC, in 1994:

Ages 15 years and over	170,985
Ages 15 to 64	90,050

[Statistics Canada, 1994¹⁴]

The BC Ministry of Education reports that in 2000/2001, there were 1,444 children (grades K-12) claimed by school boards as meeting the definition of “deaf/hard of hearing”, which determines eligibility for special education purposes (see Appendix III for this definition). This number has increased by 17% from 1,427 in 1999/2000.¹⁵

Hearing loss is increasing overall. While some causes of hearing loss have been significantly reduced, such as workplace noise³, hearing loss has accompanied many recent medical advances. For example, the decreased mortality rate of premature babies has produced survivors with hearing loss and other disorders; newer medications are sometimes ototoxic, increasing our lifespan generally has increased the type of hearing loss associated with aging, and the “baby boomers” are getting older. Statistics Canada reports the following causes of impaired hearing in Canada, as reported by persons aged 15 and over residing in households:

Aging	29.15 %
Disease or stroke	20.98 %
Work environment	18.12 %
Violence, accident at work, motor vehicle accident, other accident	8.59 %
Present at birth	6.86 %
Other	<u>16.30 %</u>
TOTAL:	100.00 %

[Schein & Peikoff, 1992¹⁶]

2.2 Population Impact

Hearing loss has a significant impact on society, even though it is generally not life-threatening (although infection, not hearing in traffic, and not understanding medication orders are examples of how it can, indirectly, be life threatening). Hearing loss often changes the course of one's life dramatically. In children, hearing loss can result in severe

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developmental delay and subsequent behavioural problems. In adults, hearing loss can result in a significantly impaired quality of life. "Hearing loss is associated with numerous negative aspects of personal adjustment: increased stress levels, anxiety, social withdrawal, and altered self-concepts manifested in lowered self-esteem, feelings of inferiority, insecurity, and loss of autonomy. In a study comparing older adults with normal or impaired hearing, those with hearing impairment rated their health poorer and they were less likely to get out without help, ventured out less far, were less satisfied with their extent of mobility, had fewer friends than in the past, enjoyed life less than previously, and were more often depressed."¹⁷

2.3 Identification of Services

There are a range of services for treating hearing loss. "In general, conductive hearing losses are amenable to surgical intervention and correction, when sensorineural hearing losses are permanent. ...Patients with mild, moderate, and severe sensorineural hearing losses are regularly rehabilitated with hearing aids of varying configuration and strength."¹⁸ Specific treatments for these and other conditions were not investigated in this report. Evidence supporting particular treatments for the most common conditions, such as otitis media in children, is required to be able to assess a comprehensive set of appropriate services. It is not known if such evidence exists.

An inventory of all types of services provided and a description of the impact of these services was not possible to undertake in this study, as this data currently is not readily available and it was not possible to obtain this data within the 4 month time limit of this study.

The scope of practice of audiology was not investigated in this report (e.g., screening/testing, treatment, and follow-up care). It is not known the extent to which the same person does or should provide all services, or more than one of them, for proper care (e.g., the relationship of proper treatment to proper diagnosis).

2.4 Mix of Personnel

The mix of personnel in any profession should provide the best, safe services, for evidence based treatments, at the least cost, which usually requires a mix in levels of expertise by trained professionals and technicians.

Audiology services are rendered by a range of providers in BC, including otolaryngologists, audiologists, hearing instrument specialists, and audiometric technicians. Some audiology services appear to be provided by generalists as well, such as general practitioners, nurses, teachers, secretaries, assistants, and volunteers. It is not known which provider is the most suitable for particular roles. For example, it is not known if all providers are qualified to deliver the service they currently deliver. Conversely, it is not known if some providers are overqualified to deliver the particular service they currently deliver (e.g., it is not known if a particular group of providers with less training could deliver more services for less cost).

Other variations exist as well, including: the structure of care delivery (e.g., some work in multidisciplinary teams; some work in pairs; some work independently), funding mechanisms (e.g., a particular service can be provided by the public sector in one area, only provided by the private sector in another area, and not be available at all in a third area), the location of care (e.g., a particular service can be provided in a hospital setting, in a local clinic, in a private office, or in a mobile van).

Data on the mix of personnel in BC or in the rest of Canada is not available at this time. For example, The Canadian Institute for Health Information (CIHI) currently does not collect this data.¹⁹ A recent overview report by CIHI states “What we don’t know: What is the right mix of health human resources at regional, provincial and national levels to meet health care needs.”²⁰

3. Regulation

3.1 Scope of Practice

Audiologists

“Audiologists usually work as part of a comprehensive team of rehabilitation specialists including educators, medical and rehabilitation personnel, psychologists and social workers. Audiologists assess the extent of hearing loss, balance and related disorders and recommend appropriate treatment. Services are provided to people who are deaf or hard of hearing and persons at risk of hearing loss due to noise exposure, genetic causes, and exposure to certain drugs, or middle ear infections. Audiologists also work with adults and children who need aural rehabilitation, such as auditory training and speech reading, and educate consumers and professionals on the prevention of hearing loss.”²⁰

The scope of practice definition for audiologists, as recommended by the Health Professions Council of BC (HPC), January 2001, is:

- the assessment, diagnosis, treatment, (re)habilitation and remediation of hearing and related communication disorders and peripheral and central auditory system (dys)function;
 - the education of clients, families and others concerning such disorders of (dys)function;
 - facilitating the conservation of auditory system function, including the development and implementation of environmental and occupational hearing conservation programs;
 - cerumen management for the purpose of providing audiological care;
 - the selection, fitting, verification and dispensing of amplification, assistive listening and alarming devices and other systems and implantable devices and training in their use;
 - the promotion of hearing accessibility;
 - research concerning any of the above;
- for the purposes of facilitating the development and maintenance of human communication and maximizing auditory function.⁴

Complementary Health Personnel

- 1) **Otolaryngologists** (ENTs), are MDs regulated by the College of Physicians and Surgeons of BC, and diagnose and treat patients with hearing loss.
- 2) **Hearing Instrument Specialists** (name change to “Hearing Aid Dispensers” recommended by the Health Professions Council)²², provide the following hearing aid dealing and consulting services, according to the Hearing Instrument Specialists Society of BC:
 - Examination and evaluation of human hearing relating to hearing acuity, sensitivity and communication disorders
 - Selection and fitting of hearing instrument
 - Industrial hearing protection screening and fitting of hearing protective earmolds

- Taking impressions and making and modifying any type of earmolds
- Rehabilitation advice and guidance to the hearing impaired
- Post fitting service to the patient
- Instruction and supervision of hearing instrument specialist students
- Repair and maintenance of hearing instruments and accessories
- Watches for signs of abnormal conditions and refers such cases to a medical practitioner.²³

3) **Audiometric Technicians** assist public health audiologists in their work by conducting hearing (audiometric) tests; they do not interpret test results. They may assist in the fitting of a hearing aid by taking an ear mold impression and advising the patient on the operation of the aid.²⁴ They also assist audiologists in private practice. Industrial technicians and energy/mines technicians also practice in BC.

3.2 Regulatory Environment

Regulation for the audiology workforce is complex. Several regulators exist, and their jurisdiction depends upon the setting and types of services rendered (see Table 1).

Table 1: Regulation

Health Care Provider	Regulatory Environment
Hospital sector audiologists	-Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) – membership required -CASLPA membership requires 45 continuing education credits over a 3 year period. [Source: Reference Group, 2002 ²⁵]
Public sector audiologists	-“Must be eligible for membership in CASLPA” -CASLPA membership requires 45 continuing education credits over a 3 year period. [Source: Reference Group, 2002 ²⁵]
Private sector audiologists who dispense hearing aids	Board of Hearing Aid Dealers and Consultants (membership required) [Source: Regina Ternus, 2001 ²⁶]
Private sector audiologists who see clients with WCB claims	-CASLPA membership required [Source: WCB, 2001 ³] -CASLPA membership requires 45 continuing education credits over a 3 year period. [Source: Reference Group, 2002 ²⁵]
Private sector audiologists who do not dispense hearing aids or see clients with WCB claims	No formal regulations or requirements. [Source: WCB, 2001 ³]
Private sector consultants who dispense hearing aids	Board of Hearing Aid Dealers and Consultants membership required [Source: WCB, 2001 ³]
Private sector consultants who do not dispense hearing aids	No formal regulations or requirements. [Source: WCB, 2001 ³]
Public sector technicians	No formal regulations or requirements. [Source: Dorothy Fairholm, 2002 ²⁷]
Private sector technicians	No formal regulations or requirements. [Source: Dorothy Fairholm, 2002 ²⁷]
Industrial technicians	Workers’ Compensation Board certification. [Source: WCB, 2001 ³]
Energy/mines technicians	-Training by the Ministry of Mines [Source: Dorothy Fairholm, 2002 ²⁷] -Certification required (as per the Health, Safety and Reclamation Code for Mines in BC) [Source: Victoria Power-Pollitt, 2002 ²⁸]
Otolaryngologists	College of Physicians and Surgeons of BC (membership required)

In January 2001, The Health Professions Council (HPC) recommended that a self-regulatory college be established to regulate the profession, and that The Board of Hearing Aid Dealers and Consultants be maintained.²² The HPC Report is currently pending cabinet review.⁵

3.3 Professional Organizations

Audiologists may take up membership in four different Canadian professional associations.

