Prevention of deafness and hearing impairment

The World Health Organization has recently set up a specific programme to deal in depth with one of the most widespread handicaps in the world today. World Health Forum's Assistant Editor, Barbara Campanini, spoke to three of the people involved in helping WHO to assess the problem and direct its activities: Professor P. W. Alberti, Professor Yash Pal Kapur, and Dr Suchitra Prasansuk are optimistic about the prospects for helping deaf and hearing-impaired persons and for bringing about a reduction in new cases.

Avoidable deafness and hearing impairment have been recognized as an important public health problem. How widespread is the problem, and what is its impact in socioeconomic and human terms?

Professor Kapur: In 1985 it was calculated that hearing impairment and deafness affected about 42 million individuals worldwide above the age of three (below that age it is very difficult to make an assessment). This figure is a severe underestimate. For example, in the USA alone there are 28 million people with hearing impairment, of whom about 2 million are profoundly deaf. Considering that the majority of people with deafness and hearing impairment live in the developing countries, a more realistic global figure is over 200 million. So it is indeed a major problem.

The impact in socioeconomic and human terms is significant. The disability — affecting all ages — may not be immediately apparent, but these people can suffer in many ways: normal education and job opportunities may be denied them, as they require special education, special placement, and vocational training. Apart from causing a great deal of distress, deafness is sometimes the root cause of psychiatric problems.
Understandably, the causes of hearing impairment are varied. What are the main causes that lend themselves to prevention and control?

Professor Alberti: First of all I would like to distinguish between deafness and hearing loss. Deafness is hearing loss which is so profound that normal communication through the spoken word is difficult or impossible. Deafness is much less common than hearing loss but it has a more profound effect: a deaf person may remain dependent on others all his life. Much deafness is congenital and much congenital deafness is preventable. To take a major example, maternal rubella during pregnancy can be totally prevented by immunization programmes, and has been eliminated in many communities. Another area leading to severe hearing loss and deafness is fetal damage and complications at delivery, including premature birth. One of the major preventable causes of hearing loss is the indiscriminate use of inappropriate drugs, e.g., the wrong type or an overdose of antibiotics.

Also the amount of hearing loss that is caused by industrial noise, in developing as well as in developed countries, is enormous. Wherever there is industry there is noise, and its effects are devastating. Noise is the most pervasive of all industrial pollutants: it involves every industry and causes severe hearing loss in every country in the world, yet it is entirely preventable by engineering controls, by the use of hearing protectors, and by limiting the amount of time people are subjected to it.

The hearing losses that come from middle-ear infections are also preventable. The proper and prompt treatment of ear infections can prevent a lot of permanent lifetime hearing loss: chronic perforations of the ear drum should not be a feature of the modern human condition.

Infections are obviously still a major problem, particularly in developing countries. How do you see the Programme tackling this problem?

Dr Prasansuk: I think that our Programme of Prevention of Deafness and Hearing Impairment can tackle this problem by building on existing activities. Bacterial infections such as acute otitis media, which follows an acute respiratory tract infection, can be treated quite easily at the primary health care level through the Programme for Acute Respiratory Infections. The same goes for meningitis, which can be bacterial or viral. Other viral infections — rubella, mumps, and measles — can be prevented through the Expanded Programme on Immunization. Primary health care workers can take care that all children are immunized and that the women receive vaccination against rubella. It is a matter of generating awareness not only in the community but also among general practitioners and other health workers, to promote good hygiene and good nutrition and encourage immunization.

So we really can talk in terms of prevention of deafness. What about prevention of the effects of existing deafness and hearing impairment?

Dr Prasansuk: If we can ensure early detection and early management then we can provide proper medical or even surgical treatment and rehabilitation to prevent the debilitating effects of deafness. In the old days most children who were deaf were also dumb; but if rehabilitation starts early enough we can give speech training to small children so that they can achieve language skills.

How can people learn to cope with their disability?
Dr Prasansuk: In the developing world it is very difficult: only 5% of the hearing-impaired or deaf people have hearing aids. In very poor communities they are not aware of the existence of hearing aids or any sort of rehabilitation. This is one of the main problems: the hearing impairment programme can only be a success if it goes hand in hand with rehabilitation.

