

Health Promotion and Audiology: The Community-Clinic Link

Arlene J. Carson and M. Kathleen Pichora-Fuller
*School of Audiology and Speech Sciences
University of British Columbia*

In this paper we describe a model of health promotion planning, the PRECEDE-PROCEED model (L.W. Green & M.W. Kreuter, 1991), which may be applied by audiologists. Within the context of a specific population, a community of seniors living in a care facility, the concepts and components of the model are applied toward the health goal of improving hearing-related communication performance. The PRECEDE-PROCEED model, in its systematic step-by-step approach, stresses the importance of planning; highlights how clear, realistic, objective-setting is key to meaningful evaluation; and emphasizes the active involvement of community members in all phases of program planning, implementation, and evaluation. It is concluded that this health promotion model holds promise as a framework within which the concepts and practices that are presently evolving in audiology may be organized.

Audiology and health promotion are two fields whose paths have seldom crossed. At a personal level, members of each discipline have some awareness of the other field, but interdisciplinary dialogues have seldom occurred. Since its inception, audiology has been concerned with applied science in clinical practice. In contrast, health promotion existed for most of this century as philosophy rather than practice. In the last two decades, however, health promotion has increasingly shaped changes in health care practices. Interest in health promotion has been sparked for many health care practitioners by public sector efforts to encourage more healthful lifestyles through community education and legislation (e.g., to restrict smoking in public places), shrinking health care dollars, and growing de-

Address: 5804 Fairview Avenue, Vancouver, British Columbia, Canada V6T 1Z3. E-mail: arlene@audiospeech.ubc.ca or kpf@audiospeech.ubc.ca. Fax: 604-822-6569. Phone: 604-822-4716. Key words: health promotion, audiologic rehabilitation, institutionalized elderly, program planning, program evaluation.

mands for accountability. Thus, health promotion is now seen as a practical, effective, and potentially cost-curtailling approach to tackling many health issues. Parallel trends in hearing health care have emerged. The plenary session on audiology and public health held at the 1994 International Congress of Audiology in Halifax was an event that marked the emergence of a global recognition that public health issues have become priorities for audiologists. Partly in recognition of the unmet needs of many individuals who are hard-of-hearing, some audiologists have espoused the need for rehabilitative practice to become more "ecological" by being client-centered and contextualized with respect to the individual's life experiences and situations (e.g., Erber, 1988; Gagné, Héту, Getty, & McDuff, 1995; Jennings & Head, 1994; Lesner & Kricos, 1995; Noble, 1983; Noble & Héту, 1994; Pichora-Fuller, 1992; Stephens & Héту, 1991). Partly driven by economic pressures, others have started to question and re-evaluate their roles in the arena of hearing health care (e.g., Coyte, 1992; Hyde & Riko, 1994). Most recently, some have stressed the need for rehabilitation to be recast in terms of hearing accessibility issues; they have sought new alliances with professionals in other disciplines who may contribute to a more community-minded approach to the problems of people who are hard-of-hearing (e.g., Pichora-Fuller, 1994, in press). As a step in establishing an interdisciplinary link between audiology and health promotion, we describe an example of how one widely accepted model of health promotion planning could be applied to a selected program for seniors who are hard-of-hearing.

The PRECEDE-PROCEED model of health promotion planning (Green & Kreuter, 1991) will be described. PRECEDE stands for "Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation," and represents the diagnostic or planning portion of the model.¹ PROCEED is "Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development"; these are the implementation and evaluation portions of the model which emphasize multi-level administrative and environmental aspects of health programs. This model reflects the culmination of the experience of its authors and many other contributors' experience in public and private practice, research, and consultation. It also reflects theories from psychology and education, among other disciplines. It emphasizes the importance of education combined with environmental changes in health promotion, focuses on activities at the community level, and stresses the need for active participation of members of the tar-

¹The term *diagnosis* as used by Green and Kreuter (1991) is defined as "health or behavioral information that designates the 'problem' or 'need.'" (p. 430) To avoid confusion with the usual medical meaning audiologists attach to this term, we have taken the liberty of replacing the term *diagnosis* with the term *analysis* throughout this paper. Green encourages clinical practitioners to adapt the model to their situations. The substitution of terms is in keeping with this outlook. In fact, the original choice of the term *diagnosis* was largely based on its familiarity to the physicians to whom the model was being proposed in its earliest presentations.

get community whereby they assess their own needs, and take part in evaluating their own progress and programs. The model stresses the crucial contribution to planning and evaluation of each of its stages, and highlights as well the importance of ongoing evaluation to fine-tune implementation strategies.

Although there have been over 500 published applications of the PRECEDE-PROCEED model to health-related situations, we found no published applications to hearing health care issues.² As we shall see, however, the quality-of-life concerns arising from hearing loss are well-suited to study using this model, especially considering the model's emphasis on community. This model also has appeal in that it provides a way of organizing evolving concepts and practices in audiologic rehabilitation. The purpose of this paper is to describe the components of the PRECEDE-PROCEED model by applying the model to program planning for a community of senior residents of a long-term care facility. Working step-by-step through the model for a specific application may provide readers with a more concrete understanding of the model. This exercise may also encourage the adoption of a more ecologically grounded style of practice by audiologists.

HEALTH, HEALTH PROMOTION, AND HEARING

How do the concepts of health promotion and health relate to hearing? Many people equate health promotion with educational programs whose focus is the *prevention* of disease. Thus, if asked how a health promotion approach could be employed, an audiologist's first response might focus on the education and training of youth and workers to prevent noise-induced hearing loss. Such programs, of course, are not new, and have achieved some success in reducing the long-term health impact of hazardous noise.