- BC Association of Speech-Language Pathologists (BCASLPA). 46-71 members 1991-1997; 142 members in 1999.²⁹⁻³² Rollcall 2000 does not contain data on audiologists. Data for 2001 is not yet submitted for Rollcall 2001.
- Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA). 142-154 members 1996-2000.³⁴⁻³⁸
- Dual Membership (BCASLPA and CASLPA). 56 in 1996^{39,34}; 121 in 1999^{33,37}
- Canadian Academy of Audiologists (CAA). 95 members in 2000; 115 in 2001.⁴⁰

CASLPA requires joint membership with BCASLPA and charges a \$401.55 fee per annum.⁴¹ CASLPA keeps \$225.00 of this fee and gives \$176.55 to BCASLPA.⁴² The CAA charges new applicants \$130.00 per annum and renewed applicants \$80.25.⁴³

The mandates of the associations are described below, as per information on their respective websites:

The British Columbia Association of Speech/Language Pathologists and Audiologists (BCASLPA) represents the interests of the professions of Speech/Language Pathology and Audiology and promotes the highest quality of service for the communicatively impaired in British Columbia. In support of this purpose they are committed to:

- The advancement of knowledge relating to communication disorders
- Providing membership services and support as determined by the current needs of the membership
- Ensuring high professional and ethical standards through the process of registration with adherence to the code of ethics of the association
- Providing the public with information regarding the professions; educating consumers regarding services and rights; liaising with government agencies
- Advocating for services for the communicatively impaired through documentation of the need for services and lobbying government and others for their provision
- Supporting consumer advocacy efforts.⁴⁴

The Canadian Association of Speech-Language Pathologists and Audiologists (CASLPA) exists to support the professional needs and development of speech-language pathologists and audiologists and, through this support, champion the interests of those who require the services of these professionals.⁴⁵

The Canadian Academy of Audiology (CAA) is a professional organization dedicated to enhancing the profession of Audiology, the provision of quality hearing health care and education to those with, or at risk for, hearing and/or vestibular disorders. The Academy further strives to represent the audiological community on relevant national issues in a timely, organized manner. The Academy is committed to maintaining and advancing ethical standards of practice. The Academy promotes the continuous improvement in the abilities of its members by facilitating and encouraging professional development and research, thereby enhancing the role of audiologists as primary hearing health care providers.⁴⁶

4. Basic and Continuing Education

4.1 Hearing Instrument Specialists

Hearing Instrument Specialists require the following training:

- Introductory correspondence course established by the International Hearing Society, which consists of 22 lessons followed by a proctored exam.
- A minimum of 840 hours (six months) of supervised full-time training with a practitioner certified by the Board of Hearing Aid Dealers and Consultants.
- Successful completion of a two-hour written and oral exam.²³

4.2 Audiometric Technicians

Technicians who work in public health clinics require grade 12, plus related experience in the health field, preferably working with people who are hearing-impaired. They are trained on-the-job by audiologists and experienced audiometric technicians. The training takes six months to a year, and further specialization may require an additional six months of training.⁴⁷

Private sector technicians are trained on the job. No certification is required.²⁶ This creates a range of expertise.

Industrial technicians are sponsored by their employers and trained by the Workers' Compensation Board to carry out basic hearing tests. They are required to attend refresher courses annually.⁴⁷ Those who fit hearing aids are not permitted to take the course, as the WCB views this as a conflict of interest.³

Energy/mines technicians attend programs with examinations through the Ministry of Mines.²⁷

4.3 Audiologists

4.3.1 Training Programs

Professional training in audiology is available in English at the master's level at Canadian universities, and at many universities in the US. Master's level programs in French are also available in Canada. Undergraduate studies required to enter the master's level, include courses in psychology, physiology, linguistics, education, human sciences, and health sciences. Specific requirements vary by university. Canadian programs meet provincial licensure and CASLPA certification requirements. US programs may not meet these Canadian requirements.⁴⁸

University courses include acoustics, anatomy, assessment, counselling, hearing disorders, hearing aids, language development and disorders, linguistics, neurology and neurophysiology, nonvocal communication, parent training, psychology, phonetics, speech disorders, statistics, stuttering, voice and voice disorders, and a variety of specific

areas (e.g., autism). The course and clinical practica cover the development, disorders, and the training or retraining of human communication in all its aspects.⁴⁵

PhD programs specifically for audiologists are not available at the three Canadian universities which offer master's degree programs. Interdisciplinary programs, however, are offered, but it is difficult to track the number of audiologists completing such programs. Doctoral programs for audiologists (AuD) are available in the United States, and are increasing in number. None exist in Canada, and it is not known if AuD programs will develop here, as discussed by Dr. Andree Durieux-Smith at the CAA conference in October, 2001.

“In the US there are 14 four-year doctoral programs and five distance learning doctoral programs in audiology. There are many other programs at different stages of development. ... Obviously, in Canada, as always, we are following with interest the evolution of the AuD in the US, and this is being discussed by CAA and Canadian audiology programs. The AuD, however, should not be seen as the solution to all our problems. Again, the need should be driven by the expanded scopes of practice, and the provision of quality education to our students. The ultimate goal is for audiologists to be adequately trained to meet the needs of individuals with a hearing loss. The further expansion of our scopes of practice will determine the level of training we require. In addition, the practice of audiology has changed over the years. More and more audiologists work in private practice and we must ensure that the graduates of our training programs have the knowledge and skills to adequately function in this environment.”⁴⁹

Three Master's level audiology programs are available in Canada in English:

- Dalhousie University, Halifax;
- The University of BC (UBC), Vancouver; and
- The University of Western Ontario (UWO), London.

All are 3 year programs; which also offer 2 year programs for those with additional pre-requisites.⁵⁰⁻⁵²

The number of applicants to the audiology programs offered in English in Canada considerably exceeds places available (see Table 2):

Table 2: Available Spaces in Canadian Audiology Programs in English

Applications	Dalhousie	UBC	Western
Number of Applicants	200-300 for SLP. Few for Audiology* Many from Ontario*	150-160 for SLP and Audiology	considerably exceeds places available
Number of Seats	Variable, average: 22 SLP 8 Audiology	Variable, average: 17 SLP * 8 Audiology*	15 Audiology (varies year to year)

[Sources: Data obtained from respective university websites (46-48) or as noted with (*), which were obtained through personal communication with departmental secretaries.⁵³⁻⁵⁵ Exact numbers are not available.]

It is likely that some applicants apply to more than one program. This data, however, is not available.

Table 3 provides specific information for each Canadian audiology training program regarding attrition from the program, length of the program, clinical placements, and continuing education.

Table 3: Specifics of Canadian Training Programs

Program	Dalhousie	UBC	Western
Attrition rate	One since 1976*	None since 1994*	One in the last 3 years*
Length of time	Similar between universities**: <ul style="list-style-type: none"> a 2.66 year program or a 1.66 year program plus 1 year of prior preparatory courses All include 2 practicum terms 		
Continuing Education	No*	No*	Occasionally*
Clinical Placements	Many students prefer placements in Ontario, as they are from Ontario and intend to work there*	Students can obtain clinical placements outside of BC*	Students can obtain clinical placements outside of Ontario*

[Sources: *Data obtained from the respective departmental staff.⁵³⁻⁵⁵ More exact numbers are not available.

**Data obtained from the respective university websites⁵⁰⁻⁵²]

An assessment of the curriculum in each of these programs is beyond the scope of this 4 month study, particularly as this evaluation would require considerable specialized expertise. The course content of each of these programs, is listed in Appendices IV, V, and VI.

An assessment of whether these programs are able to increase the number of available seats is also beyond the scope of this study, particularly as this evaluation would involve complex issues such as university funding and the availability of professors/instructors.

4.3.2 Place of Graduation of Practicing Audiologists

Place of graduation is requested of BCASLPA biennially for the province's Rollcall publication, but is not provided. Therefore, the available data is limited to a 1996 survey by BCASLPA (which does not represent all the audiologists in BC), which suggests that the majority of practicing audiologists in BC receive their professional training in the United States (See Table 4). It would be methodologically invalid to extrapolate these dated results to reflect audiologists currently practicing in BC, particularly due to the small, unrepresentative sample.

Table 4: Place of Graduation

University	Respondents
UBC	20 (33%)
Another Canadian University	4 (7%)
A University in the United States	34 (57%)
Other	2 (3%)
TOTAL	60 (100%)

[Source: BCASLPA, 1996⁵⁶]

4.3.3 Year of Graduation

Year of graduation is also requested of BCASLPA biennially for the province's Rollcall publication, but is not provided either. Therefore, the available data is limited to a 1996 BCASLPA and the UBC School of Audiology and Speech Sciences survey of 793 speech-language pathologists and audiologists from BC which had a 54% response rate (the response rate was not reported for audiologists alone). The results were reported by profession, however, and are shown for audiologists in Table 5. It would be methodologically invalid to extrapolate these dated results to reflect audiologists currently practicing in BC, particularly due to the small, unrepresentative sample.

Table 5: Year of Graduation

Year of Graduation	Respondents
<1977	9 (15%)
1977-1981	10 (17%)
1982-1987	14 (24%)
1988-1991	10 (17%)
1992-1996	16 (27%)
TOTAL	59 (100%)

[Source: BCASLPA, 1996⁵⁶]

The authors of the survey concluded that “These data suggest that burn-out and attrition are not a significant factor in our profession. If they were, there should be a larger proportion of persons with recent entry.”⁵⁶ Again, drawing conclusions from unrepresentative data, for the entire profession in BC is methodologically invalid.