Professor Alberti: If we are dealing with the hearing impaired rather than the congenitally deaf, hearing aids are a useful means of rehabilitation. The extent to which they are used varies directly with the cost to the individual. In countries where they are provided by the state, the number of hearing aids per hundred would-be users are 4-5 times more than in countries where people have to pay for it themselves.

But apart from the device, there is a whole area of rehabilitation that consists of learning how to cope, firstly by admitting that a person has a problem, persuading relatives that he or she is not stupid but simply cannot hear what is going on, and encouraging them to find a solution to the problem. There is a whole range of practical measures that an individual can take to be more comfortable and receptive. For example, don’t stand in the middle of a crowded room with everyone chattering around you: put your back to a wall, preferably one with a carpet or a curtain which absorbs the sounds, so that you only see and hear the person talking to you. Put yourself in a position where the light falls on the face of your interlocutor so that you can watch what he is saying. In a restaurant, sit to one side and not next to the entrance or the door to the kitchen. Find out which theatres in your home town have amplifiers. There are many such things which even in the developed world are not done sufficiently.

Dr Prasansuk: In the developing world the provision of devices and rehabilitation services is almost nonexistent. It is important to be able to provide hearing aids at a very low cost, which is possible with mass production. I am delighted that plans are afoot to produce low-cost devices.

Professor Alberti: Making hearing aids available is only part of the process. The health care delivery system has to include making the device acceptable, fitting it comfortably to the ear, and maintaining it in working order. That means that people have to be trained to make and fit ear moulds; in addition, there has to be someone in the community capable of maintaining the devices and advising the users, rather than a technician from outside who leaves the user without support when he moves on. The maintenance cost of a hearing aid is not negligible: $30-40 a year for mercury cells may be out of the reach of many people. So the provision of hearing aids involves not just the initial price of the device but the cost of operating it, and learning how to use and look after it.

Noise is the most pervasive of all industrial pollutants: it involves every industry and causes severe hearing loss in every country in the world.

Dr Prasansuk: Yes, I agree, learning how to use it properly is most important. It is not as unusual as one might think to find hearing aids put away and not used. People complain of a noise in the ear, but this is because they don’t know how to adjust it. And it is essential to have a properly fitting ear mould, especially for children because
Programme for the Prevention of Deafness and Hearing Impairment

In response to the public health dimension of the problem of deafness and hearing impairment, the WHO Programme for the Prevention of Deafness and Hearing Impairment (PDH) was launched in 1986. The focus of the Programme is to prevent and control the major avoidable causes of deafness and hearing impairment, and make basic ear care available as an integral part of primary health care to populations in greatest need.

Some of the most common causes of deafness, especially in developing countries, are acute otitis media, ototoxic damage to hearing, and congenital factors.

While addressing these problems as a priority, the Programme is also giving attention to standardized data collection, national programme planning for PDH, development of low-cost diagnostic (audiometer) and amplification (hearing aid) services, personnel training, and information, education and communication, to prevent and control avoidable hearing impairment and deafness.

The extremely meagre resources to support programme activities are a major constraint.

otherwise they cannot run around without the device falling out. In the Bangkok School for the Deaf where hearing aids are provided, about 80% of the students wear them only because they are told to but often there is no battery, or the cord is broken, or the microphone is upside down in a pocket. There are many things involved in using a hearing aid: just owning one is not enough.

In our society, and maybe elsewhere too, people think that having hearing-impaired or deaf children is a punishment for past wrong-doing, and they do not want their neighbours to see the children wearing hearing aids. We have to explain that deafness is a worldwide problem, even if they have never seen anybody using a hearing aid.

Professor Alberti: It is not just in your society. We also have families where the children are hidden away. People do not like to show imperfections.

Dr Prasansuk: We can suspect hearing loss in a one-day-old baby, so what is the proper time to fit the hearing aids? We usually fit one at the age of one year; maybe six months old would be better, but generally we start at one year. A child enters the school system at the age of six years in most
countries, so there are five years when deaf or hearing-impaired children should be learning their language. Parents do not know how to deal with the problem, but I would stress that this period is very valuable for deaf children.

Professor Kapur: I fully agree with Dr Prasansuk, handling of early detection is very important. In India we have been encouraging mothers to form voluntary associations for organizing preschool classes where the children can be taught. So by the time they are ready to go to the schools for the deaf they have some language and communication skills. A similar system is urgently needed worldwide.

