Outreach to Hard-of-hearing Seniors

Rejoindre les aînés malentendants

by • par

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ABSTRACT

A city-wide hearing health program for seniors is described. Seniors who were unable to access traditional clinic-based programs designed for younger adults were targeted. Three levels of programs provided service to seniors based on their relative independence and mobility. Level 1 services were educational and screening programs for seniors attending community centre programs or living independently in designated seniors' housing. Level 2 services involved educational, screening, diagnostic, and rehabilitative services provided on-site at adult day centres or personal care housing. Level 3 services were provided in-house in continuing care facilities, and involved a full range of hearing services, including planned follow-up. Service delivery methods were described, as well as preliminary findings. Results to date suggest that this combination of programs can be effective in reaching large numbers of hard-of-hearing seniors with relatively restricted resources.

ABRÉGÉ

L'auteur décrit un programme de santé auditive destiné à toutes les personnes âgées d'une ville qui sont incapables de bénéficier des programmes conventionnels offerts par des cliniques mais conçus pour les jeunes adultes. Trois niveaux de services sont offerts aux aînés selon leur degré d'autonomie et de mobilité. Le niveau 1 a un objet éducatif et comprend des programmes de dépistage visant les aînés qui participent aux programmes des centres communautaires ou qui vivent de façon autonome dans des habitations pour personnes âgées. Le niveau 2 comporte des services d'éducation, de dépistage, de diagnostic et de réadaptation fournis dans les centres de jour ou les habitations mêmes. Les services de niveau 3 sont fournis sur place, dans les établissements de soins prolongés, et représentent un large éventail de services auditifs, y compris un suivi. Les modes de prestation des services et les constatations préliminaires sont exposés. Les résultats obtenus jusqu'à présent donnent à penser qu'avec des moyens relativement modestes, cette gamme de programmes peut réussir à rejoindre de très nombreux aînés malentendants.

KEY WORDS

community outreach • audiologic rehabilitation • institutionalised elderly • frail elderly • nursing homes • hard of hearing

The Program

Background

Since 1993, a community partnership has collaborated to develop effective hearing services for senior citizens who are unable to access traditional clinic-based audiology services. The partnership includes the Health Subcommittee of the Seniors' Advisory Committee to the Mayor of the City of Vancouver, the Vancouver Health Department Audiology Centre, the Western Institute for the Deaf and Hard of Hearing, and the University of British Columbia School of Audiology and Speech Sciences. It is worth noting that the idea to initiate a program to address the hearing needs of seniors originated with the Seniors' Advisory Committee, and that it was the seniors who were responsible for creating the partnership involving groups that had not previously collaborated in this fashion[1].

Our society is facing a tremendous increase in the proportion of senior citizens in the population (for reviews see Carson & Pichora-Fuller, 1997; Kricos, 1995; Purves & Orange, 1996). Senior citizens have a much greater prevalence of hearing loss than the young adult population, and this disparity increases with age (Kricos, 1995; Pichora-Fuller & Cheesman, 1997). Hearing health care providers need to plan for the future and to design programs which will serve the particular needs of seniors. Our goals are: (a) increased awareness, coordination, and accessibility of hearing services; (b) identification of the most cost effective and viable services; and, (c) reduction of handicap experienced by hard-of-hearing seniors.

We have tried to recognise the continuum of needs through the aging process. The assumption is that promoting hearing health for seniors when they are younger and healthier will result in better hearing health when these individuals become older, frailer, and less able to begin and fully participate in rehabilitation. Consistent with such a health promotion approach, we also recognise that hearing health achieved by behavioural

changes can also be enhanced through positive environmental and organisational changes.

Environmental changes include modifications to the physical or social environment. Examples of changes in the physical environment include architectural modifications[2] or technical solutions, such as encouraging the installation and use of wide-area listening devices. Examples of social changes would include improving the attitudes and increasing the knowledge of significant others about the hearing-related needs of seniors. In addition, our program is concerned with organisational changes that will foster better hearing health care delivery by minimising obstacles to accessing services. For example, obstacles may be related to knowledge of available services, travel distance to clinic-based services, and referral procedures that are unknown, complicated, or confusing (see also Getty, Gagné, & McDuff, 1996).