4.3.4 Continuing Education Programs

As stated in section 3.2, the Canadian Association of Speech-Language Pathologists and Audiologists requires members to obtain 45 continuing education credits over a 3 year period. This has been difficult for many members, according to CASLPA: “There have been many questions about how to reach the three year 45 CEE minimum, especially if the member lives in a remote area, works part time or has had multiple maternity leaves.”⁵⁷ Several “creative” ideas are suggested, which imply a shortage of the typical sources of continuing education (e.g., seminars, conferences).

The BCASLPA website currently lists several conferences, but only one in the next 9 months is specifically for audiologists: The Itinerant Teachers of the Deaf and Hard of Hearing BC Workshop “Transitions and Beyond” (i.e., the others are for the speech language pathologists or for both speech-language pathologists and audiologists).⁵⁸

The Hearing Instrument Practitioner’s of Alberta and British Columbia hold a yearly professional conference. This year it will be held in Alberta.²⁸

Industry also sponsors programs.²⁵ Presumably individual audiologists are contacted directly by industry regarding registration for these programs. It is not known whether the sponsors of these programs direct their educational messages in favour of utilizing their products.

Canadian audiologists sometimes access distance programs offered by the American Speech-Language Hearing Association (ASHA). Some of their continuing education programs are described by ASHA as:

- “Telephone Seminars: participation in person via a toll-free call from anywhere in the United States and Canada. Distinguished faculty discuss the seminar topic as participants review printed material supplied in advance. Question-and-answer periods help develop solutions to specific problems.
- TeleWeb Seminars combine ASHA’s traditional telephone seminar formats with online interactive exercises and discussion forums. This offers participants more opportunities to ask questions of faculty and to apply the information provided. Web-based activities are optional and offer the opportunity to earn extra CEUs following the telephone seminar.
- Workshops and Conferences bring participants face to face with presenters and colleagues at interactive, problem-solving sessions.
- Web Workshops provide opportunities to interact with content experts over the Internet. Our asynchronous course design offers independence of time and place. Content is delivered in weekly units. Participants complete materials during the

week on their own schedule. Weekly forums provide opportunities to discuss course content with faculty and other participants.

- Self-Study Videotapes bring hot topics and top national experts to you in the convenience of your home or office. Videotapes are supplemented by printed course materials. Earn ASHA CEUs by completing the self-study test at the end of the product.”⁵⁹

5. Supply

5.1 Number of Practitioners

As there has not been a self-regulatory body governing audiologists in BC, and since membership in all of the audiology associations is optional, gathering information on the number of audiologists practicing in BC has been a challenging task. The data which are available, do not provide complete information on “headcount”. Therefore, it is not known whether the number of audiologists in BC is increasing or decreasing. The implementation of a College would provide these data in the future.

Table 6: Estimated Number of Audiologists in 2001

SECTOR	ESTIMATE
Public Sector, on registry	15 [Sources: Public Health Audiology Services Phone List, Sept 13, 2001 ¹¹ ; The Board of Hearing Aid Dealers and Consultants Registry 2001/2002 ¹⁰]
Public Sector, not on registry	25 [Source: Public Health Audiology Services Phone List, Sept 13, 2001 ¹¹]
Private Sector, on registry	80 [Source: the Board of Hearing Aid Dealers and Consultants Registry 2001/2002 ¹⁰]
Private Sector, not on registry	Unknown
Hospital	Unknown
TOTAL:	Unknown

Additional data for previous years was requested of these sources, but was not retained by them.

5.2 Mean Age of Audiologists

The ages of audiologists is requested of BCASLPA biennially for the province’s Rollcall publication, but is not provided. Therefore, the available data is limited to a 2001 survey by BCASLPA (which does not represent all the audiologists in BC), which only states that “the mean age range of audiologists in 2001 is 40-49 years”⁶⁰ (i.e., further details are not available yet), suggesting an older workforce. However, it would be methodologically invalid to extrapolate these results to reflect audiologists in BC, however, due to the small, unrepresentative sample. Data on the age of audiologists in BC or in other provinces is not available elsewhere at this time. For example, neither Health Canada nor The Canadian Institute for Health Information collects this data on audiologists.¹⁹

5.3 Geographic Location of Known Audiologists

The distribution of known audiologists by 1997 – 2001 BC health authorities is presented in Table 7. The number of audiologists per 10,000 population varies considerably between regions, with a low of 0.12 in the Fraser Valley and a high of 0.65 in the Cariboo region. The provincial average is 0.31 audiologists per 10,000 population.

Table 7: Location of Known Audiologists by the 1997 – 2001 BC Health Authorities

Health Authority (see Appendix IV for map)	Number of Known Audiologists (2001)	Population (2000)	Ratio of Audiologists / 10,000 Population
Cariboo	5	77,188	0.65
Kootenay Boundary	4	82,758	0.48
Okanagan – Similk	11	233,133	0.47
Peace Liard	3	66,254	0.45
Capital	15	334,847	0.45
Northern Interior	5	134,081	0.37
Thompson	5	137,639	0.36
Vancouver/Richmond	27	741,862	0.36
North Okanagan	3	119,250	0.25
East Kootenay	2	82,552	0.24
Simon Fraser	12	517,594	0.23
North Shore	4	180,432	0.22
North West	2	91,959	0.22
Central Van Island	5	245,279	0.20
South Fraser	11	575,919	0.19
Upper Isle/Cen Coast	2	122,809	0.16
Coast Garibaldi	1	80,448	0.12
Fraser Valley	3	243,175	0.12
TOTAL	120	4,067,179	0.31

[Sources:

Audiologists Public Health Audiology Services – Clinic Phone List Sept 13, 2001¹¹
Board of Hearing Aid Dealers and Consultants, Registry 2001/02¹⁰

Population PEOPLE Projection Run #25⁶¹]

The lower ratio of known audiologists/population in the Fraser Health Authority is more apparent in Table 8, which groups the data in Table 7 by the current, larger health authorities.

Table 8: Location of Known Audiologists by Current BC Health Authorities

Health Authority	Number of Audiologists (2001)	Population (2000)	Ratio of Audiologists / 10,000 Population
Interior	30	732,520	0.41
Northern	10	292,294	0.34
Vancouver Island	22	702,935	0.32
Vancouver Coastal	31	1,002,742	0.31
Fraser	26	1,336,688	0.20
TOTAL	120	4,067,179	0.32

[Sources:

Audiologists Public Health Audiology Services – Clinic Phone List Sept 13, 2001¹¹

Board of Hearing Aid Dealers and Consultants, Registry 2001/02¹⁰

Population PEOPLE Projection Run #25⁶¹]

5.4 Recruitment/Retention Issues

Recruitment and retention issues are of concern to audiologists as well as numerous other professionals in BC. As discussed in the report Canada's Health Care Providers, "Across the country, large amounts of time and money are spent on initiatives to recruit and retain health professionals. Many different strategies are being used. They range from paying for education and training to community support for providers and their families. Which strategies work best? Not all have been fully evaluated. And, different approaches may be needed for different situations. Nevertheless, researchers have started to look at the effectiveness of some of the approaches that have been used so far. Their findings include:

- Offering money incentives to nurses in Ontario, such as grants and bursaries, seemed to provide only short-term benefits.
- Undergraduates or residents who spend part of their training in rural areas are more likely to work there when they start practicing.
- Providing a good quality work environment has been shown to be successful in attracting and keeping health care providers."²⁰

The following information on recruitment, retention, job satisfaction and remuneration of audiologists (Tables 7-12), has been obtained from the 2001 BCASLPA survey⁶⁰ and the 2001 CASLPA Salary Survey.⁶² As the details of the 2001 BCASLPA survey have not been published to date, the response rate and several terms are unclear at this time (e.g. the difference between health unit and government, whether salary includes benefits). Analysis of this data is not possible as it would be methodologically invalid to extrapolate these results to reflect audiologists in BC, due to the small, unrepresentative sample.

Table 9: Recruitment

Question	Response
Current vacancies	Yes 34 %
Current recruitment problem	Yes 43 %
If there is a recruitment problem, in which setting	Private practice 56 % Health unit 22 % Government 6 % Hospital 11 % WCB 6 %
Difficulty of positions to be filled (in order)	-Full-time permanent -Part-time permanent -Full-time temporary -Part-time temporary
Top factors contributing to successful recruitment	-Good benefit package -Competitive salary -Students got to know setting during practicum -Flexibility and autonomy

[Source: BCASLPA Survey 2001⁵⁸]

Table 10: Retention

Question	Response
Current retention problem	Yes 25 %
Poor retention factors (in order)	-Family/lifestyle reasons -Overall workload -Competition from other settings -Salary
Retention success (in order)	-Desirable location -Competitive salary -Good benefits package -Stimulating environment -Enjoyable client population -Supervisory/peer support

[Source: BCASLPA Survey, 2001⁶⁰]

Table 11: Job Satisfaction/Dissatisfactions

Satisfactions (in order)	Dissatisfactions (in order)
<ul style="list-style-type: none"> -Clientele -Direct contact with clients and families -Making a difference or improving quality of life -Client satisfaction -Independence 	<ul style="list-style-type: none"> -Administration duties -Funding -Space -Lack of time -Waitlists -Salary/benefits

[BCASLPA Survey, 2001⁶⁰]

The CASLPA has conducted two membership salary surveys, one in 1999 and one in 2001.⁶¹ The following tables summarize the results from the 2001 survey with comparisons with the 1999 survey. The survey response rate is not reported.

