HEARING AIDS FOR DEVELOPING COUNTRIES

Report of Informal Consultation to launch the WHO Guidelines for Hearing Aids and Services for Developing Countries

WHO, Geneva 11-12 July 2001

World Health Organization
Prevention of Blindness and Deafness (PBD)
World Health Organization - 2001 -

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EXECUTIVE SUMMARY

WHO estimated this year that 250 million people worldwide have moderate or worse (disabling) hearing impairment in the better ear. Two thirds of these people live in developing countries.

There is also evidence of a massive gap between the provision and need for appropriate and affordable hearing aids and services in developing countries. Approximately 32 million hearing aids are estimated to be needed per year in developing countries, but only 0.75 million are reaching them (this is less than 1 in 40 of those needed). Even if they did, hearing aids cannot be afforded by the vast majority of people in developing countries.

This gap has so far been largely neglected. Governments and NGOs have not appreciated the size of the problem and have not allocated resources to alleviate it. Most manufacturers have not realized the size of the potential market and have kept to a low-volume, high cost approach.

This consultation was convened by WHO to bring together scientific and technical experts, health care planners and providers, representatives of the hearing aids industry, users and donors to address these problems.

The first part of the meeting heard new information from recent population-based surveys on the increasing size of the problem in developing countries. Developmental, social and economic implications of hearing loss were discussed and then sufferers and care providers described what it means to be hearing-impaired in different developing countries, and how hearing aids can help.

The central part of the meeting launched the new WHO Guidelines for Hearing Aids and Services for Developing Countries and, through an interactive panel discussion with the key players, sought to find ways to stimulate manufacturers and service providers to address the problem on a large scale.

These guidelines have been developed by an expert working group set up by WHO in 1998. They set out minimum requirements and recommendations for affordable, appropriate, acceptable, and available hearing aids and services, and are targeted at manufacturers, distributors, policy makers and service providers at all levels. The hearing aid requirements should enable manufacturers to produce them at low cost and in bulk with currently available technology.

The target groups recommended for hearing aids and services should be children with an average hearing impairment in the range 31 to 80 dBHL in the better ear in the frequency range 500Hz to 4kHz, followed by adults in the range 41 to 80 dBHL. Behind the ear hearing aids should be preferred but body-worn aids will still be required. The guidelines emphasize that a hearing aid is only one component of a hearing health system that includes the earmould, battery, maintenance, repair, instruction, and rehabilitation. Hearing aid services comprise raising awareness, identification and assessment, provision, support for users, and training and should be designed and implemented as a low cost, sustainable, community service with elements at secondary and tertiary level. The guidelines provide detailed information on training various categories of health workers in this field including primary care workers in situations of limited resources.

Participants at the meeting recommended that newly gathered epidemiological data from recent population-based studies should be widely disseminated and further surveys conducted in more countries using the WHO Ear and Hearing Disorders Survey Protocol. There should also be studies on the cost-effectiveness of different hearing aid interventions, and on the cost-benefit of the burden prevented focusing especially on early provision of hearing aids to children.
Participants agreed to raise awareness with their own governments of the urgent need and likely social and economic benefits to provide appropriate and affordable hearing aids and services in their own country and to encourage those in need there to do likewise.

The meeting recommended that a task force should be convened by WHO to enable within 2 years the provision through a public private partnership of affordable, appropriate hearing aids and accessories, and the services to fit them in large enough numbers to commence to satisfy the need in developing countries.

It was also recommended that hearing aid manufacturers and allied industries should consider establishing a philanthropic foundation to provide support for projects for hearing aids and hearing care in the developing world.

A press release marked the launch of the guidelines and highlighted the size of the problem and the need for appropriate and affordable hearing aids costing US$10-20. A press conference that was held following the consultation publicised the plan to create the task force.
1 INTRODUCTION

Up now the numbers of people with hearing impairment in developing countries, including those who would benefit from hearing aids, have not been accurately known. Recently, some more accurate information begins to indicate that these numbers are substantially larger than previously estimated.

There is also evidence of a massive gap between the provision and need for appropriate and affordable hearing aids and services in developing countries. This gap has so far been largely neglected.

Governments and non-governmental organizations have not reduced the gap because they have not appreciated the size of the problem and hence have not found or allocated resources to it. Most manufacturers have not addressed the problem, since they have not appreciated the size of the potential market in the developing world and have preferred to stay with a low-volume, high cost approach.

This WHO consultation brought together scientific and technical experts, health care planners and providers, representatives of the hearing aids industry, users and donors to illuminate the problem and attempt to determine the next steps to solve it. The purposes of the meeting are set out in the box.

The first part of the meeting heard new information from recent population-based surveys on the size of the problem in some developing countries. Next, some of the main implications of hearing loss from developmental, social and economic viewpoints were discussed. To put these problems in their context, sufferers and care providers then described what it means to be hearing-impaired in developing countries, and how hearing aids can help.

The second part of the meeting presented and launched the WHO Guidelines for Hearing Aids and Services for Developing Countries. These guidelines, which have gone through extensive peer review, were developed by a group of experts and users, the Hearing Aids Working Group, which was set up following a recommendation from a recent workshop.

In the third part of the meeting, an interactive discussion with the participants was led by a panel comprising representatives of users, health care providers and service providers from developing countries, the hearing aids industry, the donor community, and the WHO Hearing Aids Working Group. The discussion focused on the role of the WHO guidelines in stimulating adequate provision of appropriate and affordable hearing aids and services for developing countries.

A press release was produced about the launch of the guidelines (see Annex 3), and a press conference was held following the consultation (see Annex 4). This led to considerable media interest. Depending on the conclusions of the meeting, it is planned that the process would lead to discussions with associations of manufacturers and service providers on how to stimulate provision.

- To raise awareness of the burden of deafness and hearing impairment in developing countries, and the gap between need and provision of sufficient appropriate and affordable hearing aids
- To launch the WHO Guidelines for Hearing Aids and Services for Developing Countries
- To stimulate manufacturers and service providers to address the problem on a large scale

**Purposes of the Meeting**
1 WHO: Guidelines for Hearing Aids and Services for Developing Countries, World Health Organization, Geneva, July 2001. PBD/PDH/01.1. Also available for reading and downloading at the following internet address: http://www.who.int/pbd/pdh/Docs/hearing_aids_guidelines_E.pdf

2 RECENT INFORMATION FROM DEVELOPING COUNTRIES

2.1 Oman

The Countries of the Gulf Co-operation Council (GCC), that is Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates, total nearly 30 million people all using the same language and suffering similar diseases. It would seem necessary that they should have similar health policies and priorities.

Oman, as a member of the GCC, has shown considerable progress over the last two decades. Immunization coverage against tuberculosis, measles, diphtheria, pertussis, tetanus, and polio is approaching 100%. Between 1978 and 2000, institutions with ear care facilities increased from one to twenty and qualified ENT surgeons from two to sixty. Indications for Ear Surgery between 1982 and 1998 have changed from 38% to 11% of cases having cholesteatoma but from 9% to 32% having otitis media with effusion; the proportion with perforated tympanic membrane increased slightly, from 53% to 57%. Active disease at the time of surgery decreased from 86% to 48% in the same period. A Deafness database (for sensori-neural hearing loss) was created in 1986, and showed the major causes of deafness and hearing impairment to be congenital and genetic disorders, chronic otitis media, and early childhood infectious diseases. The contribution of oto-toxicity and noise pollution is less but that of genetic causes is greater in Oman than in other developing countries. The high rate of consanguineous marriages, 70% of all marriages, is thought to be an important factor in the group of genetic causes. School entry hearing screening began in 1994, a National Survey of deafness and hearing impairment was performed in 1996, and most recently, universal newborn hearing screening was started.

The 1996 national house-to-house survey randomly sampled 11,402 subjects in 116 clusters throughout the country. Participation rate was over 90%. The prevalence of bilateral deafness was found to be 55.3 per 1000 population. Projection of this figure to the total population gives 88,000 bilaterally deaf existing in Oman at the time of survey, with males being more affected than females. Projecting the same rates onto the whole population of the GCC countries gives 1,056,000 persons bilaterally deaf in these countries at the time of the survey.

20.7 Per 1000 Population were found to have bilateral disabling hearing impairment which projects to 32,962 in Oman at the time of the survey. Male to Female Ratio Was Equal. 374 persons were found to need a hearing aid in the survey population which projects to approximately 50,000 for the whole of Oman. The number of hearing aids supplied in the year 1997 in Oman was 650 which gives a coverage of hearing aid provision in 1997 of 1.3%. A similar calculation projects that 600,000 hearing aids were needed in the GCC countries at the time of the survey.