But health is more than the absence of disease and health promotion is more than a series of educational measures to prevent poor health. A simple definition of health promotion is "the combination of educational and environmental supports for actions and conditions of living conducive to health" (Green & Kreuter, 1991, p. 4). The purpose of health promotion is to enable people, either individually or within communities, to gain greater control over the determinants of their own health (Ottawa Charter for Health Promotion, 1986). Health itself is defined by the World Health Organization (1980) as the ability to adapt to or cope with challenges or changes in circumstance. Such a definition sees health not as an end in itself, but as a resource for everyday life, and as a means toward achieving other goals in life which may include, for example, extended longevity or im-

²We have come across one or two publications which apply other, less comprehensive, health promotion models to the subject of hearing conservation (e.g., Lusk, Ronis, Kerr, & Atwood, 1994). There is one very recent publication of an application of the PRECEDE-PROCEED model to hearing accessibility programs employing assistive listening devices for the elderly; see Pichora-Fuller (in press).

proved quality of life.

Health promotion, and the PRECEDE-PROCEED model in particular, tackles health issues at the community or institutional level, rather than working primarily with individuals in isolation. Health promotion also uses an educational rather than a prescriptive approach to work toward long-lasting changes in behavior. This emphasis on education and community participation is in marked contrast to the traditional medical model of intervention characterized by the hierarchical clinician-patient relationship.

OVERVIEW OF THE PRECEDE-PROCEED MODEL

The PRECEDE-PROCEED model distinguishes itself by avoiding the “top-down” planning endemic to many health care programs. Instead, it hinges on a sense of collaboration whereby the target community is significantly and continuously involved in program planning. In addition, program planning directs its

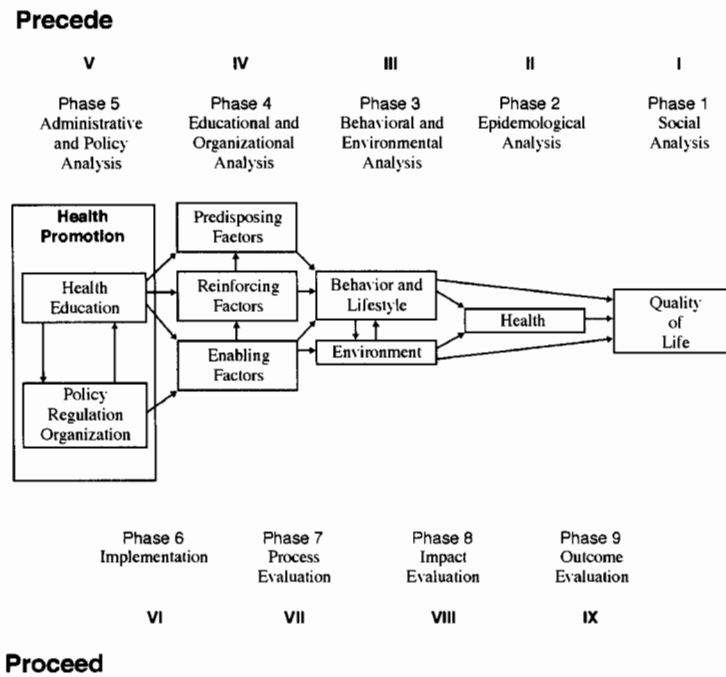


Figure 1. Overview of the PRECEDE-PROCEED model of health promotion planning. From Figure 1.4 in *Health Promotion Planning: An Educational and Environmental Approach* (2nd ed.) by L.W. Green and M.W. Kreuter, 1991, Mountain View, CA: Mayfield. Copyright 1991 by Mayfield Publishing. Adapted with permission.

initial attention to *outcomes* rather than *inputs*. Stated another way, the factors important for an outcome must be assessed *before* interventions are designed.

Figure 1 provides a schematic representation of the model. In Phase 1, the social analysis, the reciprocal relationship between health and social issues is considered. The planner identifies a target population's social priorities which, in turn, reflect that population's quality-of-life priorities. The task of the planner in Phase 2, the epidemiological analysis, is to identify the specific health goals or problems that may contribute to the social goals or concerns identified in Phase 1. Objective indicators such as demographic patterns of health problems are used to ascertain how specific health problems relate to the subjectively appraised quality-of-life issues.

Often, a specific health problem has already been identified as a priority by the target population, health professionals, or administrators. In such cases, program planning begins with Phase 2 but must work back to Phase 1. By moving from Phase 2 back to Phase 1, an "expansionist" approach is adopted by looking at how the specific health problems of hearing loss are related to the larger health and social context.

In Phase 3 of the model, the behavioral and environmental analysis, specific behaviors and environmental factors linked to the health problems under study are identified and ranked in terms of relative importance and the degree to which they are changeable, so that clear behavioral and environmental objectives may be set. In Phase 4, the educational and organizational analysis, the planner evaluates the relationship between those factors that determine the behavioral and environmental objectives set in Phase 3. These may be grouped into three broad categories: predisposing, enabling, and reinforcing factors that influence behavior or environment (described in more detail below). These factors may be altered by educational and organizational strategies employed in the program. Phases 3 and 4 result in the formulation of clear behavioral and environmental objectives for the program, and the educational and organizational strategies to be employed to achieve those objectives.

Phase 5, the administrative and policy analysis, marks the transition from the planning stages of the model to the *action* stages. Phase 5 entails appraising available and required resources and setting out a timetable and budget for the specific objectives to be achieved. Phases 6 through 9 are the PROCEED components of the model, encompassing implementation and evaluation of the program in terms of process, impact, and outcomes. This paper will concentrate on Phases 1 through 4 of the PRECEDE portion of the model, in which concepts most significant to issues around hearing loss, disability, and handicap are discussed. Although the importance of these concepts has received considerable attention from the evaluator's viewpoint (for a discussion see Gagné et al., 1995), we wish to emphasize the need to consider these concepts from the planner's viewpoint.