A major organisational issue in the development of programs for seniors continues to be the allocation of resources. Given the large numbers of seniors who are hard-of-hearing, there is a potentially overwhelming workload that could be undertaken. In the past, the limited supply of audiologists in Canada would have prohibited the undertaking of this workload. Although the short supply of audiologists may be less of a prohibitive factor today, the prospect of justifying payment for their services in a new sector of service delivery is daunting. We are faced with the quandary of wishing to provide more services to more people but with diminishing resources. Some programs for hard-of-hearing seniors have adopted service delivery models in which all services are provided by a rehabilitative audiologist (Jennings & Head, 1994, 1997; Pichora-Fuller & Robertson, 1994, 1997), whereas others have relied exclusively on consumer manpower (Carson, 1997; Dahl, 1997). We adopted a hybrid approach in which the workload is distributed over different kinds of personnel, including a rehabilitative audiologist, audiometric technicians, other professional team members, and volunteers. For example, by using audiometric technicians for technical support, screening for candidacy for the program, and sharing information we have reached large numbers of seniors who could not possibly have been served by the available audiology staff. Our model maximises the availability of a rehabilitative audiologist when there is clear indication of need for more specialised service.

Another important consideration in estimating the potential magnitude of the caseload and the services to be provided is the crucial need for follow-up for seniors. It has been recognised that there is a need for follow-up even when younger adults are fitted with hearing aids (Alberti, Pichora-Fuller, Corbin, & Riko, 1984; Surr, Schuchman, & Montgomery, 1978), and the need is even greater in the case of seniors (for a review see Holmes, 1995). Factors such as social isolation, financial limitations, memory impairment, and other chronic disabilities cannot be ignored, and can, without planned follow-up, result in complete failure to achieve lasting change. Therefore, workload estimations must allow for intake of new cases as well as regular revisiting of at least a proportion of those who are in the program (see also Pichora-Fuller & Robertson, 1997)[3].

Defining the Population

According to Statistics Canada (Minister of Supply and Services Canada, 1993), 12% of the population of Canada is over the age of 65, and this proportion is expected to increase by 2011 to 14%. Approximately 34% of these individuals are considered disabled, with disability defined as: "any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being", including the stipulation that "an individual who uses a hearing aid and states that he has no limitation when using the hearing aid would not be included in the data base" (Statistics Canada, 1988, p. 1). Given that the population of the City of Vancouver over the age of 65 years is estimated at 67,000 (PEOPLE 21, 1996), the population of interest to us at the present time consists of at least 22,700 individuals and the number will continue to increase in the years to come. Nineteen percent of this population does not participate in activities outside the home and the majority of these individuals can be expected to be institutionalised, with their needs addressed through a full range of services. Within the Vancouver Health Board Continuing Care Program, there are 45 residential care facilities catering primarily to the aged, with a total of 3,350 beds, the majority of which are for intermediate care. In addition, there are 11 public extended care units, with a total of 1,500 beds, funded under the Hospital Act, as well as private hospitals licensed under the Hospital Act (Vancouver Health Board, Continuing Care, 1996). There is also a relatively small number of shut-in seniors who live on their own, perhaps with limited support from family or other caregivers. These seniors are unable to travel to clinics and are otherwise not able to access audiologic services. However, their needs are beyond the scope of the present programs.

Levels of Service

Faced with a huge potential client to available staff ratio, it seems useful to attempt to define groups of seniors who have similar needs. In our case, the division of this heterogeneous population into meaningful groups was based primarily on relative levels of mobility and independence rather than chronological age (for a discussion of the latter approach see Botwinick, 1984; Silverman, 1987). Other researchers have divided the population based on wellness (Piscopo, 1985) or on a combination of wellness and age (Hooyman & Kiyak, 1988), but we felt that the divisions based on levels of mobility and independence

could be more meaningfully related to the types of community services accessed. Following this approach, we divided the population of seniors living in the Vancouver (excluding those who have no problem accessing clinic-based services that are available to younger adults) into three groups according to level of service needed: Level 1, Level 2, and Level 3[4].

The service provided and target population of each service level are: (a) Level 1, service in community centre programs and independent living housing for seniors; (b) Level 2, service in adult day centres and personal care housing designated for seniors; and, (c) Level 3, service in continuing (intermediate, extended, and special) care facilities. Each of the three levels of service will be described in terms of the target group, the focus of the services, the specific roles of the personnel, and particular organisational features.