The magnitude of the problem and main groups of causes in 1998, determined through clinic sampling, are shown in the figure.

Calculations using the survey and clinic figures indicate that 126,000 need tympanoplasties in the GCC countries, but so far only 2004 are done per year.

Cochlear Implants have successfully restored partial hearing to some profoundly deaf people; they are expensive and often the complex rehabilitation needed is not available.

It is not clear why they are given so much importance by ENT Surgeons, such as at recent scientific meetings, when many know little about hearing aids. Instead of promoting cochlear implants it would be preferable to focus on prevention, deal with otitis media, increase public awareness about deafness and encourage acceptance of hearing aids.
Problems remain with hearing aids, including cochlear implants. For example, there is no clear legislation for the rehabilitation of handicapped people and no clear health policy for the provision of hearing aids. There is a lack of a sound infrastructure for audiological and speech therapy services and there is currently no expertise in the fitting and repair of aids over the counter. There are significant questions concerning who will pay for these devices and their batteries and for their repair. It is also very important that there should be good follow-up which is culturally appropriate. It should be encouraged through understanding at pre-fitting and enforced if necessary. Nigeria.

2.2 Nigeria

In developing countries, there is a major paucity of population-based data on prevalence and causes of hearing impairment. The available data on Hearing impairment is mainly hospital or clinic-based and may only survey particular target groups. This gives difficulty in assessing the magnitude of Hearing impairment and planning programmes for intervention.

This situation is found in Nigeria, so the National Ear Care Centre (NECC) with support from Christoffel Blinden Mission (CBM) has conducted a population-based survey on hearing impairment in 3 states (see table 1). The objectives were to assess the prevalence and identify major causes of hearing impairment in Nigeria; to assess the distribution of hearing impairment among different age groups and geographical regions; and to determine the magnitude of action needed to manage hearing impairment in the population.

The study design was based on the WHO Ear and Hearing Disorders Survey Protocol and Software (EHDSP) and used a modified multi-stage sampling to obtain clusters of whole populations of people aged 6 months and above. Demographic, audiometric and clinical information as in the WHO protocol was obtained from all subjects studied and recorded. Analysis of results was done using the WHO software.

The results showed that prevalence rates for mild or worse hearing impairment and for disabling hearing impairment (moderate or worse in better ear) were substantial at 17.9% and 6.2% respectively. Nigeria has a population of 120 million, so this projects the number of people nationally with disabling hearing impairment to be 7,440,000. The major causes of hearing impairment are acquired with infectious causes as the biggest group. 40% of country’s land area is in the meningitis endemic zone which is likely to be a significant factor. The use of potentially ototoxic drugs has

<table>
<thead>
<tr>
<th>HEARING ASSESSMENT</th>
<th>No of subjects (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ak n = 2024</td>
<td>Bn n = 3007</td>
</tr>
<tr>
<td>Normal Hearing</td>
<td>1720 (85%)</td>
</tr>
<tr>
<td>HI</td>
<td>304 (15%)</td>
</tr>
<tr>
<td>DHI</td>
<td>81 (4.4%)</td>
</tr>
</tbody>
</table>

HI = Hearing Impairment (> 25 dB)
DHI = Disabling hearing impairment = Average threshold in better ear > 40 dB for ages 15 years and above or > 30 dB for ages 4 years to 15 years.

<table>
<thead>
<tr>
<th>Age groups (yrs)</th>
<th>Total no. of subjects n = 8975</th>
<th>No. of subjects (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H. I.</td>
<td>DHI</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>1221</td>
<td>28 (2.3%)</td>
</tr>
<tr>
<td>5 - 14</td>
<td>3820</td>
<td>510 (13.4%)</td>
</tr>
<tr>
<td>15 - 24</td>
<td>1349</td>
<td>210 (15.6%)</td>
</tr>
<tr>
<td>25 - 34</td>
<td>762</td>
<td>156 (20.5%)</td>
</tr>
<tr>
<td>35 - 44</td>
<td>581</td>
<td>164 (28.2%)</td>
</tr>
<tr>
<td>45 - 54</td>
<td>498</td>
<td>159 (31.9%)</td>
</tr>
<tr>
<td>55 - 64</td>
<td>343</td>
<td>153 (44.6%)</td>
</tr>
<tr>
<td>65 and &gt;</td>
<td>401</td>
<td>224 (55.9%)</td>
</tr>
</tbody>
</table>
also been shown to be high. All these causes are preventable.

Of the 1604 subjects who needed some kind of clinical or rehabilitative intervention, 5.6% needed medication, 3.2% needed a hearing aid, 0.6% each required language/speech rehabilitation or special education or vocational training. 2.3% required surgical referral and 7.3% needed some kind of further evaluation.

In a population of 120 million, the projected number of Hearing aids needed would be 3,840,000.

Thanks are due to the Federal government of Nigeria through NECC, the ChristoffelBlinden Mission and the Ministries of health in Akwa Ibom state, Benue state and Katsina state for supporting this survey.

2.3 Indonesia

Prevalence Survey. This study used the WHO Ear and Hearing Disorders Survey Protocol (EHDSP) to conduct a population based, cross-sectional stratified multi-stage cluster survey, with a sample size of 6000 in 30 clusters. The study population was randomly selected from Bandung Municipality and Bandung District (total population: 5,034,685) in Java, Indonesia. Informed consent was obtained from subjects and treatment given or referral as required.

Results showed a prevalence of disabling hearing impairment of 4.5% in the better ear (disabling hearing impairment defined as a hearing threshold > 30 dB in the better ear for persons under 15 years, or > 40 dB for persons of 15 years and older, using an average of thresholds at 1, 2, and 4 KHz). 13% of the population had occluding wax in one or other ear and 3.6% had chronic suppurative otitis media (1.7% in age under 5 years), 2% had dry perforation and 0.3% had serous otitis media with effusion. 8.3% needed medication and 3.8% non-urgent referral for surgery. 3.7% of subjects needed a hearing aid. Thus that ear disease, especially middle ear infections, still have a high prevalence in Bandung area and at least 50% of the burden of hearing impairment is avoidable, so that programs for "primary ear care" should be started in this region.

Validation Study. A further study in the same population in 240 subjects was undertaken to measure the validity of the methods used for hearing testing and ear examination recommended by the WHO protocol. Results obtained from field testing (ambient noise 40 - 45 dBA) were compared with those on the same subjects and using the same testers in ideal conditions at a hospital with a soundproof room and also when performed by specialist testers to give a "golden standard". Regarding a 5 dB difference "normal" variation, the main result was that 71.5% have the same thresholds but 28.5% have different thresholds. The overall average hearing loss in the better ear in the field subjects was significantly slightly higher by 2.5 dB than when the same subjects were tested in the sound-proof room in the hospital. The results were consistent and reliable in both places (correlation coefficient 0.795). Validity measurement of the diagnosis of hearing impairment showed sensitivity to be 85.7% and specificity 100%, kappa index: 90.1% (> 75% represents excellent agreement beyond chance).

Tests of inter- and intra- observer variation between the 5 testers (1 experienced, 4 junior) showed some low correlations in the field especially at the 1 KHz frequency. Comparisons between field and hospital testing showed significant differences for one tester in the 1 KHz and 2KHz freq., giving higher values, not so reliable; another junior tester showed significant
differences in all frequencies, but with a consistent positive correlation, hence reliable; a further junior tester showed higher values with some significant differences, but high correlation and hence judged highly reliable. One junior tester was generally not reliable - a possibility that should be checked whenever testers are selected. Overall, hospital values were lower than found by the senior tester but there were no statistically significant differences. Thresholds tended to improve on the second test in the same subjects.

It was concluded that overall there was a very small percentage difference between the field and hospital otologists. It was recommended that an experienced tester (at least one year experience in audiology) is preferable for the hearing testing in the field. Where newly trained testers are used, inter- / intra- observer validation should be measured before the survey begins to determine the good and poor field testers. The study confirmed that audiology is a somewhat subjective test, with a “learning process” (each second test had lower and more reliable threshold level values). Training of subjects before actual testing would be ideal, but technically difficult.

**Hearing Aids Survey.** An interview survey was conducted of hearing aid facilities in West Java Province. The hearing aid types sold consisted of 40% pocket type (body-worn) for small children & the aged, and 60% BTE (behind the ear). The cost of the 2 types of hearing aids were in the ranges US$60 – 90 and US$150 – 450 respectively. Digital BTE each cost about US$1,200.