Is it easier to teach small children sign language than to encourage them to lip-read?

Dr Prasansuk: When you enter into the realm of sign language then the child does not achieve speech at all. Sign languages are different throughout the world, and international sign language is similar to the English sign language. It isn’t adaptable to the Thai language or to many others. Reading the lips is also very difficult and creates a closed community.

So how do the teachers and the children communicate in schools?

Professor Kapur: There is sign language, but the stress is on total communication using both verbal and sign language. But, as Dr Prasansuk has pointed out, it depends on what is applicable to your native tongue. In Singapore, for example, where there are large Chinese and Asian populations, there are separate methods of teaching: as Chinese is a tonal language the Chinese children go to a school where there is just sign language as they cannot use speech at all, whereas the Asian children are taught total communication because they can recognize speech. So the method is quite different according to the native language, and that is mainly what determines the method to be used in different countries.

Professor Alberti: It has been a very controversial area. In English-speaking countries, there was emphasis for many years on lip-reading or “speech-reading”. Sign language, originally finger-spelling, was completely avoided. The American sign language that has developed is a language in its own right, with its own art and its own poetry. It is not a simple translation of English but a means of expressing ideas economically in sign.

There is controversy about whether learning sign language prevents the development of oral communication. I personally believe it doesn’t, and that the important thing is to get the child to learn to communicate somehow. Wherever people have emphasized oral communication as well, children seem to learn it. Some children never acquire oral speech and lip-reading, however great an effort is made, whereas others take to it easily. The total communication package is the one that is currently in favour, the goal being to make use of residual hearing by fitting an aid as soon as possible. Language must be taught early, at the time when children are normally learning to speak, because the brain appears to be particularly plastic for...
the acquisition of language from a few months old to the first two or three years of life; thereafter it is much more difficult. So a child's deafness has to be detected and helped before he is four or five, or else he falls behind.

_Can people who have mastered total communication, including sign language and lip-reading, adapt it to a foreign language? Or do they have to learn a different system for a different language?_

**Professor Alberi:** The American sign language is used further afield than North America, but it is certainly not the only sign language that's used. It may be necessary to learn a new one.

**Dr Prasansuk:** I have seen a lot of western deaf people who can speak two or three languages, it is amazing. But I think we cannot expect such prowess from Thai people: just to speak the Thai language is already very difficult, because of the intonation. I agree that we should aim at total communication in an integrated school, and this is another reason to stress early detection and preschool training, because the gap that exists must be filled in early childhood.

_Given that early detection is of paramount importance, are there simple methods that can be adopted at community level to detect these children?_

**Professor Kapur:** Yes, there's a whole range of technology available. In the developing countries we use simple methods of behavioural techniques in which the child responds to sound given in the free field, as we call it, as opposed to in a sound-treated room or using earphones. These techniques were used for years in the West and then became obsolete with the development of technology, but I think we need to resuscitate and improve them so that they can be used in developing countries. And we have portable audiometers, with or without earphones, which have three or four frequencies for testing. These portable devices have been used successfully in Africa. In the developing countries simple, low-cost techniques can be applied to detect hearing deficiencies early, we can then get on with the management of the problem.

**Dr Prasansuk:** I am not altogether happy with the idea that simple methods are sufficient on their own. To measure hearing impairment in babies and very young children you do need a certain amount of technology. You can measure electrical impulses from the brain or you can use the new device that measures acoustic emission: just put a little probe into the ear and get the echo from the inner ear and then you can measure hearing loss very easily. This is an expensive device, which you might call high technology, but it is a simple test if you know how to do it and it is very accurate. You even know the level of hearing loss and whether it is from the right or left ear, then you can fit hearing aids effectively. We use

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without help before the age of seven a child won't achieve language. Many children with hearing impairment who should be able to go to an integrated school were put in a school for the deaf as they were thought to be totally deaf, and they started to use sign language. I can't say often enough that the
these two devices in the rural areas around Bangkok without trained otolaryngologists or audiologists to carry out the tests: a properly trained technician can do them. So I prefer to call it “high touch”, not “high tech”. If we train the people properly in the rural areas it is not expensive at all. At a cost of 200 000 Thai bahts (about US$ 7850), which includes the cost of the device, you can detect hundreds of children who were born deaf. So it is only a question of passing on the know-how to the people in the community, which is not difficult.