Level 1: Seniors living independently. Level 1 services are intended for individuals who are living independently in the community without requiring support in activities of daily living, but who have begun to define themselves as "seniors" by attending community centre programs designed for seniors, or by choosing to live in housing designated for seniors. Because of their high level of independence, our efforts focus on education and motivation, so that these seniors may decide of their own volition to access clinic-based hearing services. Seniors with existing hearing aids are made welcome if they request service, since, as many authors have pointed out (Abrahamson, 1995; Herbst, 1986; Franks & Beckman, 1985; Wasson, Gall, McDonald, & Liang, 1990), possession of a hearing aid does not necessarily result in elimination of handicap. Service is provided on-site in quiet rooms at community centres or housing complexes. If no quiet rooms are available, the Vancouver Health Department mobile hearing vans may be used.

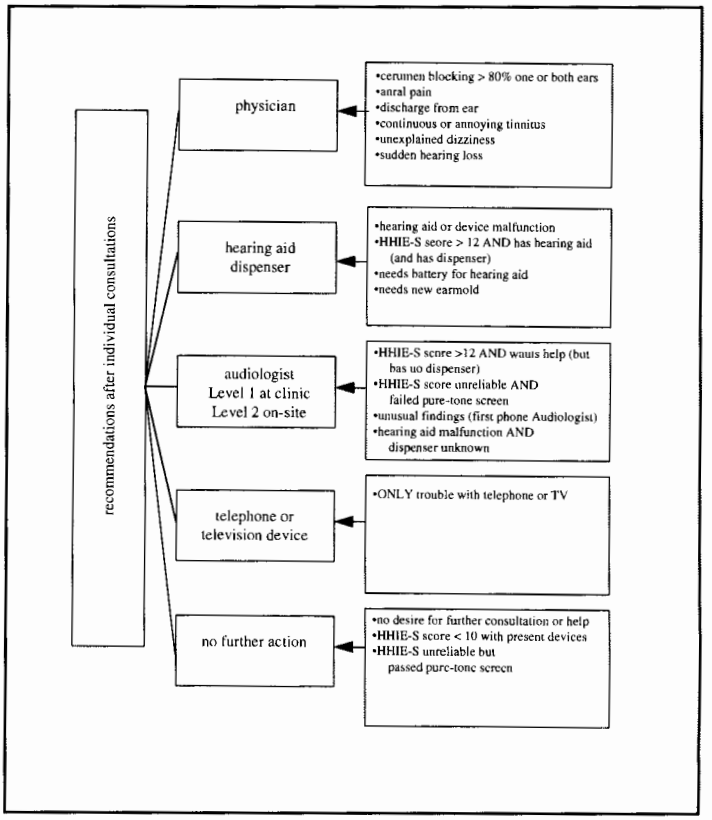
Prior to delivering any services to the seniors, a preliminary visit is made to the site, the program is explained to those in charge (community centre staff or apartment managers), and advertising posters are provided well in advance of the scheduled service events. This preparation is vital. It is important to identify the most effective ways of reaching the seniors at each site, including recruiting appropriate site staff to provide assistance and determining the best locations for group presentations and individual consultations. Advance sign-up for individual consultations is encouraged, although it is also possible for seniors to sign-up for these appointments on the day of service.

On the day of service, audiometric technicians provide education regarding the program and other available services, conduct screening, perform minor hearing aid repairs, and encourage seniors to take advantage of the options presented to them. The educational aspect of the program begins with a group presentation on hearing (an outline is shown in Table 1). Group size for these talks is limited to approximately ten seniors. Assistive listening devices are provided to seniors who need them. The group presentation is followed by individual consultations, which are provided to those seniors who choose to sign up. During the individual consultations with an audiometric technician, seniors have an opportunity to ask questions arising from the material covered in the group presentations and to address their own particular concerns. Various devices and hearing aid styles are displayed and written materials are available on topics such as assistive devices, tinnitus, and communication strategies. Some seniors attend both group and individual sessions, while others attend only one type of session.

Table 1. Outline of a talk on hearing loss given to seniors.

I. Introduction of the Program
II. How We Hear
  – anatomy
  –ear wax
  –hearing loss types
III. Conversational Strategies and Speechreading (lipreading)
  – audibility and visibility of sounds
  –strategies to make yourself heard and to help you hear
IV. Hearing Aids
V. Assistive Devices

Figure 1. Level 1 and Level 2 recommendation guidelines for audiometric technicians.