Hearing aid facilities of West Java Province consisted, in the capital city Bandung, of 3 hearing aid dispensers with hearing aid technicians & earmould lab, private ORLs and smaller agents in all other cities.

Approximately 600 hearing aids were sold in the province for the year 2000 (10% for congenital deafness, 40% for presbyacusis, 50% for adults with unknown causes). In the total population of West Java of 40 million, if 3.7% need a hearing aid as was shown in the survey (see above), this would mean 1,480,000 hearing aids are needed. If a hearing aid lasts 5 years, then 296,000 units need to be sold per year. Currently only 0.2% of this number (600/296,000) are currently being sold.

### 2.4 India, Myanmar, Sri Lanka

**Attitudes to hearing loss** vary from indifference through irritation to stigmatization. Why should we care? Hearing loss affects education, social situations, occupation, religious practice, home and family life and transportation. A recent questionnaire study compared attitudes to hearing loss between a native community (English mother tongue) with a settled Bangladeshi community (Bangla, Urdu or Gujarati mother tongue) in the same Northern English city (Mackenzie and Arnold, 2001). Perceptions were very different with the worst perception of hearing loss and hearing amplification being amongst the English speakers who had most concern about the effect of deafness on the family. Bangla speakers had most concern about its effect on education.

What is the size of the problem worldwide? Unfortunately, much of the data already obtained from developing countries is unreliable and it is not wise to extrapolate figures from developed countries such as from the UK and USA as has sometimes been done. There is also a need to be consistent in defining what is a significant hearing loss which is not an easy task.

Prevalence studies are much better than guesswork. There are now approximately 6 billion people in the world and until recently it was estimated that 120 million persons globally have disabling hearing loss\(^1\). WHO’s latest estimate (see Annex 3) = 250 million. It has also been

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\(^1\) **WHO DEFINITIONS OF DISABLING HEARING IMPAIRMENT:**

Disabling hearing impairment in adults should be defined as a permanent unaided hearing threshold level for the better ear of 41 dB or greater; for this purpose the “hearing threshold level” is to be taken as the better ear average hearing threshold level for the four frequencies 0.5, 1, 2, and 4 kHz."

Disabling hearing impairment in children under the age of 15 years should be defined as a permanent unaided hearing threshold level for the better ear of 31 dB or greater; for this purpose the “hearing threshold level” is to be taken as the better ear average hearing threshold level for the four frequencies 0.5, 1, 2, and 4 kHz."

[Note that the term “hearing impairment” without the epithet “disabling” is taken to mean a hearing problem of any level or all levels of severity.]
estimated that 1 in every 1000 babies born worldwide has a severe / profound hearing loss (Logan and Mackenzie 2001).

**Prevalence of hearing impairment in Asia.** Population-based, randomly selected cluster sample surveys using the WHO Ear and Hearing Disorders Survey Protocol and software (WHO 1999) have been conducted in 4 countries in the South-East Asia Region (India, Sri Lanka, Myanmar, Indonesia). Approximately 6000 subjects in 30 clusters of 200 subjects each were tested audiologically and received an ear examination in each survey. Testing in these studies was not always performed in ideal conditions which means that 40dB is an appropriate cut-off. Preliminary analysis indicates that disabling hearing loss is substantial in the population (see table). Many of these are children and it has been well researched that poor hearing leads to poor education. Data is currently being analysed and will be published soon.

**Rejection of hearing aids.** There is a huge lack of provision and lack of use of hearing aids, even in developed countries. Of those aged over 65 years in the USA who need a hearing aid, only 21% actually wear one. In the UK, almost 70% of these needing a hearing aid did not wear one. Only 60% of users are happy with their hearing aid (Kochkin et al, 1993). The stigma and difficulties of wearing hearing aids are pervasive (Arnold and Mackenzie, 1998).

**References**


**2.5 China**

Recent advances in progress in prevention of deafness and hearing impairment including hearing aids services in China are focusing on raising public awareness, enhancing prevention activities and initiating the national campaign of “Helping hearing disabled people”.

**Raising public awareness.** The National Ear Care Day (March 3) has been set up since 2000. The themes were “prevention of ototoxic hearing loss” and “early intervention of hearing impairment” in 2000 and 2001 respectively.

Large consultation activities were held in almost all center cities throughout the whole of China on that day. This annual public campaign played a great role in raising awareness and spreading scientific knowledge about hearing especially, on the risk of ototoxic damage from

abuse and/or improper use of drugs. It also made more people conscious of the importance of early detection and early intervention for hearing impairment.

Awareness was also raised in TV shows, radio broadcasts and publishing stories, which showed hearing aids successfully rehabilitating from a deaf-child to an excellent university student.

More and more hearing impaired people and their families were thereby encouraged to accept scientific treatment for their hearing problems. In the Out Patient Department at Jiangsu Provincial Hospital, the number of hearing loss patients are twice what they were two years ago.

At the beginning, most hearing impaired people do not like hearing aids; and want medicines for their sensorineural hearing lose. A hearing aids delivery system must be based on the real needs of such people alongside competing necessities such as food, shelter and drinking water. There is still a long way for us to go.

Enhancing prevention activities.

1) Ototoxic drugs were considered the fourth main cause of hearing loss, after presbyacusis, otitis media and high fever in China (National survey, 1987). The Guidelines for Clinical Use of Ototoxic Drugs were issued in 1999.

In order to control this avoidable hearing loss, The National Ministry of Health issued guidelines and required all clinicians, especially primary health care workers, to pay more attention to use of ototoxic drugs; they should be vigilant of the risk and ensure medical safety. This was a good intervention which appears to be reducing the incidence of drug-induced hearing loss, although there is still a lack of accurate data.

2) Universal Newborn Hearing Screening Program has been recommended. UNHSP has been conducted in a number of Maternity and Infant Health Institutes and University Hospitals with OAE (oto-acoustic emissions) and ABR (auditory brain-stem responses) procedures since 1999. In the Jiangsu Provincial Hospital, 1213 newborns (96% of all live births) were screened during the last one year. 1098 newborns passed the first TEOAE screening within 72 hours after birth. 92% of newborns, who failed the first screen, passed the second at one month of age. About 8% of newborns, who failed both screens, needed to take the ABR procedure. The programme identified three hearing impaired newborns (2.47% of total screened). In the follow up procedures, further diagnosis and habilitation were made.

UNHSP provides the earliest opportunity to identify and deal with hearing impairment. It is worth recommending if there are trained staff, rehabilitation services and facilities already available. Up to now, at least two provincial governments have issued official documents to recommend the program.

Initiating the national campaign of “Helping hearing disabled people 2001-2005”.

Purchasing ability is a big problem that limits the use of hearing aids in China. At present, one basic BTE hearing aid costs a worker twice his or her monthly salary, or a farmer's family two months income (150 US$).

For reducing hearing disabled people's heavy burden, China's government is initiating the national campaign of “Helping hearing disabled people” from 2001 to 2005.

The purpose: to provide appropriate and affordable hearing aids and (re) habilitation services for poor deaf and hearing impaired children.

Components:

1) Hearing aids are purchased in bulk (8,000 each year, total 40,000 in 5 years) by the government to reduce costs from 150 USD to 75 USD / each, with three years warranty.

2) To train 150 audiological technicians and hearing aids maintenance workers for better services.

3) To establish the center-satellite linkage model: national - provincial - city - county - district – community – family. To provide convenient and effective (re) habilitation services for deaf children, particularly in rural and remote areas.

4) All services will be recorded, annual statistics and analysis will be available.

5) Raising awareness will occur throughout all activities.

In Jiangsu Province, we conducted a pilot implementation of the campaign in Jiangdu and Baoyi counties last month. We tested 50 pre-lingual deaf-children (age from 4-12 years old, 7 years old on average), who were referred by primary health care workers. One third of them had
severe impairment, two thirds had profound. All of them had no experience of hearing aids. 16 children were fitted with hearing aids (unilateral only) this time. People thought as ever that hearing aids were still cumbersome, expensive and not always effective. On the other hand, too profound a hearing loss and the age beyond speech development hindered the remainder from being fitted in these places. In addition, despite reduced prices, the majority of people in poorer areas, still cannot afford them at the current price (75 USD). If the price reduces to 50 USD, that would be better.