Professor Alberti: I’ll add a rider to that: certainly in the developed world it is probably quite impractical or undesirable to use the high touch device on every infant born, because the prevalence of severe hearing loss is sufficiently low (1/1000 perhaps). So I agree with you that devices should be available to test children where there is concern. However, it is not feasible to try to test every child because people lose interest in yet another test. The crucial point is that mothers should know what signs to look for and, if a mother is worried about her child’s hearing, facilities should be made available for tests. Mothers should have a list of things to look for, primary care givers should be trained to recognize a child who should have a hearing test, and there should be centres in every country where the high-touch techniques are available. Would you agree with that, Dr Prasansuk?

Dr Prasansuk: Yes, indeed. Start in the community with simple behavioural testing; then suspected children with a hearing impairment are referred to another health centre which has the device and technicians to operate it. The referral system is very important.

Are you thinking in terms of sending teams into the rural areas? Or would you rather

train primary health care workers to detect the need for treatment?

Professor Alberti: In countries where money is no object, mobile teams haven’t worked. You need preliminary identification of children at risk and then referral to a centre that’s properly set up for testing.

Professor Kapur: I agree. I must stress again that at the community level we have to use simple devices, and then we have a whole host of tests that can establish a diagnosis for children who need to be tested further.

We have to try to put hearing problems into the curricula of all the staff who man the health systems in different parts of the country.

Dr Prasansuk: We should enlist the help of the village midwives. If they were to follow up the babies they delivered — every three, six, or twelve months — all the children in the village would be covered.

Can you tell us more about your Programme of Primary Ear Care in Thailand?

Dr Prasansuk: We stress that the Primary Ear Care programme (now operating in 25 provinces all over Thailand) is people-oriented, not service-oriented. It is a self-reliant programme which can be carried out at the community level, building on existing primary health care infrastructures. We inform people about the ear and how it functions as a hearing organ and show them
how to take good care of it. If upper respiratory tract infection in children leads to earache or running ears, their mothers should be able to spot the symptoms very early and seek immediate treatment at the primary health care level. Untreated infections lead to chronic otitis media,

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which is now a widespread problem in the developing world. In the schools we instruct the students to look at their friends’ ears or whisper into the ears and see whether they can hear, and look to see if there is any discharge. The main causes of deafness and hearing impairment are usually poor hygiene, malnutrition and poor education. Primary health care — combining curative, preventive, and promotive aspects — is well accepted in the community.

Are there some simple, old-fashioned technologies for people with hearing impairment that are worth remembering, like rolling up a newspaper to make an ear trumpet?

**Professor Alberti:** Yes, if you can get people to use them, ear trumpets are still a good thing. The great advantage of the rolled-up newspaper or the ear trumpet is that it is directional and excludes other sounds, but they are socially so unacceptable that people don’t use them. The exception is the almost automatic reaction of a person who has difficulty in hearing: cupping the hand round the ear, which has the same effect of bringing more sound in.

**Dr Prasansuk:** I use ear trumpets even in my clinic in the university hospital. It is a good way of testing whether the patients will benefit from hearing aids. When you talk normally they cannot understand, then you give them an ear trumpet and you can start to have a conversation. It’s very low technology: no maintenance at all!

**Professor Kapur:** We train mothers who cannot afford hearing aids to speak into their children’s ears so that there is some speech coming directly into the ear. In places where there is no possibility of getting a hearing aid, that’s the only hope one has. This is another old technology that still works in many cases.

*When speaking to a deaf person, is it better to speak at a normal level but closer than usual, rather than to shout?*

**Professor Kapur:** Shouting wouldn’t really convey very much to a person who cannot hear, but speaking slowly and clearly is always a help. In fact, we have found that people speak very slowly and clearly to someone wearing a hearing aid, even if it is not connected!

**Professor Alberti:** Yes, a hearing aid indicates to the speaker that the person has a hearing loss and they will talk a little louder and a little more clearly: the key is to face the person you are talking to and to enunciate clearly. All of us who work with hearing-impaired people have developed a special consultation-room voice, so people say, “Doctor, I can hear you perfectly well!” but in fact we are enunciating much more clearly than we usually do. The hearing-impaired person automatically watches the way the lips move even if he or she has never had formal lip-reading instruction. So, the person speaking must face them and stay
close by. If you raise your voice a little you won’t damage their hearing, but don’t take on the posture of anger while you are doing it.