Table 12: 2001 Salaries by Years of Experience

	Up to Three Years	Three to Five Years	Five to 10 Years	More than 10 Years	Average Salary
BC	48,000	56,000	60,786	62,992	61,050 (27)
AB, SK & MB	51,439	53,400	51,583	56,869	54,429 (18)
ON & QC	49,750	51,803	52,889	56,211	53,785 (34)
NB, NS, PEI & NF	—	—	51,088	53,233	52,804 (10)
Average Salary	49,388 (5)	52,615 (15)	55,000 (22)	58,269 (47)	56,009(89)
Compared to 1999	+16.5%	+ 15.6%	+ 11.1%	+ 3.6%	+ 10.2%

Note: Numbers in parentheses indicate number of respondents; percentages indicate increase or decrease in average salary compared to the 1999 Salary Survey.

[Source: CASLPA Salary Survey, 2001⁶²]

Table 13: 2001 Salaries by Work Environment

	School Board	Hospital or Clinic	Government	Private Practice	College or University	Other
BC	—	59,305	63,563	62,500	—	50,000
AB, SK & MB	—	53,222	—	55,938	—	—
ON & QC	—	57,846	—	51,911	—	51,160
NB, NS, PEI & NF	—	56,255	—	39,000	—	—
Average Salary	—	56,737 (40)	63,563 (5)	55,634 (33)	—	51,054 (11)
Compared to 1999	—	+13.9%	+15.8%	+15.6%	—	- 9.0%

Note: Numbers in parentheses indicate number of respondents; percentages indicate increase or decrease in average salary compared to the 1999 Salary Survey.

[Source: CASLPA Salary Survey, 2001⁶²]

Table 14: 2001 Salaries by Work Location, Union/Non-union, Benefits

	Urban Area	Rural Area	Both Urban and Rural Areas	Unionized	Non-Unionized	Benefits as Percentage of Salary
BC	60,100	63,271	65,722	61,220	60,458	13.7%
AB, SK & MB	54,102	52,000	56,000	54,049	54,988	5.6%
ON & QC	54,667	52,667	55,500	49,763	55,022	15.6%
NB, NS, PEI & NF	56,645	47,775	46,667	55,435	46,667	11.5%
Average Salary	56,526 (62)	55,949 (8)	55,188 (13)	56,010 (35)	55,803 (51)	12.6% (37)
Compared to 1999	+10.1%	+28.5%	+7.2%	+1.3%	+15.1%	- 8.9%

Note: Numbers in parentheses indicate number of respondents; percentages indicate increase or decrease in average salary, as well as benefits as a percentage of salary, compared to the 1999 Salary Survey.

[Source: CASLPA Survey, 2001⁶²]

6. Demand

6.1 Employment Sector/Type of Employment and Services

As previously discussed in Section 1.1, estimating the demand for audiologists requires evidence of population health needs and health care utilization data. Studies comparing different types of audiology services at different stages of delivery are not readily available. Some research data may be found in an extensive international search, but this is beyond the scope of this 4 month project. Therefore, it is not known which services should ideally be provided, and consequently there is insufficient data to reach conclusions on the needs of the BC population.

We have, however, briefly examined available data on the deployment of audiologists as a proxy for demand to document what is currently known, but not for further analysis. An analysis of the current deployment of audiologists would imply endorsement of the current treatment and delivery approach. This is not possible given the dearth of information and the extensive research that would be required, and therefore would be erroneous. Comparing the ratio of audiologists/population between BC and other provinces or countries would also be erroneous, as it would imply endorsement of the other country's treatment and delivery approach and an identical health care system to ours.

The data which is available is provided with the proviso that they are methodologically flawed and therefore inconclusive; most of the data are from BCASLPA, and does not include at least half of the audiologists in the province.

The available data suggests that most audiologists are in private practice.

Table 15: Settings in Which Audiologists Work

		Schools	Hospitals	Health Units	Rehab	Private Practice	Other	Total
	1994 BCASLPA study	4 (8.2%)	5 (10.2%)	18 (36.7%)	7 (14.3%)	12 (24.5%)	3 (6.1%)	49 (100%)
1	BCASLPA study	4 (6.2%)	5 (7.7%)	18 (27.7%)	8 (12.3%)	27 (41.5%)	3 (4.6%)	65 (100%)
9	BCASLPA /UBC study	4 (6.8%)	2 (3.4%)	29 (49.2%)	*	17 (28.8%)	7 (11.9%)	59 (100%)
9								
6								
	2001 BCASLPA study	1 (2.0%)	6 (11.8%)	13 (25.5%)	1 (2.0%)	22 (43.1%)	8 (15.7%)	51 (100%)

* included in Hospital column

[Sources: BCASLPA Survey, 1994⁶³
BCASLPA Survey, 1996⁵⁶
BCASLPA/UBC Survey, 1996⁶⁴
BCASLPA Survey, 2001⁶⁰]

The BCASLPA 2001 survey⁶⁰ also included two questions on outreach programs (definition of outreach not provided). Twenty-one percent (21%) served clients on an outreach basis involving more than 1 hour travel each way. Sixty-seven percent (67%) spent less than 25% of their time with them. If clients were served on an outreach basis, seventy percent (70%) of the time it was by audiologists in private practice, and seventy-one percent (71%) of the time it was to either adults or seniors.⁶⁰

Table 16: Settings in Which Audiometric Technicians Work

Setting	Number
Public Health	30
Western Institute for the Deaf	2
Otolaryngologist's Offices	76
Industry Outside of Mining	288
Mining Industry	55
TOTAL	451

[Source: personal communication, Roger Floyd, chair, BCATA, 2001⁶⁵]

Other data on sectors served is available from the 1996 BCASLPA and UBC School of Audiology and Speech Sciences survey⁶⁴, and the 2001 BCASLPA survey.⁶⁰ While the BCASLPA survey is estimated to represent less than half of the audiologists in BC, the

data suggest that the number of audiologists in the public sector has declined while the number in private practice has increased over the past 5 years (see Table 15).

Table 17: Distribution of Audiologists by Work Setting, 1996 and 2001

Sector	1996		2001	
Public	29	49.2 %	13	25.5 %
Hospital	2	3.4 %	6	11.8 %
Private	17	28.8 %	22	43.1 %
WCB	7	11.9 %	3	5.9 %
Other	4	6.8 %	7	13.7 %
TOTAL	59	100.0 %	51	100.0 %

[Source: BCASLPA/UBC Survey 1996⁶⁴, and BCASLPA Survey 2001⁶⁰]

The 1996 BCASLPA survey also indicated that not all audiologists provide all services. For example, fifty-five (55%) provide “infant identification services”; forty-eight percent (48%) provide “school screening services”; eighteen percent (18%) provide “long term care facilities services”.

The data from Tables 13-15 together, suggests that the proportion of audiologists working in the public sector has decreased and the proportion in private practice has increased between 1996 and 2001, in this unrepresentative sample.

6.2 Other Data Regarding Demand

The following data is included for documentation, but not for analysis, as it is not known not qualify as meeting the level of methodological rigor required by academic research standards.

Human Resources Development Canada (HRDC)

HRDC cites CASLPA: Current labour market prospects are currently good and will remain good through 2004, on a scale of good, fair, or limited.⁶⁶

Difficult-to-Fill Positions Survey

According to the quarterly Health Human Resources Unit Difficult-to-Fill Positions Surveys, in select acute care facilities, for 1994-1996, an audiology position had not been in existence for at least one month, during which time there was active recruitment without hiring a suitable applicant.⁶⁷⁻⁶⁹

There are limitations with this approach of collecting vacancy information. In addition to surveying acute care facilities only, where few audiologists work, the term “active recruitment” is not defined for the respondents. An employer may cease active recruitment for a position if it cannot fill the vacancy within what it deems a reasonable length of time. Thus the vacancy may remain unfilled, but the position is no longer reported on the DTF form. Alternatively, the employer may choose to re-designate a previously permanent position as temporary, so that the unfilled position is no longer

counted in the DTF survey. Another problem may result from the timing of the survey. Since mailings are done on a quarterly basis, it is possible that positions become vacant early in the quarter and remain DTF for some length of time, but are not reported in the next survey because they have been filled by the time the report is made. The last issue relates to the size of the survey. The survey is limited only to acute care facilities and excludes long-term care facilities and community health networks. Although the restriction helps to boost the response rate to 100%, information from a significant employment sector is not included. Also, in the last two years in which the survey was conducted, the response rate had dropped. Therefore, data from those years should be interpreted with caution.

Healthcare Labour Adjustment Agency Vacancy Lists

According to the Healthcare Labour Adjustment Agency weekly vacancy lists, there were ten job postings for audiologists over the past two years.⁷⁰

Three different HSA postings for full-time audiologists

- One CUPE posting for a 0.73 FTE audiologist
- One HSA posting for a 0.73 FTE audiologist
- One BCGEU posting for a 0.50 FTE audiologist
- Two different CUPE postings for 0.40 FTE audiologists
- One HSA posting for a 0.56 FTE speech-language pathologist/audiologist
- One BCGEU posting for a full-time hearing coordinator/clinician.

There were also three postings for paraprofessionals:

- One CUPE/HEU posting for a 0.67 FTE audiometric technician
- One BCGEU posting for a 0.50 FTE audiometric technician
- One HEU posting for a 0.55 speech and hearing assistant.