THE TARGET POPULATION

The population of interest to us is comprised of seniors who are hard-of-hearing and who are residents of one publically funded intermediate care facility in the downtown core of Vancouver, a major Canadian city. There are 154 residents, ranging in age from 55 to 103 years, who reside at our target facility, Porter Home.³ Seniors in intermediate care are ambulatory with walker or wheelchair, are able to self-feed and dress with assistance, and have 24-hr nursing care available.

Like some other audiologists, in many years of clinical experience, we have been struck by the vast unmet need for services to institutionalized seniors who are hard-of-hearing. The situation has been well documented in the literature (for a review see Kennie, 1993): there is a lack of adequate hearing assessment of seniors in facilities (e.g., Bebout, 1991); there is a lack of training of health care staff about hearing loss, hearing aids, and assistive listening devices (ALDs) (e.g., Johnson, Stein, Lyons, & Lass, 1995); and there is a pervasive attitude among residents and caregivers alike that "nothing can be done" for hearing loss due to aging (e.g., McCarthy & Sapp, 1993).

The residents of Porter Home are more fortunate than those living in many other facilities. A preliminary foundation of hearing services was established there in 1993. The initiative for this program originated with the Seniors' Advisory Committee to City Hall, who organized a community partnership that included seniors who are hard-of-hearing, representatives of the care facilities, representatives of community health-providing agencies, health care professionals, and researchers. The partnership proposed a plan and obtained operating funds from the Ministry of Health to begin work in one or two facilities, with the expectation that the project would eventually expand to all care facilities in the city. On-site services are currently provided by two part-time staff – a technician and an audiologist – contracted from the city health department. In applying the PRECEDE-PROCEED model to this setting, we aim to demonstrate the usefulness of employing the conceptual framework of the model as we consider how to expand upon the existing services in planning, implementing, and evaluating a more comprehensive program at Porter Home.

THE BIG PICTURE: EPIDEMIOLOGICAL ANALYSIS

As explained above, because hearing loss has been chosen from the outset as the focus of this work, an expansionist approach has been taken by relating hear-

³"Porter Home" is a pseudonym for an actual facility. The description of the seniors, the facility, and the city-wide hearing outreach program that has been implemented are actual (Hoek et al., 1996); the application of the PRECEDE-PROCEED model in this setting at this point in time is hypothetical.

ing loss back to the larger health and social context. Such an approach, whereby Phase 2 of the model is considered before Phase 1, is typical of what health specialists (including audiologists) who deal with specific health issues would encounter in applying the model. The epidemiological analysis, Phase 2 of the model, explores pertinent population data related to the target community and chosen health issue. Gathering relevant demographic data serves at least three purposes: (a) to determine if the claim that hearing loss is a priority health issue at Porter Home is consistent with statistics from the larger population, (b) to assist the planner in assessing which specific behavioral and environmental factors contribute to the occurrence of this health problem, and (c) to provide direction in program planning during subsequent phases of the model.

Objective indicators of health problems are factors such as the incidence (the number of new cases per year) and prevalence (the total number of cases at a given point in time) of a condition and associated risk factors. Risk factors are behavioral, environmental, genetic, or biological agents that increase the probability of developing a health problem. To substantiate our choice of project to funding agencies, for example, we may wish to educate them to the fact that hearing loss is the third most prevalent chronic disability among older adults, superseded only by arthritis and hypertension (for a review, see Binnie, 1994; Haber, 1994). We may note the fact that both the incidence and prevalence of hearing loss increase with age, that hearing loss starts as early as the third or fourth decade of life, and that between 25% and 48% of seniors aged 75 to 79 years have some degree of audiometrically measured hearing loss (for a review see Willott, 1991).

The demography of aging further underscores the importance of the data concerning hearing loss and aging. Seniors are the fastest growing segment of society, as the "baby-boom" generation progresses from middle age to its senior years. By 2025, it is anticipated that there will be 822 million people in the world aged 65 and over, a number that exceeds the present combined populations of Europe and North America (United Nations, 1993). Global data should be related to local data. In our example, it is relevant that in Canada, 10.6% of the 1991 population was 65 years and older; this proportion is expected to rise to 14.5% by 2011 and 21.8% by 2031 (Statistics Canada, 1992a). If roughly 8% of this group are institutionalized in long-term care facilities (Schwenger & Gross, 1980), then it can be estimated that about 250,000 seniors in Canada were in residential care in 1991. These *old* old (contrasted with the *young* old who live relatively independently in the community) will live longer through expanding technological intervention, and issues regarding their quality of life will be increasingly at the forefront of health care program planning (Martin & Preston, 1994).

An estimate of the prevalence of hearing loss among the institutionalized population in Canada is 50% (Health and Welfare Canada, 1988; Statistics Canada, 1992b); sources from the U.S. put the figure as high as 90% (Hull & Griffin,

1989; Schow & Nerbonne, 1980). Conservatively, we estimate that there are about 125,000 Canadians with hearing loss in residential care. Looking even more locally, statistics for the community at Porter Home are found to be consistent with national and global data: 71% of residents were determined to have hearing thresholds in their better ear greater than 30 dB HL (Hoek, Paccioretti, & Lee, 1996).