China is the biggest developing country. There are 1526 (re) habilitation centres for deaf children. 140 000 deaf children were trained with hearing aids in the last ten years. Most of them developed speech well and entered schools without language barriers. Nearly 200 profoundly deaf children have been given cochlear implants since 1997. In the last three years, new projects as mentioned above have been implemented. We have got significant achievements, but compared with more than 23 million hearing disabled people in China, much work remains to be done.

At present, the following items should be particularly considered and solved for China:-

(1) To update definitions of disabling hearing impairment and grades of hearing impairment. \textit{Disabling hearing impairment} in China is defined as a permanent unaided hearing threshold level for the better ear of 41 dB or greater on average at 0.5, 1 and 2 KHz both in adults and children.

Comparing with WHO recommendation (1991 and 1997), two points should be updated.

i). To add 4 KHz to the average hearing threshold lever.

ii). Disabling hearing impairment in children should be defined separately. That should be as a permanent unaided hearing threshold level for the better ear of 31 dB or greater on average at 0.5, 1, 2, and 4 KHz.

\textit{The classification of grades of hearing impairment} also should be updated in two points:

i). To add 4 KHz to the corresponding audiometric ISO value (Average of 0.5, 1, and 2KHz) at the better ear.

ii). To change grades from six grades (25 dB or better, 26 – 40 dB, 41 – 55 dB, 56 – 70 dB, 71 – 90 dB and 91 dB or greater) to five grades (25 dB or greater, 26 – 40 dB, 41 – 60 dB, 61 – 80 dB and 81 dB or greater).

If we use new criteria, the figure of hearing disabled people in China would be much more increased.

(2) To conduct a new epidemiological study on deafness and hearing impairment. All the prevalence data of hearing impairment in China came from the national survey in 1987. The previous data cannot reflect the current situation. In addition, present definitions are different from before. So a new epidemiological study to obtain accurate data is basic, important and urgent.

We made a survey protocol in accordance with the WHO Ear and Hearing Disorders Survey Protocol in Jiangsu province last year. We are seeking funds for conducting a standardized and significant population-based survey following a pilot study.

2. To promote services of older people with hearing impairment.

As life expectancy increases, attention to older people with hearing impairment becomes more and more important. Presbyacusis was the number one cause of hearing disability in China (44 %, national survey 1987). It leads to loneliness and neglect. We should provide hearing aids services not only for children as a priority but also for older people in order to improve their quality of life.

3 IMPLICATIONS OF HEARING LOSS IN DEVELOPING COUNTRIES

3.1 Developmental and Social Implications:

These implications consist of factors that can be grouped into those which are person-related, those which are family-related and those which are community-related.

Person-related factors are firstly those due to the nature of the hearing impairment itself and the resulting ability or disability in communication. Associated additional disabilities, the
availability of means of remediation, and the personality of the subject will also influence the effect of the impairment.

Within the family, prior experience amongst other family members of having or relating to someone with a hearing loss, together with the family’s size and its socio-economic status will be factors. The position in the family of the subject may be a factor.

Cultural beliefs and practices in the subject's community may influence the impact of the hearing loss, as may whether the community is urban or rural. A major influence on children with hearing loss would be the availability, or lack, of facilities for special and normal education and their type and quality.

There is at present a paucity of published research from developing countries on this topic. The experiences of children and adults with hearing impairment demonstrate that they can suffer from isolation, stigmatization, over-protection, low self-esteem, and vulnerability to exploitation.

The isolation and feelings of isolation result from the subject’s poor communication ability, made worse by the likely lack of opportunity to mix with a hearing-impaired peer group. The child or even an adult with hearing loss may end up being hidden away by the family or sent away. The person with hearing impairment may be stigmatized because of her or his poor speech or lack of speech with the consequence that others will think that the subject is stupid. The subject may also have associated physical defects that may add to the stigmatization.

Over-protection may occur because of the poor communication ability and inability to hear warning signs. It may be compounded by parental beliefs and guilt at having a hearing-impaired child. Related to this is low self-esteem which results from the disempowerment that occurs due to being left out of conversations, mixing only with hearing persons, having less and/or worse education, or being sent away from the family. All these effects, coupled with a need for security and status, may make a hearing-impaired person vulnerable to exploitation.

In conclusion, it is apparent that the social and developmental effects of a hearing impairment are variable and depend upon many factors. The ability to communicate is an important key to a hearing impaired person’s self-esteem, personal development and safety and to successful integration into the community. Intervention in the form of adequate hearing aid service provision and efficient support services would thus have a significant impact upon the quality of life of many children and adults.

3.2 Economic implications:

The most recent estimate by WHO for the burden of hearing loss in the world is that 250 million people have disabling hearing impairment as defined by WHO (for definitions see section 2.4). Two thirds of these people live in developing countries. This new figure is more than twice the previous estimate of 120 million with disabling hearing impairment, published in 1995 for the World Health Assembly Resolution on Prevention of Hearing Impairment. The estimate before, made in 1986 using a similar definition, was of an even lower figure of 42 million persons in the world with moderate or worse hearing impairment. The reasons for these previous lower estimates are probably due to increasing recognition of cases of hearing loss in countries, ageing of populations worldwide thus adding to the burden of presbyacusis or age-related hearing loss, and some increases in certain risk factors. However it must still be emphasized that these figures are just estimates and, although there is beginning to be more, credible population-based data available from developing countries, we still urgently need more surveys to be conducted in these countries to determine more accurately the prevalence and causes of deafness and hearing impairment.

One of the most important uses of this data will be for the economic analysis of the burden of hearing loss. This information will be essential to convince governments and donors of what appear to be massive costs to society of this disability and hence how important it is that they allocate resources to deal with it. For example a recent study in the USA estimated the costs recently of rehabilitation, special education, and under- and un-employment due to disorders of hearing, voice, speech, and language amounted to between US$154-186 billion. This was approximately 3% of the gross national product of the USA in 1999. It would be very useful to perform similar calculations for developing countries. It will also be important to carry out cost-
effectiveness studies to compare interventions, such as different hearing aids services, and also compare these with other interventions and prevention.

Using the latest estimate of the burden of disabling hearing impairment it is possible to make an approximate estimate of the current gap between provision and need for hearing aids in the world (see box). The most recent estimate for world production of hearing aids was 6 million units in 2000\textsuperscript{vii}; 75% of the annual production are distributed to North America and Europe and 25% to the rest of the world. Japan, Australia and New Zealand account for over half of these and the remainder, about 750,000; are distributed in developing countries\textsuperscript{vii}. Approximately 32.2 million hearing aids are estimated to be needed per year in developing countries, so the shortfall is 31.45 million. Less than 1 in 40 hearing aids needed for developing countries are actually getting there. This is a huge and expensive problem. Hearing aids cannot be afforded by the majority of people in poor developing countries where in some countries the average monthly salary of a teacher, for example, is under $10. It is essential to make the cost of the solution more affordable. If this can be done there is thus a huge opportunity to make a difference against deafness and hearing impairment in the developing world. It would be a very good investment.

\begin{table}
| People in world with disabling hearing impairment: 250m |
| Subtract those with profound loss (6 million): -6m |
| 244m |
| Average life of a hearing aid = 4 - 5 years |
| Number needed per year globally (244/5)= 48.8m |
| Number needed per year in developing countries = 48.8 X 0.66 (may be an under-estimate) 32.2m |
| Estimated supply to developing countries = 0.75m |
| Shortfall = 32.2 - 0.75 m = 31.45 million per year |
| Less than 1 in 40 hearing aids needed for developing countries are getting there |
| (32.2/750,000 = 42.9) |
\end{table}

Need for hearing aids in developing countries

\textsuperscript{iii} Smith, AW. WHO activities for prevention of deafness and hearing impairment in children. Scand Audiol 2001; Suppl. 53, 30: 93-100.
\textsuperscript{vii} Green, D. Personal communication.

4 WHAT DOES IT MEAN TO BE HEARING-IMPAIRED IN THE DEVELOPING WORLD?

4.1 Bangladesh

I am an ENT clinician and hearing impaired from Bangladesh, just passed the MSc. for Audiological Medicine from the University of Manchester.

I feel tremendously honoured being invited to this informal consultation to describe my experience as a hearing impaired and hearing aid user from a developing country.