The screening aspect of the program consists of an otoscopic inspection of the seniors' ear canals for occluding cerumen or unusual appearance, and screening for handicap using the Hearing Handicap Inventory for the Elderly-Screening Version (HHIE-S; Ventry & Weinstein, 1983). In designing the program, it was felt that a questionnaire rather than a pure-tone screening test would more accurately gauge handicap and be more helpful to us in our attempt to identify those seniors who were in need of and willing to take advantage of services. Pure-tone screening is included when it is requested by a senior or when the handicap scale is deemed unreliable (e.g., when a resident does not speak English). A mapping of the decibel levels at which pure tones are heard is not particularly revealing of the individual's ability to function, as pointed out by Lesner and Kricos (1995). Weinstein (1986) investigated the use of the HHIE-S in conjunction with a pure-tone screen at 40 dB HL at 1 kHz and 2 kHz, and concluded that while pure-tone screening has the advantage of objectivity compared to the handicap scale, the handicap scale does not require special equipment or very quiet environments, and is more likely to predict who will accept follow-up diagnostic testing and treatment if it is recommended. Motivation is further screened by us with the question "Do you want to hear better (and would you accept a hearing aid or assistive device if it were recommended)?". The parenthetic addition is included if the HHIE-S score exceeds 12.

The audiometric technician cleans hearing aids and earmoulds or makes simple repairs such as tubing changes with the permission of the senior. If the senior declines the service, and there is evidence that it is necessary, then the senior is referred to a hearing aid dispenser. All recommendations are made according to a rigid set of guidelines (see Figure 1). Recommendations are based on the technicians' observations, discussions with the senior and significant others, and the results of the HHIE-S. Apart from referring the senior to a hearing aid dispenser, depending on the circumstance, they may be referred to a physician or to the Vancouver Health Department Audiology Centre. For example, individuals with HHIE-S scores greater than 12 are referred to either the Vancouver Health Department Audiology Centre or back to a hearing aid dis-

Table 2. A profile of the populations served during the Level 1 and 2 projects.

	Level 1 n = 141	Level 2 n = 122
Age		
mean age (years)	78	83
age range (years)	54 to 101	38 to 98
Male:female ratio	31:110	33:89
Excessive cerumen (at least one ear)	21%	19%
Handicap (HHIE-S score)		
insignificant (less than 10)	62%	43%
mild to moderate (11 to 23)	39%	22%
moderate to severe (24 to 40)	6%	20%
unable to score	0.5%	15%
Coexisting disabilities (client/staff/family report or observation)		
dexterity	10%	23%
vision	21%	35%
cognitive	3%	30%
social/psychiatric	0.7%	11%
Unable to communicate (non-fluent English)	7%	7%
Significant family support with hearing (as reported by senior)	4%	35%
Hearing aids		
hearing aids owned	30 (21%)	38 (31%)
style of hearing aid (in percentage of aids owned)		
in-the-ear/canal	62%	61%
behind the ear	28%	37%
other (bone conduction, eyeglass, body)	10%	1%
binaural	28%	26%
Assistive devices		
television (infrared, amplifier, closed cap.)	4%	3%
telephone amplifier	3%	9%
personal amplifier	1%	1%

Table 3. Services provided during the Levels 1 and 2 projects.

	Level 1	Level 2
Numbers receiving services		
total number served	145	262
attended group presentation	98	262
individual consultations with technician	141	122
on-site audiology consultation	0	58
pure-tone screening test	1	4
hearing aid check	16	50
hearing aid repair (e.g., tube change)	2	8
Devices suggested		
telephone amplifiers	26	8
television devices	14	8
Referrals (after individual or audiology consults)	n = 141	n = 122
physician (e.g., wax, pain, tinnitus)	34%	25%
hearing aid dispenser	28%	10%
on-site audiologist	0%	44%
public health audiology clinic	27%	13%
no immediate action planned	23%	17%

penser. The requirement for requesting the physician to refer to an audiologist was waived since it added an unnecessary extra step when we were attempting to make the process as simple and timely as possible. Even so, some seniors stated that they would prefer to consult first with their physician. If the senior prefers to consult first with a physician or if any medical concerns arise during the interview, then the first referral is for a medical consultation, and then on to the audiologist if indicated. If the answer to the question on motivation is an unequivocal "no", the individual is not referred for follow-up. In some cases, when the concerns of the client encompass only telephone or television listening, the technician provides information about appropriate devices and where to purchase them. The technicians have the option of consulting an audiologist by telephone if required, and all individual consultation records are subsequently checked by an audiologist for accuracy and appropriateness of the recommendations.