Although there are many risk factors associated with hearing loss, one must take into account not only their prevalence and causal relationship to the problem, but also the degree to which they may be changed. As already discussed, age is a primary *risk factor* for developing hearing loss, but aging is a factor over which we have little control (consider the alternative to aging!). Likewise, other risk factors such as genetic predisposition to hearing loss (Willott, 1991) or the effect of socioeconomic status (Gilhome Herbst, 1983; Preston & Taubman, 1994) are unchangeable, at least over the course of the present project. Among our institutionalized target population, we cannot control risk factors such as the effect of other medical conditions or medications on hearing. On the other hand, impacted cerumen, which was documented in fully 25% of residents at Porter Home (Hoek et al., 1996), is an example of one risk factor for hearing loss that could be highly changeable with appropriate intervention (see also Kennie, 1993; Shultz & Mowry, 1995).

ASSESSING QUALITY OF LIFE: THE SOCIAL ANALYSIS

Our epidemiological analysis yields impressive data highlighting the current and expected future prevalence of hearing loss, and it illuminates some risk factors associated with hearing loss. It also introduces us to the important concept of changeability that relates to the next stage: the social analysis. The fact that so few risk factors for hearing loss are amenable to change confirms that it is of little use to center our program at Porter Home around hearing *loss*, per se. It is of far greater importance for us to focus on the impact of hearing loss upon daily life, the psychological and social manifestations of reduced hearing ability.

The World Health Organization (1980) adopted definitions of impairment, disability, and handicap which have been increasingly recognized as relevant to any discussion of audiologic rehabilitation (for discussions of these concepts in the context of audiology, see Giolas, 1990; Hyde & Riko, 1994; Pichora-Fuller, 1994; Schow & Gatehouse, 1990; Stephens & Héту, 1991). *Impairment* is defined as a psychological, physiological, or anatomical loss or abnormality of structure or function (such as loss of hair cells in the cochlea). *Disability* is defined as the loss or reduction of normal ability resulting from impairment (such as difficulty perceiving speech). *Handicap* is defined as the detrimental effects a disability exerts on one's life that limit or prevent one's normal activities or roles. Handicap con-

cerns well-being and quality of life and is, therefore, of greatest concern in our social analysis.

Note the perspective that the PRECEDE-PROCEED model takes in its approach to solving problems related to health issues. The traditional approach in audiology is to begin by assessing hearing impairment, and from those measures to make inferences regarding disability and handicap. Within this health promotion framework, however, one works from the outset by considering handicap, and moves to translate the difficulties experienced in daily living into the related component behaviors and/or health problems. This reconceptualization brings audiologists out of the sound booth and office and back into the community to consider the real-life concerns voiced by people who are hard-of-hearing. This involves a total reframing of perspective from that of a (usually normal-hearing) professional with expert technical knowledge to that of a layperson who experiences life with a hearing loss. For example, the person may be confused when given instructions over the phone, but may not connect this experience to the declining status of the auditory system (see also Pichora-Fuller, *in press*; Pichora-Fuller & Kirson, 1994; Pichora-Fuller & Robertson, 1994). The reconciliation between the clinician's perspective and the layperson's perspective is what Miller and Crabtree (1994) refer to as "conversing at the wall," where the "wall" is the interface between the clinician and client, between the physical, socioeconomic, linguistic, and hierarchical boundaries of the clinic and the local, everyday milieu of individuals with health concerns.

Hearing loss may be the well-rooted cause of many complaints by seniors that link directly to quality-of-life issues concerning physical, cognitive, emotional, behavioral, and social functioning (see Mulrow et al., 1994 for a list of studies on this). Moreover, and especially pertinent to long-term care settings, hearing loss has been cited as a contributing factor in the progress of dementia, whereas in other cases, patients have been misdiagnosed as demented or confused as a result of inappropriate responses due to hearing loss (Shultz & Mowry, 1995; Uhlmann, Larson, Rees, Koepsell, & Duckert, 1989).

The role of the social analysis phase is to assist the community in assessing not just its health concerns but its quality of life, which, as Figure 1 shows, is a function of direct and indirect effects of behavior, lifestyle, and environment. This focus on quality of life, and the influences of behavior and environment, are consistent with an ecological approach to audiologic rehabilitation (e.g., Gagné et al., 1995; Lesner & Kricos, 1995; Noble, 1994; Pichora-Fuller & Kirson, 1994). It may be argued that this model, because it is community-based, goes one step further and acknowledges that the handicapping conditions experienced by persons who are hard-of-hearing is a collective responsibility and not just an attribute of the individual (see also Noble & Héту, 1994; Pichora-Fuller, 1994; Stephens & Héту, 1991).

How may we tap into those quality-of-life concerns that relate to being able or

unable to hear?⁴ Exploration of the quality-of-life issues of our target population requires their active engagement in the project right from the start. Even when a priority health problem has already been identified (as in our case), the specifics of how that problem manifests itself in our population cannot be fully understood without a high level of involvement by those most directly affected by the problem. Moreover, such active involvement evokes a sense of community ownership and control of the issues and objectives which do not so easily develop when outside professionals impose preconceived notions as a means to retain control over a project. Our approach emphasizes the *participatory* nature of health promotion. "Participatory research" is a systematic process of inquiry that has gained increasingly greater endorsement as a way to educate, take action on a health issue, and effect social change (Green et al., 1994).