As a sufferer from a developing country like Bangladesh, I can give you a real picture on what is going on in this particular field:

a). For the sheer majority of the population, normal hearing impairment is not an important health issue due to lack of knowledge. They are either unaware of the role of hearing
in their social, emotional and psychological well-being or perhaps poverty has bound them to undermine this issue where achieving the basic need for survival is difficult.

b) Lack of responsible health professionals: even among the ENT specialists, a substantial proportion of them are not aware of hearing impairment and its treatment e.g. there is no effective practice of microsurgery like ossiculo-tympanoplasty which alone could have corrected millions with conductive hearing loss. A great majority of them never feel concerned about the impact of hearing impairment and never advise any hearing test or hearing aid where necessary.

c) Lack of realisation by the health authority and the health professional about the essentials of a Department of Audiology in the health provision system.

It is worthwhile to mention here that my hearing loss is due to chronic suppurative otitis media. Until the past year I never had a hearing test or wore a hearing aid. As soon as I arrived to attend my course, I consulted an ENT specialist where I was prescribed a hearing aid and it has changed my life in the aspect of communication. Before, what was a murmur is now an intelligible sentence and I feel confident.

4.2 Gaza

I am very pleased to have the opportunity to talk about what it means to be hearing impaired in developing countries. Even though it is a sad story, it is a story that badly needs to be told, for literally thousands in our community suffer in silence, unable to make their cause known to the world outside.

In spite of the fact that there are large numbers of persons with hearing loss living in the Gaza Strip, services only emerged nine years ago at the time this Palestinian non-governmental organization was established. Before, there were no schools for the deaf, no audiology clinics, no speech and language clinics, no programs for the provision of hearing aids, no sign language courses, and no programs to help distressed parents to cope with the difficult task of raising a child with hearing loss.

It was a struggle for our organization to locate financial support to establish and maintain a school for deaf children, and to train staff in a community where no professionals at all existed.

Hashem, A Profile:

Nine years ago when we opened our little 4-room school, I met Hashem, a deaf man with three deaf children, and who was, himself, one of five deaf siblings. He represented the situation for all deaf people in Gaza City then and also still today for thousands in the Gaza Strip who still do not have access to appropriate schooling or services.

Hashem came to Atfaluna to enroll his daughter in the new school for deaf children. He was visibly moved to see his dream come true: a school for deaf children in his lifetime. He said in sign language, "Deaf people have been dead all of these years, but now they will live." Of course, deaf children do not now live in Paradise, even though things have changed for the better in the past nine years.

Hashem had never been to school, nor learned to read and write. He had never had a hearing test and never had a hearing aid. In his youth he was taunted by neighbourhood children as the "crazy boy." He started learning to be a carpenter at the age of nine years — a daunting task for a little deaf boy who couldn't even count to five and had little understanding of the world around him, except for what he could see and feel.

Hashem told me how it had been for him and his four deaf brothers and sisters. He signed, "We used to envy our hearing brothers and sisters who would go to school in the morning. Mostly we sat home and cried. Well, we didn't exactly know what a school was, but we felt so sad because we couldn't go with them, and we didn't have school bags either. We used to play that we were going to school and carried pieces of wood pretending that they were school bags. No one cared much about us at home; even our parents paid little attention to us. They couldn't communicate with us and we were always being scolded and punished for reasons we never understood. We knew a few deaf children whose parents sent them to school far away. They had hearing aids and we envied them, thinking that we could just put them on and hear and talk and be like other children. We tried to convince our parents, but they said they had no money. Hearing aids were only for the rich."
Today there are still many like Hashem in the teeming Gaza Strip which has a population of 1.2 million, 60% unemployment, and a great deal of poverty. The number of persons with hearing loss of all degrees is great, shown by the numbers of persons who come to us for help. Our school now has 200 enrolled from Gaza City alone; another 80 teenagers and young adults are in our vocational training programs. Our waiting list is close to 100 and our audiology clinic sees an average of six patients daily, in addition to community outreach work. Our new building is already full, and our finances cannot help more children. Our government neither provides subsidies to special education institutions nor runs programs of its own.

Hearing Aids. A major concern for us is to provide hearing aids for the many who come to us for help but in spite of our efforts to raise funds for hearing aids, we are not able to come anywhere close to meeting these needs. Only half of the 280 children in our programs have hearing aids. In general, those that do have hearing aids make better progress with language, speech-reading and acquisition, and social integration than those that do not. Children who acquire at least some oral skills through the assistance of hearing aids and special education integrate much better into the community, find jobs, and lead a better quality life. Donated reconditioned hearing aids help, but spare parts are problematic. And, of course, children will be children; they lose their hearing aids, break them, dunk them into water and sand ... and their ears grow and new ear moulds are always needed. Keeping the children in our school supplied with hearing aids needs major and ongoing financing and staff and then parents cannot keep up with the cost of batteries. They are more concerned with finding money for food for their large families.

Children with lesser degrees of hearing loss in our school face an even more difficult fate. If you are a child who is hearing-impaired, as opposed to deaf, you will be sent to a regular school. You would most likely not have a hearing aid because your family couldn’t buy you one and there are not enough free hearing aids to go around. Probably no one ever discovered your hearing loss since no programs exist for infant or school screening and, anyway, your parents were too burdened with trying to feed and clothe their large family to have noticed. You will struggle in school, probably only to third of fourth grade elementary. Your parents will beg the school to keep you, but you will not be allowed to stay. Teachers and family alike will accuse you of being lazy and unintelligent, and your classmates will mock your heavy speech.

After you have dropped out of public school, you will stay home helping out with chores, feeling terrible about yourself. Your family will try to keep your hearing loss a secret lest it be known that there is a "problem" in the family that might compromise your sisters’ chances of marriage or render you or your family victims of insensitive or cruel remarks. Your mother will tell friends that you were a lazy student, and so they had to take you out of school — anything but tell them that you have a hearing loss. You will have few or no friends and you will spend your time sitting idly in the alleyways of your dusty refugee camp. You will not want to go to the market or anywhere else for that matter because when you did you didn't understand what the shopkeeper was saying and that caused you great embarrassment. You seek refuge in your house, eventually becoming frightened of the outside world. More than likely you will never find a job or get married. However, if you are one of the lucky ones, your family will find you a place in a bamboo workshop, a bakery, or a sewing workshop where you will work long hours for little pay. When your parents die, you will live with your brother and his family and you will help to take care of his children and do more chores. If you want a new bar of soap or a candy bar or a new blouse, you will have to ask your brother for money. He will have his own set of problems and will be hard put to feed his own 10 children, some of whom may suffer hearing loss, as well, ... and the cycle continues.

But there is hope. Hashem is now an indispensable employee of our organization, and heads up the carpentry vocational training programs. He also counsels the older deaf boys with the wisdom and experience of a trained professional. Hashem’s four children do have hearing aids, ... and school bags ... and are outstanding students. Parents are learning to talk about their children’s hearing loss, starting to communicate with them, starting to fight the superstitions and the ignorance.

We hope that one day the Rights of the Child will apply to deaf children in Palestinian society. We hope that one day every child with hearing loss can get an education, can have a hearing aid if he or she would benefit from one, and can hold his or her head up high in the community. We hope that anyone who cares about making a better world will come to the aid of these children.
4.3 South India

India is the largest democracy in the world with 1000 million population. It also has over 12 Million incurably deaf people, over 5 Million elderly with hearing impairment, and over 70 Million with Ear Diseases and Ear Problems. Over 800 Million live in rural villages with no services available to them and over 90% of the deaf children of school going age remain out side the school system with not much possibility of education.

A recent house to house survey amongst a population of just over three and a half thousand subjects in an area of Tamil Nadu state around Tiruchirappalli found 423 subjects with mild hearing loss (25-40 dB) and 207 with hearing loss greater then 40 dB threshold (see table).

A survey of just over six and a half thousand rural village schoolchildren aged 5 – 14 years showed that 110 (1.7%) had a Hearing loss of over 40dB. Most of these children were unaware of the hearing loss and remain under achievers in School.

The Main issues that need to be addressed are shown in the box.

To fulfil the requirements appropriate and affordable hearing aids and facilities for assessment and fitment need to be developed, especially in rural locations. Planning and distribution of Hearing Aids should be on the basis of needs and hard of hearing children in schools should have priority.

Government and NGOs should make coordinated and sustained efforts to prevent hearing loss, make early identification of hearing impairment, and fit and follow up hearing aids and provide support services for speech and language.

Community-based work is the only possible way to provide ear care services, special educational services and hearing conservation programmes in rural locations.