[Source: Healthcare Labour Adjustment Agency Vacancy Reports. September 21, 1999 – September 19, 2001⁷⁰]

The number of vacant positions on the HLAA list is significantly higher than that reported in DTF surveys. This discrepancy is expected owing to the limitations of the DTF described in the earlier section. Positions that became vacant but were filled within the quarter were not reported in the DTF surveys, whereas HLAA data were recorded on a weekly basis and we were able to capture all vacancies. HLAA data also include all employing agencies covered by the collective agreement and, therefore, cover more employers than DTF surveys which are limited to acute care facilities. An additional factor is that the qualifying period for positions to appear in HLAA data is shorter than that for DTF data. Positions had to be vacant for at least a month in order to be considered DTF, whereas positions can be registered with HLAA after two weeks, if no internal candidate is found.

7. Telephone Survey/Expert Consultations

The following sections summarize the comments and discussions on various issues from the telephone survey and expert consultations undertaken. These are descriptive summaries of information and/or opinion provided by the respondents. No attempt was made to verify/validate these comments, given the study time limitations. This is a synthesis of the raw responses, not an analysis; therefore, it should not be interpreted as a list of research conclusions. An analysis would imply quantitative validity to this data, which would be erroneous. This data only represents the first step of an exploratory qualitative research study. That is, the survey and consultations merely attempted to identify some key issues for further research.

To protect the anonymity of individual respondents, the responses from the telephone survey and expert consultations are compiled together, and references are not cited.

It is important to reiterate that the small response rate from the telephone survey (6/32 = 19%) decreases the likelihood that the responses are a representative sample. For example, it is common to receive responses from those who are dissatisfied more often than those who are satisfied. Nevertheless, when the telephone survey responses are combined with the 14 expert consultation opinions, major common themes are evident.

7.1 Epidemiology

- Hearing loss is the second most common illness next to hypertension.
- Without intervention, significant “quality of life” issues occur (e.g., the psychosocial implications of isolation).
- Without intervention, there is an increased incidence of other medical conditions (e.g., depression, Alzheimer’s Disease).
- Without intervention, there is an increased incidence of accidents (e.g., medication errors due to misunderstanding medication instructions, car accidents related to not hearing car noises).
- Aboriginal populations have an increased incidence of hearing loss due to anatomical differences (genetic) and mucous producing diets (high dairy).
- Hearing losses run in families and therefore several children in one family with hearing losses are common.

7.2 Regulation

- Regulation is currently provincial, but as decision making has become more regional, regulation will need to be modified accordingly and discussions about it are ongoing.
- The recent Health Professions Council review should have included audiometric technicians.

- Audiometric technicians usually assist otolaryngologists or audiologists; hearing instrument specialists usually work in solo practice. Sometimes audiologists and hearing instrument specialists work together in settings developed by the big hearing aid companies.
- British Columbia Audiometric Technician's Association is part of the Public Health Audiology Council.
- Time spent on The Public Health Audiology Council is included during working hours. There is a conflict of interest, however, with the organizational structure, as it is not at arms length from the employer (i.e., members feel uncomfortable speaking-up too much as their jobs could be in jeopardy).
- Mail order/internet services from the United States are not regulated and many consumers (particularly the elderly) are vulnerable to misrepresentation.
- Consumers want the Hearing Aid Board to be maintained, to watch unregulated practitioners and to monitor the conflict of interest between those who diagnose hearing disorders and dispense hearing aids.
- Many are hopeful about establishing a college for speech-language pathologists (SLPs) and audiologists. But, because SLPs overwhelmingly outnumber audiologists, there is concern that audiology concerns may be minimized.
- A college will not address the issues surrounding the existence of so many associations which are fragmented.
- Membership in several associations is generally prohibitive for audiologists, as fees for membership range from \$50-215 per association.
- There is a range of opinion on the number of members in each association and the importance of each association.
- The time spent working for associations is unpaid and is often aggravating.
- Depending upon volunteer time and good will is unsustainable.

7.3 Basic Training for Audiologists

- There is a huge shortage of spaces for audiology students across Canada.
- National coordination is needed for enrollment, as the 3 English speaking universities are providing training for the other provinces as well as their own.
- We need a Canadian curriculum (e.g., optometry has one French and one English program for all of Canada).

7.4 The UBC School of Audiology

- The curriculum is currently under review.
- The shortage of spaces is compounded by the current enrollment system where students are initially enrolled into a combined SLP/audiology program without declaring their specialty. Therefore, it is not known at the onset how many students will be choosing audiology.
- Audiology students do not need the part of the program designed for both SLPs and audiologists.

- The audiology program is inadequate, as many students have to learn many of the basics on their own.
- We are graduating generalists who become specialists in the workplace.
- UBC Audiology graduates tend to move outside of the province to work.
- The UBC program currently is not structured for innovation. It needs interdisciplinarity.
- The current UBC program contains too much classroom time, partially due to the lack of clinical faculty for practicum experiences.
- Lack of clinical placements is the bottleneck for increasing student enrolment.
- Clinical faculty work in difficult conditions (e.g., no salary or time designated for teaching students; no academic space in hospitals; no benefits like those given to other clinical faculty such as clinical faculty from medicine).
- There hasn't been a permanent director for the School of Audiology and Speech Sciences at UBC for over one year. The search for a director has been unsuccessful to date. Preference appears to be given to candidates with a background in SLP. This has hindered making necessary changes in the Audiology program, and has decreased morale amongst faculty and students.

7.5 Continuing Education for Audiologists

- Continuing education is essential to practice competently.
- Some employers contribute funding towards the costs of continuing education for audiologists (mainly for public sector employers, as their Collective Agreement includes this); some contribute none (mainly private sector employers).
- Most employers provide audiologists time-off for continuing education.
- Most employers do not provide replacement staffing for audiologists who take time-off for continuing education (and therefore patient waiting lists increase when audiologists receive continuing education). Some hospital sector employers have a "casual pool" who can cover audiologists on educational leave.
- Continuing education programs are insufficient in Canada.
- Association conferences are infrequent, and usually outside of BC.
- American continuing education programs, which are available more frequently, are insufficient as the American perspective is different from the Canadian perspective.
- Online programs (from the US) are insufficient, as peer discussions and demonstrations are required.
- Some training is provided by the manufacturers of hearing aids, but it is limited, and reflects a conflict of interest due to their financial gain from the increased sales of hearing aids.
- Audiologists and consumer groups are very concerned about this conflict of interest and depend upon the Board of Hearing Aid Dealers to monitor industry educational programs carefully.
- Audiologists and consumer groups support the WCB policy which recognizes industry's conflict of interest and prohibits those who fit hearing aids from taking its Industrial Screening Protection course.

7.6 Training for Audiometric Technicians

- As training for audiometric technicians is lengthy “on the job” training, public sector employers are concerned about trainees who leave their training early. Some trainees, for example, are able to transfer into a public sector audiometric technician position from an unrelated position without an interview, as per the Health Labour Accord, as long as they have a grade 12 education. Interviews enable potential trainees to better understand their role, before they decide whether to undertake the training commitment. Interviews would also enable employers to assess whether applicants are likely to be competent.

7.7 Supply

7.7.1 Public Health

- There are no public sector services in the North Shore Health Authority. The Vancouver/Richmond Health Authority will no longer see clients from the North Shore. North Shore residents, therefore, are extremely underserved.
- The public health clinics in Vancouver, Richmond, and a few other communities refuse to see adults who are not the frail elderly (i.e., many of them only see children). Adults are referred to private practitioners.
- Most of the public health clinics which serve the frail elderly are unable to care for those who cannot attend the clinic (e.g., those in extended care facilities).
- Some of the public health clinics which serve the frail elderly have mobile vans for attending some of these clients (e.g., those in some extended care facilities), but there are “no where near enough” mobile vans to serve all of the frail elderly.
- Audiology clinics in hospitals generally are not cost-effective for serving out-patients, who are the majority of patients they see. One exception is children who may need sedation for some of the hearing tests. The main reason is the unnecessary use of otolaryngologists for all patients (i.e., most patients do not need to see an otolaryngologist). In addition, the overhead at a hospital setting is far more than that at other locations.
- Most testing equipment is inadequate outside of Vancouver and Victoria. It is antiquated, obsolete, or non-existent.
- New hearing aids require computer programming which requires centres to have up-to-date hardware and software.
- The province may not be able to afford all of the services needed. If that is the case, priority must be given first to early identification of permanent hearing losses (e.g., employ audiometric technicians to screen all newborns), and then to assessments in school-age children with intermittent hearing problems / assessments in the frail elderly (e.g., those in extended care facilities). We probably have enough audiologists currently in the province for these two priorities. If we cannot afford more, leave the generic testing to the private sector.
- There are good models for care in Europe and Australia, which should be consulted. Australia in particular shares a much more similar health care system to ours. Comparisons to US models are not parallel.

- A major restructuring of care is required, based upon national/international standards. The medical model of care for audiology services has been rejected by the World Health Organization. Need functionally oriented teams.
- Need to include consumers and audiologists in policy planning.
- Service delivery needs to be coupled with research.
- Consumers are concerned about the disparity in services between health authorities and between provinces.
- The model used by the Vancouver/Richmond health board is a world class program, but it is restricted by funding (e.g., it is cited in international textbooks and journals; international professors study their model during their sabbatical time).
- The Western Institute for the Deaf is another exemplary model (The Western Institute for The Deaf and Hard of Hearing is a provincial non-profit organization which acts as an information and service resource to deaf and hard of hearing people, and to concerned individuals and agencies. The work is supported by funding from all levels of government - municipal, provincial and federal - as well as from the United Way, private donations and, productive income. Website: www.widhh.com⁷¹).
- The Worker's Compensation Board (WCB) employs eight audiologists at its Richmond office, who see patients from across the province. There are no waitlists. Private practice audiologists in the community do most of the follow-up care with WCB claimants. WCB expects these audiologists to see their clients within a few weeks, or they are replaced by other private practice audiologists who can. The WCB pays for hearing aids and devices. Travel to Richmond for the initial assessment is difficult for those who live out-of-town.