How does the participatory approach apply in the social analysis of the community of seniors at Porter Home? One way to begin the social analysis for this population may be to consult the Canadian Hard of Hearing Association (CHHA), a national non-profit hard-of-hearing consumer advocacy group.⁵ CHHA had already gathered information about the perceived gaps in service to seniors living in care facilities similar to Porter Home (Canadian Hard of Hearing Association, 1994). The CHHA study identified problem areas such as: residents' misunderstanding of how to use their hearing aids, lack of knowledge of other ALDs on the market besides hearing aids, and the low level of awareness of hearing loss by health care providers. A second way to engage the community in a quality-of-life assessment is to solicit input from Porter Home residents directly, exploring their perceptions of how hearing affects their daily lives. Focus groups of members of this care facility's Residents' Council could be convened to discuss issues related to hearing, from the perspective of both the residents and their communication partners, including staff and family. In a similar vein, Pichora-Fuller and Robertson (1994) convened group sessions at a home-for-the-aged that were attended by a cross-section of staff, hard-of-hearing residents, and residents with good hearing. Responses were solicited to the open-ended question: "When in your everyday life in this facility is it important to hear?" The communication situations generated by the participants were used to create a short questionnaire that later served as a guided interview to evaluate individual residents' scope and quality of communication performance at 6 month intervals

⁴Green and Kreuter (1991) discuss the definition of and approaches to measuring quality of life (pp. 48-49). What this means to specific populations deserves exploration in its own right. The meaning of "quality of life" needs to be studied qualitatively in particular health contexts (e.g., Guest, 1995), and it remains to be studied adequately with respect to hearing loss.

⁵In the U.S. and Australia, SHHH (Self Help for Hard of Hearing People Inc.) could be consulted on such matters (e.g., see Robards-Armstrong & Stone, 1994). Other national associations of hard-of-hearing people are common. There is also, for example, the International Federation of Hard of Hearing People (IFHOH), whose journal headquarters is located in the Netherlands (Teldersstraat 7, NL -8265 WS Kampen).

prior to, during, and subsequent to the delivery of a rehabilitation program. Such use of individual semi-structured interviews is a third way to engage the community in the social analysis phase. Qualitative and quantitative methodologies may thus be combined in a complementary sequential design that is useful in both the planning and evaluation phases of a program (see Denzin & Lincoln, 1994; Green & Kreuter, 1991).

Where there is an opportunity for an open-ended or even semi-structured process of inquiry, individual stories of life events may reveal problems linked to hearing. From this information, client and clinician educate each other toward a mutually constructed individualized rehabilitation program. Objectives thus formulated are "owned" by the client (not just the planner). The time invested in qualitative study may yield dividends beyond the individual level. A growing qualitative data pool may, over time, reveal patterns that help to redefine our notion of what constitutes a population in relation to handicap. Such redefinition may be guided by patterns that are distinguished not by the impairment (i.e., audiogram) or isolated characteristics of the person, but by other more functional, ecological, or social considerations such as social roles or communication situations.

An important step in the social analysis is to identify as many of the people as possible at Porter Home with an interest in the issue of hearing handicap; these people are "stakeholders" in the program being planned. Aside from the participating residents, family, friends, and health care professionals, other workers, such as dietary, housekeeping, physical plant, and pastoral care staff, interact regularly with residents. Other stakeholders include Porter Home administrators; attending physicians; public health audiologists who provide service; consumer groups, such as the municipal seniors advisory committee and the provincial hard of hearing association; and dispensers who sell ALDs and hearing aids. The stakeholders can be categorized in terms of the resources they may contribute to the program. For example, one could ask audiologists and manufacturers of hearing aids and ALDs to supply personal and group equipment at Porter Home. Access to such equipment would be pointless, however, if the Porter Home Board of Directors were not convinced of the necessity of such equipment and did not endorse installation of a group ALD. Individuals and groups, such as the local media and CHHA, may also act as advocates of the program. Data access and research support could involve a fourth possible group of stakeholders, namely academics from various disciplines who are members of the local university's Institute of Hearing Accessibility Research (IHEAR announcement, 1994). It is important to involve and inform stakeholders at each step of the project, educating them, when necessary, about hearing loss and handicapping conditions.

At this point in program planning, stakeholders may formulate a "vision statement" to help keep the focus of the planners clear when the details of daily project implementation threaten to obscure the grander purpose. The wording of a

vision statement should reflect the broad mission for the project, such as “Improve hearing-related communication performance at Porter Home.”

BEHAVIORAL AND ENVIRONMENTAL ANALYSIS

Crucial to creating effective intervention strategies for the project at Porter Home is an analysis of any behavioral or environmental factors that can be linked

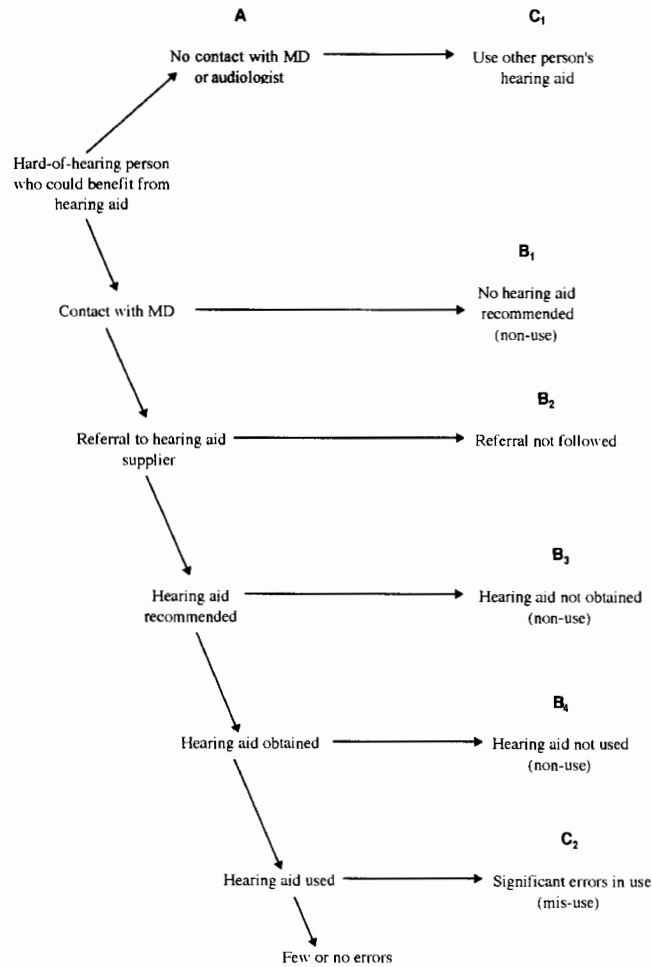


Figure 2. Possible trajectories that hard-of-hearing residents of Porter Home may follow from being candidates for a hearing aid to becoming successful or unsuccessful hearing aid users. A designates unconfirmed candidacy for a hearing aid, B refers to hearing aid non-use, and C refers to hearing aid misuse.