How can we ensure there are ear care facilities in rural locations to control this problem? How can we ensure that parents and teachers participate in providing ear care for children? Hearing aids need fitment facilities, repair facilities, batteries, spares etc. How can we ensure these facilities are available in rural locations? Can NGOs be encouraged to take this responsibility? Presently Hearing aids are sold in the market at a profit of nearly 80% by sellers. Can NGOs be promoted to distribute Hearing Aids at the purchase cost? For example, the Holy Cross Service Society, Tiruchirappalli, Tamilnadu, India has successfully demonstrated the following through community based work:-

- assessment of hearing loss and fitment of hearing aids in rural locations.
- prevention of deafness work in rural locations
- treatment of middle ear disease, the main cause of acquired hearing loss
- Inclusive education of Deaf Children in regular Schools through community-based educators
- vocational rehabilitation for Rural Deaf adults.

### Issues That Need To Be Addressed

- Needs of rural school going children who are Hard of Hearing.
- Reducing deafness among school going children, especially in rural areas.
- Meeting needs of Hard of Hearing and Deaf people age 19-40 years (potential wage-earning group).
- Meeting the alarmingly high needs for hearing aids for elderly population (nearly 40%)

### What Is Needed

1. Facilities to identify Hearing loss and Ear diseases at a very young age or as soon as they start (especially in rural locations).
   a. Mid gain, Low/Mid frequency Aid
   b. High gain, Low/Mid frequency Aid
   c. Mid gain, All frequencies
   d. Mid/High gain, Mid/High frequency
3. Fitment and distribution facilities.
4. Preventive and curative measures with highest priority for rural locations.

<table>
<thead>
<tr>
<th>Age:</th>
<th>1-18 y</th>
<th>19-40y</th>
<th>40 and above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases:</td>
<td>141</td>
<td>26</td>
<td>184</td>
</tr>
</tbody>
</table>
Hearing Impairment and Deafness in developing countries are a global challenge. The answers are available with us. What is needed is to transfer these answers through action to the weak and poor and un-reached. The world should communicate to deaf persons their concern, so that the deaf communicate their needs to the world.

5 HOW CAN HEARING AIDS HELP? ASSESSMENT AND BENEFITS OF HEARING AIDS

5.1 Seychelles, Philippines, Vietnam

This short presentation illustrates through real examples and describes in global terms the impact of hearing aids on the life of hearing impaired people in the developing parts of the world. Daniel, a moderately deaf boy in the Seychelles was excluded from school due to his disability. No one knew the extent of his hearing loss because of the lack of audiological services. At the age of 8 he received a donated, second-hand body worn hearing aid with an instant (one-stage) ear mould. During those days in Africa, access to hearing aids was largely through such donations. Daniel could not be separated from his hearing aid and wore it even when fishing for octopus. On four occasions, Daniel’s hearing aid was successfully treated for salt-water damage by a local deaf artisan who had been taught repair skills along with ear mould making. Following 2 years of special education, Daniel entered the ordinary primary school in 1976 and succeeded very well through high school. His major complaints in life were the teasing by his classmates and the unbearable noise in the classroom making his hearing aid difficult to use outside the reefs.

Rakesh was born a victim of Congenital Rubella Syndrome in Nepal. He needed urgent early intervention to stimulate his severe hearing and moderate vision losses. Not until age 3, based on crude field assessments of his hearing level, was he given a behind the ear (BTE) aid assembled locally from a kit by disabled technicians, a well fitting ear mould and a supply of 675 batteries that ran out all too quickly. He was able to go to the newly opened school for the deaf in Duran, and eventually became able to speak somewhat intelligibly. His family’s greatest struggles were finding and paying for the elusive batteries and the lack of skilled hearing aid technicians in the rural area.

Riza, a gifted young woman aged 23 from Quezon Province, Philippines, was unable to cope with secondary school due to her moderate to severe hearing loss. She received a BTE aid assembled from a kit by her Deaf brother. After she overcame her shyness against wearing her hearing aid in public, she returned to non-formal secondary school and later enrolled in college courses. She then became a teacher of the deaf.

Finally, Hung, in his mid 60's from Thi Nguyen, Viet Nam, found his way to our audiology clinic that fitted hearing aids to deaf children who are enrolled in regular schools. He showed us his much-used body worn aid he had been using for around 3 years (he thought). It was sometimes not working and the temporary ear tip that came with the hearing aid was cracked and clogged with wax. With the faulty cord replaced and an appointment to be fitted for a custom ear mould the following week, Hung returned to work to the busy streets with his air pump to service motorbikes.

Daniel, Rakesh, Riza and Hung all had some things in common: they all had some useable hearing, but none had access to hearing aids, batteries and or maintenance. These

Essentials lacking in many developing countries:
- adequate assessment of hearing ability
- early identification and intervention in young children
- unrealistic expectations about what a hearing aid can do
- social acceptance for hearing impaired people and for hearing aid use
- affordable hearing aids in urban areas
- hearing aid friendly environments
- any hearing aids in rural areas
- proper ear moulds
- BTE batteries
- repair services
- advocacy groups to control the price and quality of instruments and services.
cases closely represent the lives of the vast majority of the 167 million deaf and hard of hearing people living in developing countries, and especially those living in the 48 so-called least developed countries. They lack the same essentials (see box).

The solutions to most of these obstacles in developing countries are not that difficult to implement. If adequate hearing aids were affordable at around $25 including any mark-up, the subsequent incentives and market forces would spawn the required support services.

Hearing aid manufacturers have well recovered their research and development costs on older generation hearing aids, and seem willing to reduce costs to less than $30 for high-quality hearing aids purchased in bulk. The current problem is obtaining that sufficient critical mass for the required quantities required. For example, a well-known and respected company has offered to reduce the wholesale price for its super-power body worn aid from around $62 to $29 with an order of at least 5,000. That impossible number has now been reduced to 3,000 units and it appears could become as low as 1,000 units. Similar reductions could be obtained for BTE type hearing aids assuming there is sufficient demand for quantity orders.

What is needed in the short-term, while alternative solar rechargeable and other hearing aids become available for less than $30, is for INGOs concerned with hearing health to commit to purchasing, at the most, four models of hearing aids: two body worn models and two BTE models bought on a staggered supply basis and even in kit form. This cooperative bulk purchase and supply will solve most of the immediate hearing aid needs in developing nations.

A caveat to this plan is the inherent danger in all countries but especially in those where the GDP per capita is less than $3,000, that commercial hearing aid vendors will embark on the usual custom of "handicapitalism" or inflating the retail cost of hearing aids purchased in bulk beyond the reach of the target market. To reduce this risk concerned NGOs could be mobilized to monitor such actions.

Let me end in a quote by George Bernard Shaw aimed at all of us in the hearing aid industry.

"The reasonable man adapts himself to the world, the unreasonable one persists in trying to adapt the world to himself. Therefore, all progress depends on the unreasonable man"

Perhaps the time has come for us to be "unreasonable" in providing affordable hearing to consumers like Daniel, Hung and Riza and the other 250 million hearing impaired individuals in developing nations who could benefit from a hearing aid.

References:

"Handicapitalism a New Target Market" in Wall Street Journal December 16th, 1999 by Joshua Harris Prager. Refers to disabled consumers with discretionary income who are consumers of the usual goods and services as well as appropriate assistive devices. Reported in Hearing Health Vol. 16 No. 1 January / February 2000 page 49.

5.2 Nepal

Country Background. Nepal is a beautiful land of enormous physical contrasts and great poverty. It has a population of 18 million people and lies between China in the North and India in the South. It can be physically divided into three horizontal strips stretching from East to West. In the South is the once malaria infested and densely forested flat fertile lowlands called the Terai. The central portion consists of hills which range from 1,200 to 2,400 metres and within this region lies Kathmandu, the capital. The northern most strip bordering Tibet is the Himalayan mountain range which has the world's highest peak, Mt. Everest.

More than 90% of the population live in rural areas and depend upon subsistence farming. The annual income of a Nepalese is around 180 US Dollars. Poor communication coupled with the fact that much of the country is unsuitable for cultivation makes Nepal one of the least developed countries in the world. Only 15% people have access to safe drinking water and majority of the people do not have access to health care.

Hearing Disability Situation In Nepal. Hearing impairment is the largest disability in Nepal, much more than blindness as is commonly believed. A National Sample Survey on Deafness and Ear Diseases conducted by Tribhuvan University Teaching Hospital (TUTH) and the Britain Nepal Otology Service in 1991 revealed that 16.6% of the population (3.2 million
people) suffer from hearing impairment. Almost 90% of these hearing impaired people (2.9 million people) would benefit with the help of hearing aids.