7.7.2 Private Practitioners

- There is no fee schedule for private practitioners. Therefore there is a wide range of fees.
- Many children, adults, and the elderly don't get the care they need because they can't afford the fees of private practitioners, or the fees for hearing aids and accessories (hearing aids cost from \$500-\$2000 and require regular maintenance).
- These costs are particularly onerous on families with more than one member with a hearing loss, which is common.
- Care by private practitioners is sometimes influenced by their sales quotas for hearing aids (a particular concern of consumer groups).
- Some private audiologists need to sell a certain number of hearing aids to "break even".
- Big business is charging far more than the independents, but are able to lure customers through their advertising. Many clients cannot "shop-around" because they are immobile and/or cannot hear over the telephone (particularly the elderly).
- Big business is driving the independents out of business.
- Residents of Cranbrook and Fort St. John's often obtain services in Alberta.

7.7.3 Screening Programs

- Newborn screening programs are not in place, like they are in other provinces.
- Children are not routinely screened in Kindergarten, and therefore it usually is not done, except in some urban areas. Therefore, children lose critical developmental time when they do not hear properly. Subsequently, their hearing loss is not apparent until it has advanced enough to show severe symptoms, such as behavioural problems.
- There usually are no opportunities for older children who have not been screened, to be screened when they move into an area which screens children in Kindergarten.
- There are no screening programs for adults or for the frail elderly.
- A few communities have implemented unique solutions (e.g., at least one audiologist has trained volunteers to screen children; at least one community has organized a multidisciplinary team which screens for various conditions during a “3 month blitz”; one school district has employed an audiologist).
- Screening requires qualified professionals (i.e., those who are not qualified to screen without detailed training include: general practitioners, nurses, “hearing resource teachers”, “itinerant teachers for the hearing impaired”).
- Follow-up is required for screening programs, and often is not available due to staff shortages or geographical limitations (e.g., local locations do not offer follow-up services and/or it is too costly for rural families to travel to locations which do offer follow-up).

7.7.4 Miscellaneous Issues

- Audiologists do not practice on aboriginal reserves.
- Translators are uncommon, for those who do not speak English.
- Translators are available for the deaf, through the Western Institute for the Deaf (non-profit organization).
- There are no special services for the mentally ill/homeless.
- Social Assistance provides some financial assistance to those who are unemployable without a hearing aid.
- The WCB, the Division of Veteran’s Affairs, and Indian Affairs provide some financial assistance.
- Extended health plans provide some financial assistance, but it is limited (e.g., \$400 every four years per family). Also, those most in need are least likely to have an extended health plan (e.g., the elderly generally do not work and therefore do not have extended health plans through their employers).
- The Ministry of Health sells hearing aids at a discount in some areas, but they only offer a small price reduction on “lower end” hearing aids.

7.7.5 Utilization of Other Practitioners

- Reallocation of service providers is the key issue.
- There is little coordination between practitioners/agencies.
- Otolaryngologists, audiologists, hearing instrument specialists, and audiometric technicians all could be better utilized.
- General practitioners/family physicians over-use otolaryngologists. Most are not aware of their referral options.
- Otolaryngologists have waitlists of approximately 3 months.
- Hearing Instrument Specialists are not employed by hospitals and public health, and should be.
- Audiometric technicians could be utilized more for newborn screening, FM system assessments (training teachers and students how to use equipment for classroom use; servicing the equipment on a regular basis), educating other professionals about adjusting and maintaining equipment (e.g., teachers, nurses in extended care facilities).
- The bureaucracy surrounding third party coverage (e.g., WCB, Veteran's Affairs) is a nightmare. For example, third parties could continue to initially assess patients, but then refer more treatment and follow-up care to various private practitioners.

7.8 Demand

- Administrators often do not complete the "Difficult-to-Fill Positions Survey".
- Demand for services has increased with the decreased mortality of premature babies (who often experience hearing losses), with our increased lifespan, and with the "baby boomers" approaching old age.
- Waitlists are common. Many waitlists are restricted to just children.
- Patients complain extensively about the lack of services, about the waitlists for the services which are provided, about the short length of time spent with them when service is provided, and about the lack of follow-up.
- Newly diagnosed patients require extensive follow-up to learn how to live with a hearing loss, particularly children. This service is often only available from support groups, which often are not available in smaller communities.
- Those with hearing losses are unable to complain as well as others (e.g., sometimes they cannot: complain by telephone because they cannot use the telephone, speak-out because they have a speech disorder as well as a hearing loss, go visit their MLA because they are elderly and are immobile).
- The families who have several members with hearing losses are particularly concerned about the lack of services for them.
- As the average life span of a hearing aid is 3 years, and as professional maintenance is required (e.g, adjustments, wax removal), demand for services is frequent and long-term.

- Aboriginals often don't ask for treatment. Sometimes they don't even realize that they have a problem (e.g., many don't realize that ear drainage is abnormal, because it is so common in their community and has been common for generations).
- There is a demand for accessory devices as well as for hearing aids.
- East Indian girls often do not seek treatment because physical imperfections in girls are seen to be a greater liability than in other cultures.
- Many patients are not aware that their hearing problem is compounded by poor equipment maintenance. For example, during random checks of hearing aids on those who had not identified a problem with them, one audiometric technician found that approximately 75% of these hearing aids were not working properly (e.g., dead batteries, broken parts).

8. Discussion

This study has served to highlight the issues surrounding audiologists and audiology services in BC. Given the short time frame (4 months), the scope of the study was limited. Also, numerous gaps in the readily available research were identified in the course of the project, and could not be investigated further. Therefore, conclusions are restricted and emphasize what we know, what we don't know, and what further research is needed.

This section summarizes the deliverables requested, in the order requested, by the BC Ministry of Health Planning for this report.

Nationally and globally, there is an increased demand for audiology services, primarily due to various medical advances which have reduced death but have subsequently increased hearing defects at birth and hearing loss associated with aging, but also because the “baby boomers” are aging. Healthy development and quality of life may be severely impaired when hearing is impaired, and other problems are created.

Audiology services are rendered by a range of providers in BC, including otolaryngologists, audiologists, hearing instrument specialists, and audiometric technicians. Some audiology services appear to be provided by generalists as well, such as general practitioners, nurses, teachers, secretaries, assistants, and volunteers. It is not known which provider is the most suitable for particular roles. For example, it is not known if all providers are qualified to deliver the service they currently deliver. Conversely, it is not known if some providers are overqualified to deliver the particular service they currently deliver (i.e., it is not known if a particular group of providers with less training could deliver more services for less cost).

Other variations exist throughout the province as well, including: the structure of care delivery (e.g., some work in multidisciplinary teams; some work in pairs; some work independently), funding mechanisms (e.g., a particular service can be provided by the public sector in one area, only provided by the private sector in another area, and not be available at all in a third area), and the location of care (e.g., a particular service can be provided in a hospital setting, in a local clinic, in a private office, or in a mobile van).

The scope of practice of audiology was not investigated in this report (e.g., screening/testing, treatment, and follow-up care). It is not known the extent to which the same person does or should provide all services, or more than one of them, for proper care (e.g., the relationship of proper treatment to proper diagnosis).

Conclusions about supply and demand cannot be reached, as considerably more and better data is required than what is currently available. It appears as though the current supply of BC audiologists consists of an older workforce, mainly educated in the US, and unevenly distributed throughout the province. Most audiologists appear to work in the private sector, as the public sector does not provide many of the services which patients require.

An assessment of various international models of care appears to be a useful step for a rational approach to audiology workforce planning. A critical appraisal of these models, combined with accurate data on British Columbia's current audiology workforce is required before an evidence-based, rational plan for British Columbia can be selected and implemented.

One firm conclusion of this study is that there is much we don't know about the supply and deployment of the audiology workforce because data, information, and knowledge are often anecdotal, usually incomplete, and may be misleading. Planning for British Columbia cannot rely upon incomplete snippets of supply and demand data. For example, comparing the "headcount" of audiologists in the United States versus Canada is inappropriate, as this assumes that the number in the United States is the ideal number, and that the same ratio applies to the differently designed Canadian system. This methodology was utilized in the research presented at the Canadian Academy of Audiology conference in Toronto, October 2001, which stated that there is currently a 43% shortage of audiologists across Canada, and that our universities were graduating 57% less audiologists than the desired complement.⁴⁹ Another example of misleading data is reporting the number of patients on non-standardized waitlists. "With rare exceptions, waiting lists in Canada, as in most countries, are non-standardized, capriciously organized, poorly monitored, and (according to most informed observers) in grave need of retooling. As such most of those currently in use are at best misleading sources of data on access to care, and at worst instruments of misinformation, propaganda, and general mischief."⁷² Non-standardized waitlist statistics are included in the BCASLPA 2001 study⁶⁰ which reports that 22/48 (45.8 %) of audiologists have waitlists, with an average wait time of < 1 month (30/37, 81.1 %) but as high as more than 24 months (1/37, 2.7 %). Also, there is no information on what constitutes an appropriate wait period.