to the problems identified in the social and epidemiological analyses. The insidious nature of presbycusis is such that, over time, aging adults seem to avoid many behaviors that exacerbate handicap. As illustrated in Figure 2, seniors often avoid getting their hearing tested (point A), trying the hearing aids or ALDs that are recommended for them (point B₃), and informing others that they have trouble hearing. Those who own hearing aids, even when they wear their hearing aids, often fail to tell others such as care staff or family when these aids malfunction (point C₂).

Lack of information and education about hearing loss and how to cope with its effects also results in behaviors by seniors, care staff, and family – behaviors that heighten handicap. The use of inappropriate communication strategies in conversation is a good example of a behavior that is both prevalent and important in producing handicaps for both persons who are hard-of-hearing and their partners (Erber, 1994). Another example includes persons who make poor use of hearing aids because they did not learn how to operate or maintain them properly (points B₄, C₂).

As well as examining behavioral factors, it is important to consider factors in the social and physical environment that contribute to the health issue of concern. Too often, behavioral solutions fail if they are not combined with appropriate environmental factors. Physical environmental factors include poor room acoustics (endemic to institutional settings); inappropriate lighting conditions; and hearing aids and ALDs that are either inappropriately chosen for the client or setting, or are provided without the necessary support services. Social environmental factors include a lack of family or institutional support for seeking solutions to hearing-related handicap, and a lack of training for health care workers concerning hearing loss and hearing technology. Underpinning these physical and social environmental factors is the cultural core of an ageist society that stigmatizes hearing loss so effectively that avoidance behaviors are conditioned and reinforced.

Once a detailed inventory of behaviors and environmental factors is compiled, each factor is assessed for its importance (e.g., its prevalence and causal relationship to the health problem). It is even more crucial to assess each factor's changeability within the time frame of the project. The goal should be to set realistic behavioral and environmental objectives. Table 1 lists factors that were deemed by the stakeholders to be highly prevalent and important contributors to the handicap experienced by the community of residents at Porter Home. However, changeability varies for each factor. Within the one-year time frame set for our project, for example, it was felt that it would be relatively easy to arrange for all residents of Porter Home to have their hearing tested on site. On the other hand, attempts to change systems of family support were deemed unlikely to succeed. When setting objectives, it is important to be realistic. The relationship between the importance and the changeability of a factor needs consideration. Ideally, high priority would be placed on factors, such as residents' not getting

Table 1
Prevalent and Important Behavioral and Environmental Factors
Contributing to Communication Problems

Factor	Changeability
Behavioral Avoidance	
Participating Residents	
Getting hearing tested	High
Trying/using a hearing aid or ALD	High
Using appropriate communication strategies	Medium
Reporting hearing aid problems	Medium
Informing others of hearing loss	Low/Medium
Participating staff and family	
Using appropriate communication strategies	High
Helping resident with hearing aid or ALD	High
Environmental	
Participating residents	
Lack of ALDs in setting	High
Malfunctioning hearing aid or ALD	High
Poor room acoustics	Medium/High
Inappropriate lighting	Medium/High
Lack of family support	Low/Medium
Lack of physician support	Low/Medium
Participating staff and family	
Lack of training in hearing loss and hearing aid	High

their hearing tested, that are highly important and also highly changeable. These factors would then be translated into the objectives that should yield the greatest results. In contrast, factors that have high importance but low changeability, such as lack of family support systems, are a challenge and usually require highly innovative schemes and constant evaluation to monitor whether the intervention strategies adopted are having an effect. Factors which have less importance but are highly changeable, such as frequent follow-up testing to confirm that the degree of threshold hearing loss has not changed, may become objectives if they serve a public relations purpose. Finally, factors that have little importance to hearing-related aspects of communication performance and are not likely to change, such as residents' lack of fluency in English, would not be translated into program objectives.

Once high priority behavioral and environmental factors have been targeted for intervention, the final step in Phase 3 of the model is to state objectives in a clear manner that will permit these objectives to be easily followed and measured at the time of program evaluation. Each objective should address the questions of *who*

is expected to change, *what* behavior change is expected, *how much* change is expected, and the *time* frame in which such change is expected. Here, for example, are two behavioral and two environmental objectives that would be targeted for our community at Porter Home:

Behavioral Objective 1: By the end of the third month of the program, 90% of Porter Home residents will have taken part in hearing testing conducted on site.

Behavioral Objective 2: By the end of the first year of the program, there will be a 40% increase (compared with program start) in the number of hearing aids worn at least a portion of each day by residents who owned but did not wear such aids at the start of the program.

Environmental Objective 1: At least 90% of hearing aids identified at initial assessment to be malfunctioning or inappropriate will be repaired or replaced by the end of the fourth month of the program.

Environmental Objective 2: By the end of the third month of the program, an assessment of the acoustic environment of Porter Home group listening areas (dining hall, chapel, recreation room, and lounge) will have been completed by an acoustical consultant.

EDUCATIONAL AND ORGANIZATIONAL ANALYSIS

In Phase 4 of the model, the planner identifies determinants of the behaviors and environmental conditions explored in Phase 3. The model defines factors that must be addressed to initiate and sustain behavioral and environmental change (Green & Kreuter, 1991, p. 151). These determinants fall into three categories: predisposing factors, enabling factors, and reinforcing factors. Each category of factors has unique influences on behavior which cannot be overlooked if sustainable change is to be realized.