**ENT Doctors And Audiology Technicians In Nepal.** There are only 37 ENT surgeons in the entire country and 29 of these work in Kathmandu Valley. There is one ENT surgeon for every 500,000 persons but for Kathmandu, the ratio is 1:30,000 persons and outside Kathmandu 1:2.46 million people. The country has only 9 audiologists and 8 technicians who can do audiograms. There are less than 6 ear mould technicians.

**Hearing aid programmes.**

**Tertiary Level.** In 1988, hearing aids, silicone ear moulds and related technology services started in Nepal in Tribhuvan University Teaching Hospital (TUTH) for hearing impaired patients attending the ENT out-patients clinics. In addition to dispensing behind-the-ear (BTE) and body worn hearing aids, TUTH started a programme to assemble in-the-ear (ITE) hearing aids with the help of an American hearing aid manufacturer, who provided equipment and training and supplied hearing aids components at low cost. Each hearing aid was sold for US $ 40. only. This programme was discontinued in 1996 due to closure of the company.

A hearing aid service started in TUTH in 1998 on a small scale and now dispenses about 200 hearing aids and ear moulds every year. This distribution programme is unique in the country.

**Community level.** From 1996 to 2000, the Nepal Ear Foundation (NEF) helped by LBH, Denmark, carried out a 4 year project titled “Support to Nepalese Deaf and Hard of Hearing”. Approximately 3,500 hearing aids were dispensed along with ear moulds and a regular supply of batteries, all provided free or at a token price.

The target groups were hearing impaired persons in Dhankuta and Jhapa Districts in Western Nepal, and hard of hearing persons identified in mobile ear surgery camps in different parts of Nepal. They have so far received 2,420 hearing aids. Deaf and hard of hearing children studying in: (i) Special Classes (these class rooms are actually integrated into regular Government primary schools) and (ii) Special Schools for Deaf Children have received 498 hearing aids. Hard of hearing children attending the ENT Department of TUTH received 244 hearing aids as did 309 others persons.

**Methodology:** 3 audiology technicians and 3 ear mould technicians had 2 months training at TUTH. The audiology technicians were trained to do audiogram, tympanogram and to select and dispense appropriate hearing aids. A Mobile Ear Care Clinic (MECC) team was formed and travelled with an ENT doctor to villages in Dhankuta and Jhapa Districts, about 10 - 16 hours drive from Kathmandu. The mobile team also visited the various Special Classes, located in regular Government Primary Schools, for hard of hearing and deaf children in different parts of the country.

At the MECC, all hearing impaired persons were screened by doctors, wax was removed when necessary and medical therapy was provided. Patients needing surgery were referred to Kathmandu. Persons who needed them were provided with hearing aids and appropriate ear moulds were made on the spot and a supply of batteries given.

All persons were followed up regularly by audiology technicians to assess proper use of hearing aids and discomfort while wearing ear moulds, to provide batteries, and to replace malfunctioning hearing aids if any.

The MECC also accompanied the mobile ear surgery camps organized by organizations such as IMPACT Nepal and the Britain Nepal Otology Service in different parts of the country. In these camps ear surgery was done to restore hearing and those persons whose hearing could not be improved by surgery were provided with hearing aids.

An English & Nepali Protocol for Hearing Aids Supply Programme was developed by Nepal Ear Foundation (with the help of WHO, Geneva) to gather information by questionnaire on qualitative and quantitative indicators to assess implementation of the hearing aid supply programme. The main indicators measure the expectations of a hearing aid recipient regarding the hearing aid, whether these expectations were fulfilled and to what extent; whether the hearing aid has been accepted and used by the recipient; and, if so, for how many hours each day; whether the hearing aid been helpful and to what extent; any mechanical problem with hearing aid or any problem with ear moulds and supply of batteries. There are many other aspects of a hearing aid delivery system (social aspects, etc) that are also included in this protocol. This
protocol has been field tested and can be used by any developing country which wants to start or has a hearing aid programme.

IMPACT Nepal is a charity involved in 'prevention of avoidable disabilities'. With programmes such as conducting 3 to 5 mobile ear surgery camps in rural areas of Nepal. About 800 patients are screened in the first two days of the camp. Over the next 4 days about 40 to 50 ear operations are done to eradicate ear disease and restore hearing. Persons whose hearing cannot be restored by surgery are provided with hearing aids. However, due to lack of funds hearing aids are given only to children (<18 years of age).

In the future, TUTH is trying to procure the free solar powered body worn hearing aid developed in Mexico. These have been field tested in Mexico and Nepal and are supposed to be dust proof and water resistant.

CONCLUSION. There is a tremendous need for hearing aids in Nepal where the approximately 2.9 million have been shown by the National Sample Survey to need them.

5.3 IFHOH

The International Federation of Hard of Hearing People (IFHOH) is a non-governmental organisation that has been dedicated to the interests of the hard of hearing and late deafened people worldwide for 25 years. In accordance to an agreement we have with the World Federation of the Deaf (WFD), IFHOH is responsible for such people exclusively, while the WFD is responsible for the profoundly deaf people. There is a very good cooperation but both organisations have different tasks. The needs of the hard of hearing are oriented towards better communication with the help of hearing aids; adult people who have become deaf want to achieve better communication through lip-reading, while those with no hearing predominantly use sign language. This differentiation shows that it is important for the large numbers of hearing-impaired people to have technology, medicine, rehabilitation, and psychological support available. To give an example, the statistics from Germany: according to research and official statistics, in a population of 83 million, there are about 14 million hearing impaired people. Of these, about 4 million use hearing aids. Around 150,000 people became deaf late in life, and only 80,000 people were born profoundly deaf. Similar proportions can be seen in other European countries as well.

The IFHOH has 50 members worldwide, two thirds of which are organisations of national self-help groups, and one third of which are sponsoring members – that is, companies from the hearing aid industry, and some professional organisations dedicated to the hearing impaired. The international collaboration with the international organisations of ENT doctors, teachers, clergy, and many others is very good. The IFHOH organises an international interdisciplinary conference every four years. The last one was in Sydney in 2000, and the next will be in Helsinki in 2004.

Hearing aids are the most important thing for the hard of hearing. The biggest providers are located in Germany, Switzerland or Scandinavia, and have a technologically highly sophisticated range of products, from colourful hearing aids for children to glasses with built in hearing aids for older people. There are behind-the-ear units, in-the-ear units, implants, and a number of other technological aids, such as infrared systems to facilitate listening to TV programmes.

A hearing or ear specialist must first determine whether there is a hearing impairment and then recommend which type of hearing aid is the best option for the client. In many European countries, this is followed by adjustment by a specialist in hearing aid acoustics or a national service centre. The technical usefulness of hearing aids for the hard of hearing is quite obvious: their hearing is qualitatively improved. Another aspect is cost. In some countries, hearing-impaired people must pay for hearing aids themselves. In others, such as Germany, social security pays for part of the costs. These costs are very high. Behind-the-ear units for both ears can cost up to US$1500. Two digitally programmed in-ear units can run as high as US$4000. These prices are high, and many people, especially in poorer countries, cannot afford them. For this reason, there is an action in Germany, for example, whereby used hearing aids are given to countries in which the population cannot afford the high prices. The IFHOH helps to organise this in an efficient and coordinated manner through its contacts in the industry, for example, in Estonia, Lithuania, or Kazakhstan.
However, there is still much to be done. The IFHOH has received numerous requests from countries such as Kenya, Guinea, Uganda, Zimbabwe, and Thailand. Sometimes, there are schools for hearing-impaired children in these countries that request our help institutionally, as well as acquiring hearing aids or other technology such as infrared systems.

It has been our experience that many do not know what is technically possible on the market. Nor do they generally know to whom they should turn. These facts result in a great deal of requests.

However countries with optimal hearing aid availability and related organisations such as IFHOH internationally, as well as its national members, want to help. But we need to know how we can help and we need to address the following issues:-.

1. Improved flow of information
   The developing countries must be made able to articulate their specific needs with regard to hearing aids, and to direct these needs to the right people. In order to rule out any doubt as to the bona fide of the people making the requests, these requests for assistance should be made via the individual state’s ministry of health, social ministry, education ministry, or ministry of foreign affairs.

2. Information about the state of the art
   We would ask companies to make their offerings specific to individual countries. The IFHOH can act as a liaison here, helping to make the existing offerings in Europe, as well as the opportunities for used hearing aids transparent.

3. Inclusion of state organisations
   Since misunderstandings do occur, it would make sense to include state organisations in the assistance network. The first way to request assistance would be to go to the respective ministry and the IFHOH simultaneously. Then, the determination of how and whether to help can be made quickly.