The audiology graduates from the only program in British Columbia (UBC) have never been able to fill all of the vacancies in BC for audiologists. This statement is supported by the consistent dominance of US trained audiologists in the British Columbian workforce. The magnitude of this reliance and changes in this trend over time are unknown, as data collection has been severely limited, as discussed above. Nevertheless, it is also not known whether increasing student enrolment at UBC will create a parallel increase the number of audiologists who practice in BC, as some graduates appear to move to elsewhere (e.g., eastern Canada) afterwards. Again, it is also not known whether more audiologists are needed in BC, or whether a different mix of personnel is needed instead.

The recruitment and retention of audiologists appears to be a significant problem in BC, based upon one small survey⁶⁰ and our survey of experts and practitioners. The reasons for this are not known, as the data are so limited. Recruitment and retention research for health care providers is in an early phase of development, and therefore no obvious solutions are evident at this time.²⁰ This has been identified as a national priority.⁷³

Perceived critical issues related to service demand and access to audiologist services, according to the expert consultations and the telephone survey of audiologists (which were invalidated, explorations of a small sample of anonymous opinions only), include:

- The archaic, disorganized system in BC and subsequent need to restructure, using exemplary models of care (the Vancouver/Richmond Health Authority, The Western Institute for the Deaf, European/Australian models), rather than “re-inventing the wheel” or by continuing to use the medical model for hearing loss (which has been rejected by the World Health Organization).
- The volume of British Columbians living with significant, unnecessary hearing losses, who are suffering and increasing costs to the province in the long-term;
- The non-existence of public health services for aboriginal populations;
- The vulnerability of patients, particularly the elderly, when business interests are combined with professional services (e.g., those who test for hearing loss and sell hearing aids are in a conflict of interest);
- The need for improved regulation;
- The over-use of MDs and expensive hospital-based clinics for hearing loss services, and the under-use of audiologists, the paraprofessionals, and regional non-hospital facilities for hearing loss services; and
- The importance of aligning the UBC audiology program with provincially identified audiology workforce needs.

In conclusion, from a public policy perspective regarding a highly trained workforce group, several coordinated policy and planning measures need to be considered in order to:

- 1) better understand the particular workforce tensions;
- 2) establish evidence-based and transparent audiology service objectives for BC population groups;
- 3) develop clear parameters for short-term changes to address imbalances; and
- 4) engage all stakeholders in developing longer-term workforce plans.

It is clear that all population groups in the province do not have similar access to audiology services. However, uniform access cannot be discussed before identifying what constitutes appropriate services that society can afford. That discussion, to a large extent, would then set the framework within which questions of production, deployment, and recruitment/retention would be debated and negotiated. Discussions regarding hearing screening of population groups (newborn, school-age, adult, elderly, etc.) should take place within the wider context of discussions regarding provincial policy on population screening.

There are numerous gaps in basic information which require considerably more research. Three fundamental requirements for a rational approach to audiology workforce planning which are missing are: a mechanism to obtain accurate data, a systematic assessment of various international models of care, and the alignment of the UBC audiology program to meet the needs of the province. This would enable the implementation of an evidence-based plan for British Columbia.

9. Recommendations

1) Knowledge Development

a) As the quality of basic data (e.g., “headcount”, age, education) on audiologists, hearing instrument specialists, and audiometric technicians is too poor to be able to answer many crucial questions, and will likely continue to be poor until a regulatory body is established, it would be important to coordinate the development of regulatory body and professional association databases to provide optimal information on the entire workforce in the near future.

b) Work with the Canadian Institute for Health Information to begin developing national databases in order to better understand the national situation.

2) Service Models

a) Undertake analysis of existing models of care (e.g., assemble a team of audiologists, hearing instrument specialists, audiometric technicians, otolaryngologists, and health workforce researchers) to design, pilot test, and evaluate one or more models of care in different geographical regions of BC, including at least one urban and one rural setting.

3) Education

a) Align the UBC audiology program to meet the needs of the province.

b) Assess the feasibility of nationally coordinated audiology programs in order to establish both appropriate numbers of programs/graduates and curriculum content.

10. Appendix I **QUESTIONS FOR PRACTITIONER TELEPHONE INTERVIEW**

PRACTITIONER NAME: _____ **COMMUNITY:** _____.

We have ordered our questions from very general to more specific.

- | | | |
|---|-----------------|-----|
| | YES | NO |
| 1. a) In your opinion, do you think that there are generally enough audiology services in your community? | [] | [] |
| b) Why? _____ | | |
| 2. In your opinion, what is the level of service like in your community for the following groups. Please respond with: more than adequate, adequate, inadequate, or no opinion. | | |
| | + = - N | |
| a) Infants | [] [] [] [] | |
| b) School age children | [] [] [] [] | |
| c) Special needs clients (pre-mature births, accidents) | [] [] [] [] | |
| d) Adults | [] [] [] [] | |
| e) Elderly | [] [] [] [] | |
| f) Aboriginals | [] [] [] [] | |
| g) Other cultural groups | [] [] [] [] | |
| 3. We wonder how patients in your community get the care they may need | | |
| (open ended) _____ | | |
| a) Do they wait? | [] | [] |
| How long? Amount of time: _____ | | |
| b) Do they go to another community? | [] | [] |
| From where? Names of towns: _____ | | |
| To where? Names of towns: _____ | | |
| c) Do they go untreated? | [] | [] |
| 4. In your opinion, how well are the following services provided in your community. Please respond with: more than adequate, adequate, inadequate, or no opinion. | | |
| | + = - N | |
| a) Screening | [] [] [] [] | |
| b) Testing | [] [] [] [] | |
| c) Diagnosis | [] [] [] [] | |
| d) Treatment | [] [] [] [] | |
| 5. a) Would you like to attend continuing education programs? | [] | [] |
| b) If yes, which ones/where _____ | | |
| c) Does your employer cover the costs of education? | [] | [] |
| d) Does your employer give you time off for it? | [] | [] |
| e) Does your employer provide replacement staffing? | [] | [] |
| 6. That's the end of my questions. Would you like to add any comments? | | |

11. Appendix II

QUESTIONS FOR EMPLOYER TELEPHONE INTERVIEW

EMPLOYER NAME: _____ **COMMUNITY:** _____.

	YES	NO
We have ordered our questions from very general to more specific.		
1. a) In your opinion, do you think that there is a need for more audiologists in your organization?	[]	[]
b) Why? _____		
2. In your opinion, what is the level of service like in your organization for the following groups? Please respond with: more than adequate, adequate, inadequate, or no opinion.		
	+	= - N
a) Infants	[]	[] [] []
b) School age children	[]	[] [] [] []
c) Special needs clients (pre-mature births, accidents)	[]	[] [] [] []
d) Adults	[]	[] [] [] []
e) Elderly	[]	[] [] [] []
f) Aboriginals	[]	[] [] [] []
g) Other cultural groups	[]	[] [] [] []
3. a) Do patients from other communities receive audiology services in your organization?	[]	[]
b) If yes, which communities? Names of towns: _____		
c) Do patients need to wait to receive audiology services in your organization?	[]	[]
d) If yes, how long? Interval of time _____		
4. In your opinion, how well are the following services provided in your organization. Please respond with: more than adequate, adequate, inadequate, or no opinion.		
	+	= - N
a) Screening	[]	[] [] [] []
b) Testing	[]	[] [] [] []
c) Diagnosis	[]	[] [] [] []
d) Treatment	[]	[] [] [] []
5. a) Do you encourage your audiologists to continue their education?	[]	[]
b) If yes, which ones/where _____		
c) Do you cover the costs of education?	[]	[]
d) Do you give employees you time off for it?	[]	[]
e) Do you provide replacement staffing?	[]	[]
6. That's the end of my questions. Would you like to add any comments?		

12. Appendix III

DEFINITION OF STUDENTS WHO ARE DEAF OR HARD OF HEARING

Definition

For educational purposes a student considered to be deaf or hard of hearing is one who has a medically diagnosed hearing loss which results in such a substantial educational difficulty that he/she requires direct services on a regular, frequent and ongoing basis by a qualified teacher of the deaf and hard of hearing.

Students with a diagnosis of central auditory processing dysfunction are not traditionally served by teachers of the deaf and hard of hearing unless there is an additional diagnosis of peripheral hearing loss.

For information pertaining to students who are deafblind, see Section E37: Students with Multiple Disabilities: Those Who are Deafblind.

To be eligible for supplemental funding as a deaf or hard of hearing student the following conditions must be met:

a medical diagnosis of hearing loss has been made;

and

a current Individual Education Plan* must be in place;

and

the student must be receiving special education services that are directly related to the student's hearing loss on a regular, frequent and on-going basis from a qualified teacher of the deaf and hard of hearing. The special education service(s) must be in addition to any services provided under formula funding based on total student enrolment (e.g., learning assistance, counselling). Reduction in class size is not by itself a sufficient service to meet the definition.

* An Individual Education Plan includes: identification/assessment, planning, program support/implementation, evaluation, and reporting.