Predisposing factors are those antecedents to behavior that provide the rationale or motivation for the behavior. They include knowledge of relevant information, perceived skills (self-efficacy), beliefs, values, and attitudes that either encourage or discourage a behavior.

Enabling factors are the antecedents to behavior that make it possible for the behavior to be realized, including environmental characteristics that facilitate action. At Porter Home, for example, the provision of hearing testing services or the proper installation of an appropriate group ALD would constitute an enabling factor. Actual skills required to perform a behavior are enabling. The development of these skills, in turn, can help develop self-efficacy which predisposes the behavior.

Reinforcing factors occur subsequent to a behavior and provide a continuing reward or incentive for a behavior. Social support mechanisms, for example, contribute to the persistence or repetition of a behavior. Reinforcement predis-

Table 2
Some Predisposing, Enabling (or "Disabling"), and Reinforcing Factors
Associated With the Avoidance Behavior "Not Using a Hearing Aid"

Factors
Predisposing
Lack of knowledge of impact of hearing loss
Lack of knowledge that hearing aid fitting is adjustable (i.e., may not need a new one)
Lack of skills in operating hearing aid
Lack of skills in using hearing aid in conjunction with ALD
Lack of skills in supportive communication strategies
Belief "don't have a hearing loss"
Belief "my hearing aid will not help my hearing loss"
Belief "hearing aid cost (batteries, adjustment, new aid) is not worth it"
Belief "using my hearing aid will lead to my friends' rejection of me"
Disabling
Lack of access to hearing aid follow-up visits
Physical limitations in using hearing aid (e.g., problems with manual dexterity)
Lack of/limited funds for hearing aid batteries, maintenance
Lack of ALD
Lack of acoustical modifications
Reinforcing (hearing aid non-use)
Lack of support from family/peers/caregivers
Lack of communication success due to poorly adjusted/functioning hearing aid

poses subsequent behavior.

For every behavior inventoried in our behavioral and environmental analysis, predisposing, enabling, and reinforcing factors that influence behavior can be identified. The nature of the psycho-social impact of hearing loss lends itself to a rich description of such factors. To date, audiologists have been concerned primarily with enabling factors, such as the provision of services or technology, with little attention paid to predisposing factors (for an exception see Noh, Gagné, & Kaspar, 1994), or reinforcing factors (for an exception see Getty & Héту, 1994).

The avoidance behaviors outlined previously that might prevent a resident from seeking help for problems related to hearing loss are tied to many possible predisposing factors. In Table 1 we listed a subset of such avoidance behaviors. In Table 2, we list a subset of the predisposing, enabling, and reinforcing factors that may influence the avoidance behavior, "not using a hearing aid" (sometimes referred to as the "hearing aid in the drawer" problem). Predisposing factors for this avoidance behavior may be a lack of knowledge about the impact of hearing loss or the possibility of adjusting the hearing aid to improve fit. "Not using a hearing aid" may also be predisposed by a perceived or actual lack of various skills, such as skill in operating the hearing aid, skill in using the hearing aid in

conjunction with ALDs, or skill in employing supportive communication strategies when wearing the hearing aid. Another set of predisposing factors entails beliefs, attitudes, and values pertaining to hearing. Many seniors do not use their hearing aids because they have not fully accepted that they have a hearing loss, or that the hearing aid will really help, or that the benefit they get from the hearing aid justifies the initial and ongoing monetary costs incurred, or that the possible benefits to be derived from amplification offset the stigma produced by wearing the device. In many cases beliefs are ingrained through the reports of others, such as a peer who may have previously rejected a hearing aid, or a family physician who counsels the hard-of-hearing person that “in your case, a hearing aid would be of little benefit.” Such predisposing factors are highly influential among the residents of Porter Home who own hearing aids but do not use them. These individuals are represented in Figure 2 in the group designated B_4 . Such predisposing influences would partially explain how these individuals who have obtained a hearing aid come to join the “hearing aid in the drawer” club.

Enabling factors (which in the present example may be better termed “*dis*enabling”) for this same avoidance behavior “not using a hearing aid” may include lack of access to hearing aid follow-up (perhaps because of geographic location), lack of transportation, or the individual’s poor physical mobility. Limited manual dexterity may disenable use of a hearing aid. Other barriers might be limited funds for a hearing aid or a lack of contact with more experienced hearing aid users who could advise non-users regarding affordable resources for testing and fitting.

Reinforcing factors (in this case, those which reinforce hearing aid non-use) may include lack of support from family members and others. Continued communication difficulty, exacerbated by lack of knowledge of communication strategies and their importance during conversation, would also discourage further use of the hearing aid. A consequent reduction in hearing aid use would interfere with continued adjustment to the hearing aid, such that when the hearing aid was worn, communication difficulty would persist or worsen. Eventually, ongoing communication difficulty would lead the individual to abandon use of the hearing aid altogether. Note that a cycle is created by the relationships among these three categories of factors. Note also that a factor may fall into more than one of the three categories. For example, the feared or actual experience of social stigma associated with hearing loss may predispose one not to use a hearing aid and may also reinforce hearing aid non-use. On the positive side, Carson (in press) reports on a recent project undertaken by CHHA, in which seniors who are successful hearing aid users act as volunteer “hearing helpers” in a care facility. They act as positive role models for residents, family, and staff. By their positive example, they predispose those involved to reconsider their attitudes toward hearing loss, they enable residents to make better use of their aids, and they reinforce successful communication.