Table 2 describes the populations served and Table 3 describes the services provided in our Level 1 and 2 programs. Level 1 service was provided in an eight-week period to approximately 30 sites. Usually, one technician spent approximately five hours at each site, although the number of seniors involved at some facilities required additional time or the simultaneous involvement of more than one technician.

Level 2: Seniors in personal care settings or attending adult day centres. Most aspects of Level 2 program design are very similar to Level 1. The main differences are the types of services accessed by the target population, the addition of on-site audiology consults, and the provision of staff inservices. Level 2 services target seniors who attend adult day centres or live in personal care housing. These seniors experience increasing health problems, they rely more on family and community support, and they have more difficulty travelling to appointments than those targeted by Level 1 services. Seniors attend day centres one or more days a week to receive extra social contact and participate in organised activities. There is a nurse on staff at the day centres. In personal care housing, seniors live in their own apartments with a common dining area, they participate in organised

Table 4. A profile of the Level 3 population (n = 625).

Age	
mean age (years)	88
range (years)	42 to 107
Male:female ratio	131:494
Occluding cerumen in at least one ear	27%
Hearing loss	
PTA (0.5, 1, 2 kHz) > 30 dB HL	71%
PTA (0.5, 1, 2 kHz) > 40 dB HL	48%
Other factors which interfered with rehabilitation efforts	
dexterity	19%
vision	30%
language or speech disorder	4%
cognitive deficit	40%
social/psychiatric disorder	17%
Unable to communicate (non-fluent English)	3%
Family actively involved in rehabilitation	29%

activities, and there are members of the nursing staff available on request.

To maximise the accessibility of the program, usually on the same day as the technician's visit, an audiologist is available for on-site consultations with those individuals who fail the handicap screen. When concerns remain unresolved on the day of the audiologist's consult, she attempts to ensure any further recommendations are concrete, realistic, and simple. For example, appointment times for physicians, dispensers, or the audiology centre are made and given immediately to the senior and significant others. Whenever possible, results are shared immediately with family members or staff.

In order to effect environment change for the target population, the audiologist conducts inservices for staff, and shares with them advice and literature about communication strategies, hearing aid use and care, room acoustics, and wide-area listening systems. Specific recommendations for improvements in room acoustics or purchase of wide-area listening devices are made whenever appropriate.

Level 2 service was provided over a four-week period to 15 facilities. Most commonly, two technicians were present on-site for five hours, with the audiologist joining the technicians for the last three hours of the session. Some facilities required either fewer or more technicians, and for one facility, a Cantonese speaking audiologist joined the team to make a presentation to a group of Cantonese-speaking seniors. Three adult day centres were visited twice because different individuals attended the program on different days of the week.

Level 3: Seniors in continuing care settings. Level 3 service focuses on individuals in continuing care facilities, primarily intermediate care, but including, as the program expands, some extended and special care residents. These seniors, who receive nursing assistance in their activities of daily living, are the least mobile and the most likely of all our population groups to have hearing loss. Table 4 describes the population and demonstrates the high prevalence of hearing loss and of co-existing disabilities and conditions. The hearing services designed for seniors living in continuing care facilities diverge from traditional clinic-based services to a much greater extent than did the services designed for seniors targeted by the Level 1 or 2 programs. The health and living situations of the seniors are quite different from those of younger adults. Furthermore, the needs and attitudes of significant others and caregivers must be addressed at the same time as those of the seniors themselves. Programming must be more comprehensive in order to fit into the complicated ecology of care facilities and services are provided more continuously. Every effort is made to minimise the amount of travel required of seniors. In particular, we have found it most effective to provide service in the seniors' rooms or living spaces at the facilities.

The communication needs of the frail elderly differ from those of their more healthy counterparts. Visits to live theatre or dinners out at restaurants may be things of the past, but sharing a joke with a friend, a game of bingo, or enjoying a favourite television show become precious moments of enjoyment. The restricted variety of social opportunities available changes hearing needs and may even reduce perceived or admitted handicap; however, the consequences of a senior's inability to participate in remaining social opportunities are still extremely significant, both to the senior and caregivers. As Schultz and Mowry (1995) point out, hearing loss among continuing care residents can be confused with dementia, and thus provision of audiological services assists caregivers in providing appropriate care as well as benefiting the resident.