[Sources: BC Ministry of Education, Special Education Manual, January, 2001

http://www.bced.gov.bc.ca/specialed/ppandg/planning_11.htm

http://www.bced.gov.bc.ca/specialed/ppandg/iep_1.htm⁷⁴]

13. Appendix IV
DALHOUSIE UNIVERSITY
AUDIOLOGY PROGRAM COURSES^{75,76}

Prerequisites

None, but at least one half-year class in each of the following areas are strongly recommended:

- Research methods
- Physical and Biological Sciences
- Psychology
- Linguistics

Year 1

Introduction to Neurosciences for Communication Disorders	HUCD 5290
Fundamentals of Speech Science	HUCD5050
Audition I	HUCD6310
Introduction to Speech-Language Pathology	HUCD5130
Speech and Language Acquisition	HUCD5150
Practicum Preparation	
Phonetics	HUCD5020
Audition II (Short Course)	HUCD5280
Hearing Measurement	HUCD5120
Hearing Disorders	HUCD5260
Research Design	HUCD6980
Practicum Preparation	

Year 2

Pediatric Audiology	HUCD6320
Diagnostic Audiology	HUCD5220
Aural (Re)Habilitation with Children	HUCD5140
Practicum Preparation	
Electrophysiological Audiometric Measures	HUCD6380
Noise in Industry and the Community	HUCD6440
Amplification	HUCD6360
Topics in Audiology Procedures	HUCD6070
Practicum	HUCD5060X
Research Project	HUCD7000X
Practicum Internship	HUCD5060Y

Year 3

Advanced Topics in Clinical Audiology*	HUCD 6620
Advanced Diagnostic Audiology	HUCD 6420
Aural Rehabilitation Adults	HUCD 5240
Research Project	HUCD 7000Y
Practicum	HUCD 7060X
Practicum Internship	HUCD7060Y

*Not required for credit in thesis track – student may audit

14. Appendix V
UNIVERSITY OF BRITISH COLUMBIA
AUDIOLOGY PROGRAM COURSES^{77,78}

Prerequisites

Precalculus	MA 111 or MA 012
Syntax	LING 300
Phonetics	LING 310
Speech Production Mechanisms	LING 316
Introduction to Acoustic Phonetics	LING 317
Language Acquisition	LING 451 & 452 or LING 350
Acquisition of Syntax	LING 452
Phonology	LING 311
Developmental Psychology	PSYC 302, 315
Sensation	PSYC 367
Perception	PSYC 368
Research Methods	PSYC 317
Introduction to Neurolinguistics	AUDI 402
Auditory Mechanisms	AUDI 514

Year 1

Acoustic Phonetics	AUDI 513
Auditory Mechanisms I	AUDI 514
Fundamentals of Audiology	AUDI 518
Developmental Phonetics and Phonology	AUDI 520
Communication Disorders: Assmt & Intervention	AUDI 522
Language Disorders in Children	AUDI 571
Discourse Analysis	AUDI 516
Experimental Phonetics (speech perception)	AUDI 523
Issues in Clinical Practice	AUDI 545
Audiologic Assessment I	AUDI 552
Auditory Mechanisms II	AUDI 554
Aural Rehabilitation: Instrumentation	AUDI 556
Externship	

Year 2

Aural Rehabilitation: Principles and Practice	AUDI 528
Issues in Clinical Practice	AUDI 545
Physiological Measurement of Auditory Function	AUDI 558
Childhood Hearing Disorders	AUDI 562
Advanced Hearing Science	AUDI 564
Externship	
Topical Seminar	

15. Appendix VI
THE UNIVERSITY OF WESTERN ONTARIO
AUDIOLOGY PROGRAM COURSES^{79,80}

Preparatory Year Courses

CSD401a/b	Clinical Principles and Observation
CSD410a/b	Acoustics and Instrumentation Systems for Audiology
CSD411a/b	Introduction to Speech and Language Disorders
CSD412a/b	Introduction to Audiology
CSD417a/b	Hearing Science
CSD423a/b	Clinical Phonetics
CSD426a/b	Language Disorders in Children: Basic Concepts and Methods
CSD435a/b	Basic Principles of Hearing Measurement
CSD439a/b	Normal Language Development
CSD497a/b	Speech Science
Anatomy 225	Systemic Human Anatomy

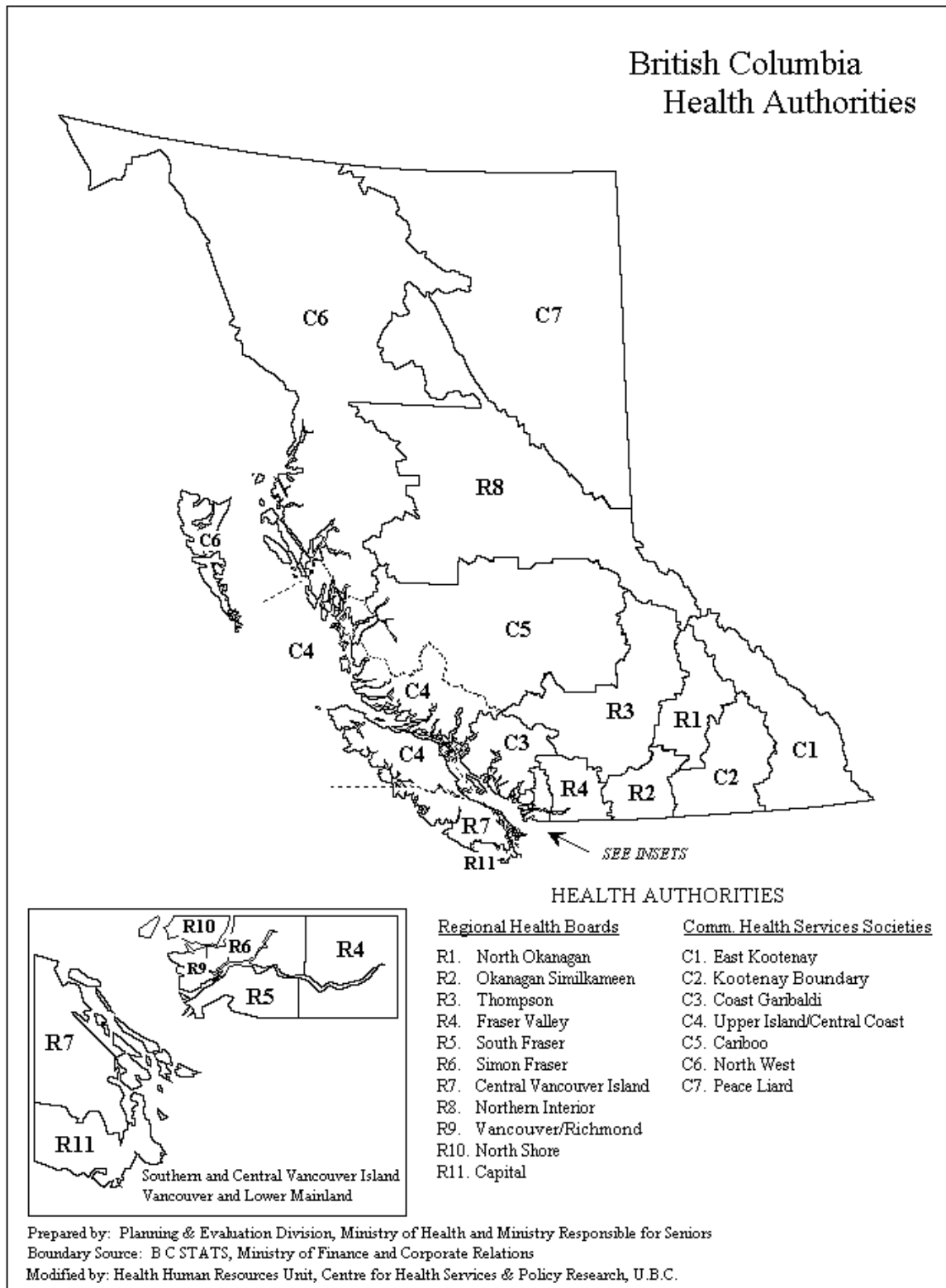
Program Courses (usually 2 years in duration)

CSD500	MCISc Comprehensive Examination
CSD590	MSc Thesis
CSD595	MCISc Thesis
CSD501a/b	Practicum in Audiology I
CSD502a/b	Practicum in Audiology II
CSD503a/b or y	Practicum in Audiology III
CSD505a/b	Advanced Practicum in Audiology I
CSD506a/b	Advanced Practicum in Audiology II
CSD507a/b or y	Advanced Practicum in Audiology III
CSD508a/b or y	Speech-Language Pathology Practicum for Audiology Students
CSD511a/b	Aural Rehabilitation
CSD513a/b	Hearing Measurement I
CSD521a/b	Audiological Assessment of Children
CSD523a/b	Electrophysiology
CSD531a/b	Noise and Audiology
CSD533a/b	Hearing Measurement II
CSD576a/b	Introduction to Amplification for the Hearing-Impaired
CSD577a/b	Advanced Topics in Amplification for the Hearing-Impaired
CSD710a/b or y	Research Methods
CSD750a/b	Counselling in Communicative Disorders
CSD752a/b	Professional Issues and Clinical Management

Other - Students must take a minimum of two of the following seminars or two half course options during their two year program (options will normally be graduate level courses or seminars and must be approved):

CSD732a/b	Special Topics in Hearing, Speech, or Language
CSD734a/b or y	Independent Study in Hearing, Speech or Language
CSD744a/b	Seminar on Aural (Re)habilitation
CSD746a/b	Seminar on Hearing Science
CSD748a/b	Seminar on Diagnostic Audiology

16. Appendix VII **MAP OF HEALTH AUTHORITIES, 1997-2001³³**



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