The combined influence of predisposing, enabling, and reinforcing factors on behavior cannot be overemphasized. It is crucial to understand how these factors interact and relate to the experiences of individuals, and to find ways to influence all three sets of factors. For example, use of appropriate communication strategies by a caregiver not only enables a resident to understand more easily, but also reinforces the caregiver because she is now able to communicate important medical information with less frustration, less vocal strain, and in less time. Such enabling and reinforcing effects, in turn, predispose subsequent interactions. For a greater understanding of this important trio of factors, the reader is referred to the social and cognitive psychology theories and the health behavior theories from which much of this phase of the model derives, in particular the Health Belief Model, Social Learning Theory, Diffusion and Adoption Theory, Communication Theories, and the Theory of Reasoned Action (for an overview see Becker, 1974; Glanz, Lewis, & Rimer, 1990; for an example of an audiologic perspective on some of these theories see Noh et al., 1994).

At each level of the health promotion framework, we use a more powerful lens to help us more clearly visualize the core of behavioral or environmental influences that are the backdrop to experiences of handicap. In Phase 3 of the model we identified behavioral and environmental objectives and earlier in the present phase we categorized factors relevant to those objectives. The next step is to rank the factors according to their prevalence and importance. The final step is to select high priority factors upon which learning and resource objectives will be based. To illustrate the final step of Phase 4, we will focus on Behavioral Objective 2 that was specified in Phase 3. Following is a sample of the learning and resource objectives that would lead to the accomplishment of this behavioral objective. Note that the learning and resource objectives specified in Phase 4 address very concrete activities that can be broken down into manageable steps to achieve success:

Learning Objective 1 (Predisposing): By the end of the first year of the program, 40% of the residents of Porter Home who own a hearing aid will be able to: (a) check that there is a battery in the hearing aid; (b) insert the hearing aid correctly; and, (c) decide if the hearing aid is working properly.

Learning Objective 2 (Enabling): By the end of the seventh month of the program, Porter Home will have installed a "wide-area" infrared ALD in one group listening space.

Learning Objective 3 (Reinforcing): By the end of the first year of the program, 50% of nursing staff who were present at the beginning of the program will make at least one positive comment a day related to a resident's use of a hearing aid or ALD.

ADMINISTRATIVE AND POLICY ANALYSIS

An analysis of organizational policy and an assessment of the budgetary and staff resources required and available for the program are the final steps of program development. These steps form the link between program planning and implementation. This phase of the model, Phase 5, is intimately connected to Phase 6, where all the planning that has encompassed the PRECEDE part of the model culminates in the action of implementation, and the final phases (Phases 7 through 9) where process, impact, and outcome evaluations are undertaken. The purpose of the administrative and policy analysis is to identify and close the gaps between the time, personnel, and financial resources that are required and those that are available, so the planning phases can be set into motion. Note that when a participatory approach to health promotion is adopted, decisions about the allocation of resources may not be the exclusive domain of administrators.

The present version of a program to improve hearing-related communication performance at Porter Home emphasizes a team approach, recruiting people of many skills from many disciplines. Within a participatory approach, the target population members are also recruited to the team. For example, the environmental assessment, subsequent modifications of the physical plant, and the installation of institutional ALDs could call for collaboration with an architect, an acoustical consultant, the ALD supplier, the program audiologist and technician, the staff and administrators at Porter Home, and the residents themselves. In addition, communications with all stakeholders would occur not only at the beginning and end of the first year of the program, but also at regular intervals throughout the year, for example, quarterly or semi-annually. In this way, all involved parties can be kept abreast of program developments, and feedback can be solicited to improve service delivery. Between meetings, a monthly newsletter, either on-line or in print, would keep all parties informed of the progress being made on the project.

EVALUATION PHASES

The importance of evaluation and the scarcity of appropriate evaluative tools in audiologic rehabilitation are well recognized (for discussions see Gagné et al., 1995; Montgomery, 1994). Although it is beyond the scope of this paper to discuss the evaluation phases (Phases 6 through 9) of the model in detail, a few crucial points should be mentioned. In the context of the model, based on a health education and health promotion approach, evaluation is defined as “the comparison of an object of interest against a standard of acceptability” (Green & Kreuter, 1991, p. 217). Further research on standards of acceptability in audiologic practice would be useful for those undertaking program evaluation. Using the PRECEDE-PROCEED model, the specific behavioral, environmental, and learning objectives will have been formulated in a fashion that permits systematic, quan-

titative evaluation of individuals or groups. In addition, qualitative methods from the social analysis phase, such as focus group or semi-structured interviews, can be utilized again during the evaluation phases. Furthermore, quantitative and qualitative methods can be used to complement or validate each other.

CONCLUSION

This paper has provided an example of how the PRECEDE-PROCEED model of health promotion may be applied to develop and implement a program to improve communication performance among a population of seniors living in care facilities. The model emphasizes community involvement and we have used program planning for a specific community to demonstrate how the model could be applied in audiologic practice. However, the model may also be used in planning programs for individuals (e.g., Dillon, 1996). The PRECEDE part of the model primarily concerns planning. The PROCEED part of the model extends PRECEDE to encompass program implementation and program evaluation. If program objectives are clearly set through careful planning, they can be measured later to assess progress and areas in which the program needs to be strengthened. If planning does not provide realistic objectives through involvement by the target community or individual and other stakeholders, how justifiable can the program be, even if measurable outcomes are developed? The pressing need for clear statement of objectives in audiologic rehabilitation has recently been raised (e.g., Gagné et al., 1995). These are important concerns that the PRECEDE-PROCEED model can help address. The integrated, step-by-step approach of this model and its emphasis on the continuous involvement of stakeholders reflect a systematic approach and an inclusive philosophy toward health promotion planning that we see as important and applicable to audiologic rehabilitation.

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