Dr Prasansuk: Some people may say, “Don’t shout at me”, because if they have inner ear problems it’s not volume they need but distinct, clear sound. They can hear but they cannot distinguish the words. This is particularly the case with elderly people.

Is a different approach necessary for older people who gradually lose their hearing with age, and people in the prime of life who are rendered deaf as the result of an accident or illness?

Professor Alberti: An acute loss of hearing by accident is a profound and terrible thing to happen. Even with something as simple as an ear blocked up with wax one morning, if a person suddenly cannot hear he panics, though if he had developed that degree of hearing loss progressively over six months he would hardly have noticed it. A total loss is totally devastating to the person involved and it takes a long time to learn to cope. There’s a whole rehabilitation programme to be gone through. Luckily such cases are rare.

The slow, insidious onset of hearing loss with age or due to excessive noise is far more common. It leads to withdrawal and not participating in things quite as much as before, because of insecurity about hearing what is said and fear of misunderstanding or being misunderstood. People who suffer in this way should be detected and rehabilitated at the earliest possible time with a hearing aid, and the younger one starts the easier it is. It may not be necessary to use an aid all the time: there will be certain occasions when it will be helpful and others when it will not.

Are deaf people more prone to workplace accidents and traffic accidents?

Professor Alberti: Traffic accidents, no; there is no evidence that the deaf driver is at risk. Generally they are more careful, and what evidence there is shows that their rate of traffic accidents is less. Children are different, though, because they do miss cars hooting. Pedestrians in the street or children playing may be at risk. In the workplace there is a minimal increase in risk because of not being able to hear warning signals.

Professor Kapur: I think you are right that deaf people are very, very careful regarding accidents. They are known to be very good workers.

Do families and co-workers need to be informed and educated as much as deaf people themselves?

Professor Kapur: Exactly, because then they will seek to help and will know when to get professional advice. Of course, hearing impairment naturally tends to lead to withdrawal and isolation; but it doesn’t have to be that way because a great deal can be done to help them lead full lives.

Professor Alberti: In my own clinic we run aural rehabilitation programmes (for the elderly, for people who need hearing aids, etc.) and we insist that a family member should come and participate in the whole programme. The involvement of the family at an early phase is absolutely crucial. As with all handicaps, it is essential that nuclear family members understand the handicap and know how to cope with it.

Dr Prasansuk: Many deaf children have been wrongly thought to be mentally retarded and have not received the attention they deserved. It is important that parents
and relatives should have a good understanding of what it means to be deaf and take special care of such children. Parents whose children have been detected with a hearing impairment easily become depressed, so we help them with practical advice and support.

**Dr Prasansuk:** Although I agree with you, I can say I have put some portable headsets to good use! We have sometimes prescribed them for deaf children who did not want to use hearing aids. They enjoyed the music in their ears and became amenable to hearing aids.

**Professor Kapur:** Yes, definitely, in the developing countries there are very few people available to deal with hearing impairment. As far as the short term is concerned, I think the solution is to train the available resources in the management of hearing problems and the prevention of hearing loss. That is to say, enlist the cooperation of primary health workers, nurses, paediatricians, family practitioners, and interns. They see the volume of patients that have hearing problems; if they are well briefed they can refer them to the specialized facilities for the otolaryngologists to make a diagnosis and decide on a course of action. We have to try to put hearing problems into the curricula of all the staff who man the health systems in different parts of the country.

**Professor Alberti:** And then we have to think of training the specialists. Thailand is an excellent example. In 1960 there were 15 otolaryngologists, all trained abroad; a training programme was initiated, and now the country has a good supply of trained professionals. Hearing technicians could be trained at the type of centre that Dr Prasansuk is running in Bangkok. Once focal centres are established around the world courses can be created to meet the needs: short-term training courses, longer programmes, two-week training courses on how to use an audiometer for public health nurses, etc., emphasizing that each group

**In many countries young people are increasingly exposed to noise in discotheques and by wearing head-phones for their music. Does this have an effect on their hearing?**

**Dr Prasansuk:** Yes, I think so. We have discotheques in Thailand — I’m sure every country does! — and the sound is very loud, around 120 decibels. The youngsters enjoy it because in some communities there is no other entertainment. Because noise-induced hearing loss starts gradually, it is not noticed until much later. Discotheques undoubtedly have an adverse effect on hearing.
should be able to transfer its knowledge to other people.