A rehabilitative audiologist and an audiometric technician (termed for this project an outreach worker) work together with a larger team to provide the in-house Level 3 service. The rehabilitative audiologist provides initial contact with facilities, direct service to seniors at the facilities including individual diagnostic and rehabilitative assessments, hearing aid and assistive device fittings and orientation, consultations regarding room acoustics and wide-area listening devices, group rehabilitation sessions, and other education such as provision of literature tailored to the program and the concerns of the facility. The outreach worker provides initial visits to identify residents in need of service, routine checks for excessive cerumen, routine follow-up visits to hearing aid or amplifier users, and cleaning and minor repairs to devices. She maintains a hearing aid database listing all hearing aids in the facility by owner and serial number, and prepares and updates hearing aid profile sheets which are placed on each hearing aid owner's chart. In addition, she oversees the activities of volunteers and provides staff inservices.

The larger team consists of a steering committee and other service providers. The steering committee consists of seniors as well as representatives from the Western Institute for the Deaf, the University of British Columbia School of Audiology and Speech Sciences, and the Vancouver Health Department Audiology Centre. The steering committee engages in program planning, fund raising, and program evaluation. Many other service providers are also part of the larger team. Device sales and repairs are provided by community dispensing audiologists. Many seniors have also used the Western Institute for the Deaf and Hard of Hearing Loaner Hearing Aid Program. One or more contact people are identified on the facility staff to provide a liaison between facility, project staff, family, and residents. Contact people are provided with extra training regarding hearing aid trouble shooting, so that they may also act as an on-site resource. Other facility staff provide daily assistance with devices and communication, assistance with identification of

hard-of-hearing residents, advice regarding the social needs and financial arrangements of residents, and assistance with cerumen management. Biweekly volunteer visitors provide additional social contact and routine hearing aid and device checks for hearing aid and assistive device users. Physicians provide medical support and cerumen management. Family members and friends provide assistance in identifying hard-of-hearing residents, assistance with acquiring and maintaining devices, assistance with financial arrangements, and social support. The residents themselves are important team members; they provide information sharing and social support to other residents.

At the beginning of the program in 1993, a questionnaire regarding existing hearing services and the perceived need for such service was sent to all care facilities in the city. Overall, most facilities did not offer an existing hearing health care program although they recognised the need for these services and were eager to have them initiated. Based on the responses to this questionnaire, as well as further communication with the facilities, priorities were established such that the facilities with the greatest need and, therefore, where the most impact was likely to be achieved, were designated to receive services first. Furthermore, before services were provided, each facility was required to identify a liaison person and make specific commitments regarding the provision of space and staff cooperation.

We have found that there are two distinct phases in implementing a Level 3 program. During the initial phase, the outreach worker is primarily involved in staff inservices, identifying the individuals in need of a visit from the audiologist, making referrals for cerumen management, and creating the hearing aid database. At the same time, the audiologist is primarily involved in promoting the program with administrators, providing wide-area and room acoustic consultations, providing individual diagnostic and rehabilitation assessments, and recruiting and organising volunteers. The continuing maintenance phase of the program begins when all residents have been seen, their needs addressed, and volunteers and recheck schedules established. In this phase, the outreach worker, facility staff, volunteers, and families take over the daily running of the program and the audiologist is consulted only when there is a change in a resident's status or when a new resident is admitted. (We have observed an annual turn-over rate of about 14% among the residents in most intermediate care facilities). Awareness and enthusiasm about the program among staff, family, and residents are essential for long-term success. Hearing aid databases, individual hearing aid user profile sheets, articles for facility newsletters and other literature, the ongoing presence of volunteers, and regular follow-up visits and presentations to staff, families, and residents promote a sense of continuity for all team members.

Table 5. Hearing technology owned and used by Level 3 seniors before and after completion of initial service provision (n = 625).

	Preservice	Post initial service
Hearing aid owned	19%	27%
Hearing aid used	13%	24%
Hearing aid non-functional	5%	1%
Personal amplifier owned	2%	9%
Phone amplifier used	2%	3%
TV amplifier used	9%	10%

Table 6. Description of hearing function of Level 3 seniors before service and after completion of initial service (n = 551).

	Preservice	Post initial service
Hears well one-to-one	69%	80%
Uses telephone	61%	65%
Uses TV	63%	66%

Table 7. Changes in status of seniors one year following provision of Level 3 program.

No longer in program (n = 164)	
deceased	6.5%
moved away	7.3%
Changes in hearing (n = 164)	
hearing changed	1%
impacted cerumen	4%
Changes in hearing aids (n = 52)	
lost	2%
broken	6%
abandoned	11%

Current staffing provides for 25 hours per week of Outreach Worker time and 10 hours per week of Public Health Audiology time for service provision. Approximately 850 residents in nine facilities are now in the maintenance phase with 190 users of hearing devices receiving ongoing scheduled follow-up visits. An additional 332 residents in two more facilities are in the initial phase of the Level 3 program. Although these facilities provide primarily intermediate care, some extended care and special care residents have also received service. Ongoing service is provided to all residents, but scheduled follow-up and volunteer visits are made only to users of hearing aids or personal amplifiers, who comprise approximately a quarter of the population.

Tables 5 and 6 describe the rehabilitative status of a subset of residents before we began the program and after the initial phase of service was completed. We were able to effect an increase in the numbers of hearing devices owned and used, as well as an increase in the number of residents reporting that they hear adequately in various listening situations. Table 7 describes hearing aid use for the portion of the population who have completed a one year follow-up visit. For this subset, hearing device use remains better than before our intervention, although there has

been significant attrition due to resident deaths or relocation, and, despite our efforts at follow-up, some residents have lost or abandoned their hearing aids. These findings suggest that benefit has been realised by at least a subset of the seniors. We also strive to change the environment for hearing-impaired individuals by educating caregivers and significant others; however, benefits from these efforts are more difficult to quantify. Our success in promoting wide-area listening devices has been limited to the acquisition of one system, the reinstatement of another, and planning for a third. Progress in this area is seriously hampered by financial constraints, as well as continuing challenges in convincing administrators that such systems are needed and can benefit seniors.

Discussion

In total, about 1300 seniors in our community have been served by these programs. On occasion, individuals as young as 38 years of age who have physical, psychiatric, or cognitive disabilities have been included because they also have trouble accessing clinic-based audiologic services. The vast majority of individuals targeted by the program would fall into Hooyman and Kiyak's (1988) categories of "frail" (ages 75 to 85), or "fragile" (older than 85 years), with the mean age of those accessing the services being lowest for Level 1 and highest for Level 3 (see Tables 2 and 4).

There are still segments of the population which remain essentially unserved, such as shut-in seniors who live at home and never travel to appointments or community services, and seniors in hospital long-term care facilities. Obviously, much remains to be done. The process of refining programs and searching for the most efficient and effective methods of achieving our stated goals continues. Of course, ensuring continuing funding is always an issue in this changing world of health care. For each of the levels of programming, a number of observations have arisen from our experience to date.

Level 1. Turnouts were lower than expected for the Level 1 program during our summer project. Turnouts were higher in previous years when the Vancouver Health Department provided pure-tone screening for seniors using mobile hearing vans. The lower turnouts may have been in response to modifications in service delivery. Specifically, lower turnouts may be due to the absence of the mobile hearing vans, which are a novelty that may have attracted many seniors in the past. Another possibility is that there was less promotion of the program by community centre staff or apartment managers, especially those who had been looking forward to the van-based service. Community centre staff were, in general, quite unhappy that we were not routinely offering pure-tone screening. In contrast, although some seniors expressed initial surprise that there was no "hearing test", after completion of the interview, most seemed satisfied with the results of the HHIE-S and the information given. Obviously, prevailing attitudes among other team members, including the seniors themselves, regarding appropriate outreach methods do not always match those of the audiologists, and this must be considered and addressed when designing and introducing new programs. We have also found that the Level 1 participants were more likely to attend individual sessions than group presentations. Note that the seniors targeted for Level 1 services tend to have less handicap and to own fewer hearing aids than those attending Level 2 services. The efficacy of Level 1 services are presently under review. Further investigation of the rates of compliance with recommendations, an examination of the relative importance of factors affecting participation or motivation (e.g., novelty of the mobile hearing vans), and an evaluation of the usefulness of screening methods (pure-tone screening, handicap questionnaires, or both) is required.