Professor Kapur, you have recently reviewed activities related to the prevention of deafness and hearing impairment in some countries in the South-East Asia region. Do you envisage a potential for mobilizing resources in support of national programme development in these countries?

Professor Kapur: Yes, I am reasonably optimistic about this happening. I visited Burma, Indonesia, Nepal, and Thailand, and I am grateful to the South-East Asia Regional Office of WHO for making these visits possible. Dr Prasansuk of Thailand is with us here and has told us about her programme, which is already under way. In the other three countries I was encouraged by the response. The governments, particularly of Burma and Nepal, have included health care for hearing in their five-year plans. There is an overall shift from curative to preventive services, and health care is specially mentioned.

The ministers and directors-general of health fully realize that they have not given enough attention to the problems of hearing, because they did not know how to go about it. They are willing to develop and implement programmes for the prevention and management of hearing problems.

Another very positive aspect is the attitude of the health professionals. They have been overburdened with curative problems, trying with limited resources to treat chronic otitis media with pus coming out of the ears. They are keen to see a decrease in this kind of hearing problem and would whole-heartedly support a programme to improve hearing health care.

The Indonesian situation is unique in that, though they have no money specifically for hearing problems, a presidential directive rules that any child with a problem affecting his or her development must receive priority. So resources should be available if a programme existed. Most countries expressed willingness to support a programme of demonstration projects using available resources and training health personnel at the primary, secondary and tertiary levels. They need help with the technical knowledge to implement such a programme.

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In the context of the severe constraints in human, material and financial resources, where do you think the priorities lie for WHO's Prevention of Deafness and Hearing Impairment Programme?

Professor Alberti: First of all, in prevention: immunization against rubella and proper maternal care during pregnancy and delivery. Then in early detection of the deaf child (with the provision of appropriate resources so as to eliminate dependency).

Then back again to prevention, through the reduction of noise and information about the hazards of noise. Plus, of course, the whole area of appropriate nutrition and management of acute respiratory infections to prevent middle-ear disease.
**Forum Interview**

**Professor Kapur**: I agree. I would add that education on the causes of hearing loss is very important; people do not realize how much can be done by education and by understanding where the problems lie.

*What would you say is the future scenario in respect of hearing impairment and deafness?*

**Professor Alberti**: If we estimate that 4% of the population have a degree of hearing impairment sufficient to interfere with normal life — and as the population ages the percentage will increase — we are dealing with one of the most common of all handicaps. There is a need for awareness of this fact and for action. I am impressed by how effective the programmes have been in many developed countries, where the sequelae of middle-ear infections have now disappeared. I believe that this achievement is possible worldwide. There will be a dramatic improvement in some of the developing countries where, with awareness of the problems of noise and the proper use of hearing conservation programmes, that type of hearing loss is being reduced. Better, cheaper technology is becoming available, so with increased awareness and education I am quite optimistic about the future.

**Professor Kapur**: I am very pleased that we have reached the stage at which WHO is now involved, through the Programme for the Prevention of Deafness and Hearing Impairment, in sensitizing health professionals and governments to the need to conserve and maintain hearing and to develop activities in this field. This is a very good starting point, and I, too, am optimistic about the progress we have made so far.

**Dr Prasansuk**: It is important to remember that two-thirds of all hearing-impaired persons live in the developing world where they have no facilities. How can people have good health without being able to hear? If we do not make a start now, we cannot get to the goal of health for all by the year 2000.

To achieve the goal of primary ear care at primary health care level, one has to keep in mind that it has to be people-oriented at the grass roots. Programme implementation should be technically sound and, above all, socially acceptable: simple, economical and practical. It should be financially feasible for each country, with full participation by the people themselves. This is the way to success.

**Editor’s note**: Readers may also like to refer to the interview with Salyaveth Lekagul, “Ears to hear”, in *World health forum*, 10: 374–380 (1989).