Level 2. In general, seniors participating in the Level 2 program were more severely handicapped and were more likely to own hearing aids than those participating in Level 1. Staff, families, and seniors were very appreciative of our efforts. Having an audiologist on site helped to resolve many questions and problems, which could be addressed immediately with a concrete action plan. This population needs continuing follow-up; the social and health factors affecting the needs of these individuals will change over time. Consequently, there is a need for additional assistance in maintaining and using devices and strategies efficiently. Funding permitting, we hope to continue this program in its present format.

Level 3. For the institutionalised population receiving the Level 3 program, expectations for success must be tempered by a realistic view of the multitude of factors, other than hearing loss, which affect the lives of the residents. Even so, we have effected an important and lasting improvement in the communication abilities of the population (see Tables 5, 6, and 7). We have found that, in this population, those requiring one-to-one intervention tend to be those with pure-tone averages (PTA at 0.5, 1, 2 kHz) exceeding 40 dBHL, probably because they are often unable to adequately hear speech even with a single conversational partner. Provision of wide-area listening devices, staff and family education, and consultations regarding room acoustics can benefit both this group and those with lesser degrees of hearing loss who have trouble hearing in groups. This means that 71% of the population can potentially benefit immediately, whereas the remainder of the population may benefit in the future, or indirectly due to improvements in the communication ability of their peers.

Measurement of handicap has presented an ongoing challenge for seniors receiving the Level 3 program. The validity of handicap questionnaires, even with wording modifications (Sorin-Peters, Tse, & Kapelus, 1989), is jeopardised when they are used

with cognitively impaired individuals, and the reports of handicap by caregivers and significant others do not always correlate with the individual's own perceptions (Chmiel & Jerger, 1994; Corbin, Reed, Nobbs, Eastwood, & Eastwood, 1984). Even using modified wording, we have found the HHIE-S to be useful with only a few residents. We prefer to use simple yes/no questions (such as "Can you hear people one-to-one?", or "Can you hear people talking on the telephone?") that seem to work well for the majority of individuals. For the most severely cognitively impaired individuals or those with whom we have no common language, attempting to establish speech awareness thresholds or to obtain a reasonably objective idea of most comfortable listening level are sometimes all we can do to supplement our observations.

A team approach, in which everyone involved in the lives of the residents becomes aware of and involved in the program, has proved to be the most effective in ensuring our success in continuing care facilities. Even with the assistance of the rest of the team, the demands on the outreach worker and the audiologist are heavy in relation to the number of seniors served. Creativity, flexibility, and a sense of humour are essential.

Concluding Thoughts

This city-wide program is designed to effectively meet the needs of a population within constrained resources. We believe that audiologists need to reach out into the community to better serve elderly clients. We are faced with enormous and growing numbers of hard-of-hearing seniors compared to the number of available and funded audiologists. Programs which employ properly trained and supervised audiometric technicians to identify the most severely handicapped and motivated clients, to raise awareness of hearing loss and hearing services, and to provide information and routine technical support to consumers, can maximise our effectiveness. Finally, in order to increase consumer support, elderly consumers should help with the implementation of the program. In the future, we hope to recruit many volunteers who are hard-of-hearing seniors.

Endnotes

1. The Seniors' Advisory Committee to the Mayor has also taken initiatives regarding other programs such as oral hygiene programs in the care facilities. At the moment, program development and evaluation research concerning other parallel programs is being conducted by the teams who have taken responsibility for them. Although these initiatives began following more traditional discipline-specific health models, new inter-disciplinary conncetions are now emerging.

2. At the meeting of the Canadian Acoustical Association in October 1996, an inter-disciplinary interest group was created to develop guidelines for room design that would favour speech intelligibility.

3. The budget for this project has been secured through a grant of $35,000 per year for the period from 1993 to 1997; the bulk of the budget covers the salary of the technician, with few resources remaining for audiology consultation and support. Additional administratiove and overhead expenses and capital costs are not covered by the grant. These expenses and additional professional support have been contributed by existing community agencies who participate as partners in the project. With approximately 400 seniors in Level 3 care seen per year, this corresponds to a grant-born cost of approximately $75 per person.

4. Chronologically, the Level 3 program began in 1993 as the Community Outreach for Hard-of-Hearing Seniors project; this project is funded for intermediate care residents. A limited number of extended and special care residents have also been served. A version of the Level 1 program has been provided by the Vancouver Health Department Audiology Centre since 1987; in the project conducted in Summer 1996, the Level 1 program was revised and a Level 2 program was added.

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