4. Creating an assistance network
   It is difficult to deal with individual requests. Large numbers of requests and time-consuming correspondence make it difficult to provide - sometimes urgently needed - assistance quickly. If these requests are combined, for example, with the needs of other institutions in the same country or with similar institutions in other (neighbouring) countries, assistance can be coordinated more quickly. A network of needs should be created with the help of the IFHOH or the WHO.

I know from my experience in a great number of individual projects that quick and effective help is possible in the area of hearing-impairment reduction. For example, a German professor, a specialist in early recognition of hearing impairment, is active worldwide, in Thailand, Pakistan, and Brazil, for example. But these are only individual actions. What we need to do globally is to arrive at a worldwide concept for supplying people with hearing aids – especially in the developing countries. Once again: the industry and the IFHOH want to help – but we need to know how and to what extent.
6 PRESENTATION OF THE WHO GUIDELINES FOR HEARING AIDS AND SERVICES FOR DEVELOPING COUNTRIES

The WHO Guidelines for Hearing Aids and Services for Developing Countries* have been developed by an expert working group set up following a recommendation by the WHO-CBM Workshop on Needs and Technology Assessment for Hearing Aids Services in Developing Countries held in 1998.

The guidelines set out minimum requirements and recommendations for affordable and appropriate hearing aids and services, and are particularly targeted at manufacturers, distributors, policy makers and service providers at all levels. It is intended that the hearing aid requirements would enable manufacturers to produce them at low cost and in bulk with currently available technology.

However, the working group is not just recommending manufacture and distribution of an affordable hearing aid but rather a total package to ensure that recipients of hearing aids are able to benefit from use of their aid. In developed countries the systems to ensure this are well established and trained staff, resources and well equipped facilities are available. In most developing countries this sort of structure generally does not exist except in a few isolated facilities.

Thus appropriate systems may need to be developed for use by countries in such a position. The principle adopted in the guidelines is that of “the most benefit at the least cost without sacrificing quality.”

The guidelines recommend that the target groups for hearing aids and services should be given to children with an average hearing impairment in the range 31 to 80 dBHL in the better ear in the frequency range 500Hz to 4kHz, followed by adults with an average hearing impairment in the range 41 to 80 dBHL in the better ear in the same frequency range. First priority should be given to children. Behind the ear hearing aids should be the preferred option but body-worn aids will still be required in some situations.

To ensure that a basis for specifying the electroacoustic performance of hearing aids is available a minimum performance specification is given† (see table); this does not preclude the use of higher performance aids as appropriate, although this may increase the cost. The benefit that a user gets from a

<table>
<thead>
<tr>
<th>Minimum Performance Requirements</th>
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<tbody>
<tr>
<td>Maximum OSPL&lt;sub&gt;90&lt;/sub&gt;</td>
</tr>
<tr>
<td>OSPL&lt;sub&gt;90&lt;/sub&gt; at 1 kHz</td>
</tr>
<tr>
<td>Maximum full-on acoustic gain</td>
</tr>
<tr>
<td>Full-on acoustic gain at 1 kHz</td>
</tr>
<tr>
<td>Basic frequency response</td>
</tr>
<tr>
<td>Total harmonic distortion at 70 dB SPL input</td>
</tr>
<tr>
<td>800 Hz &lt; 5%</td>
</tr>
<tr>
<td>1600 Hz &lt; 2 %</td>
</tr>
<tr>
<td>Equivalent input noise level</td>
</tr>
<tr>
<td>Battery current</td>
</tr>
</tbody>
</table>

* The guidelines can be ordered from the Programme for Prevention of Blindness and Deafness, WHO, 1211 Geneva, Switzerland or they can be seen and downloaded from the WHO web site at the following address:-

http://www.who.int/pbd/pdh/Docs/hearing_aids_guidelines_E.pdf

† Measurements should be made in accordance with IEC60118-7: Hearing Aids Part 7: Measurement of the performance characteristics of hearing aids for quality inspection for delivery purposes.
hearing aid depends on the electroacoustic performance of the aid being used and on how that aid is fitted, how the user is instructed and given after care, and the degree and type of deafness. All these factors have to be taken care of in the dispensing of the hearing aid.

The basic performance characteristics relate to user needs broadly as follows:

- Gain or amplification of the aid relates to the degree of hearing loss, the larger the loss the higher the gain. Generally the gain required is approximately half the hearing loss.
- Frequency response of the aid may be selected according to how the subject's hearing loss varies over the audiometric range. However the frequency range of hearing aids is limited and the earmould can significantly modify the frequency response.
- The maximum acoustic output of the aid (OSPL90) relates to the level of discomfort for loud sounds experienced by the user. If the maximum output is too low the user will not find the aid loud enough but if it is too high the aid will be uncomfortable in the presence of loud sounds.

The requirements in the table given above should provide satisfactory use for the majority of subjects with hearing losses up to 80 dB HL, and there will be far more people with smaller losses. The battery current reflects on the running cost of the aid and the length of time that the user has before needing to change the battery. The figure quoted will provide the user with about 120 hours use from a standard 675-type button cell and 30 to 40 hours use from a rechargeable cell.

As previously indicated, a hearing aid should be regarded as only one component of a hearing health system that includes the earmould, battery, maintenance, repair, instruction and rehabilitation. This system should be appropriate, acceptable, affordable and available. Hearing aids should not be provided unless the whole system, in some form, is available.

Hearing aids should be constructed in a form that allows for ease of servicing and with components that are readily available and will remain so for a period of at least five years. They should be powered by batteries – primary cells or rechargeable - and should be able to operate within temperature ranges of 5-45°C and humidity range of 0-80%. They should be designed so that risk of injury or discomfort is minimized and should be provided in a few basic colours. The availability of a reliable supply of batteries is essential.

Manufacture or assembly, and servicing should be feasible in developing countries. Hearing aids and batteries that are imported from another country should be classified as medical devices in order to avoid import duty.

Earmoulds should be individually made by a two-stage syringe technique in locally established static laboratories. Portable, mobile facilities may be necessary in less accessible areas. Universal or stock size earmoulds should only be used as a temporary measure. Earmoulds should be replaced at recommended intervals.

Services for providing hearing aids to users are an essential component of a hearing health system. The guidelines make detailed recommendations for services which comprise raising awareness, identification and assessment, provision, support for users, and training.

Awareness should be raised through the promotion of prime messages about the problems caused by hearing impairment, its detection, and prevention of its effects. These messages should be targeted at particular groups in society including people with hearing impairment, parents, teachers, community and national leaders, health care and educational and other service providers, and policy makers and administrators.

Identification of hearing impairment should be done at the primary level by primary health care (PHC) workers with training and skills in primary ear and hearing care (PEHC). Persons with hearing impairment and discernible ear disease (such as otitis media) should receive medical &/or surgical treatment initially, where possible; persons in whom such treatment fails to resolve the hearing problem and also persons who are found to have a hearing problem alone should be referred to the secondary level for hearing assessment (see box).
Provision of hearing aids includes supply, pricing, distribution, delivery, and fitting. Reliable sources for the aids, batteries, earmould materials, spare parts and repair materials need to be identified and adequate systems for importation, storage, stock control and delivery should be set up. Costs should be kept low through bulk purchase. Hearing aids and services should be provided to the user at a price they can afford or, in certain cases, they may be provided free. Hearing aid services should be designed and implemented as a low cost, sustainable, community service.

Fitting of a hearing aid with earmould and batteries should only be done following a hearing assessment. Persons doing the fitting must have received the necessary training and keep adequate records. Support for users (including their caregivers, if present) should include easily understood instruction in using and continuing to learn to use the hearing aid; care and maintenance; obtaining batteries; dealing with problems; and special instructions for parents and teachers. Follow-up should be done at secondary and primary levels and by suitable hearing-aid users in the community. There should be easy and close access to affordable services for replacement of earmoulds and batteries and maintenance and repair of hearing aids. Initial contact for these services should be with the PEHC-trained worker.

The guidelines list topics and equipment required for training the different categories of health worker at primary, secondary and tertiary levels; topics can be adapted according to a country’s needs. The training categories covered by the guidelines include primary ear and hearing care workers, audiology technicians, audiologists, earmould technicians, and hearing aid repair technicians. Training courses, especially at primary level, should take place as close as possible to where the workers will be employed. Courses should be recognized as soon as feasible in the countries where they are conducted. At the primary level, it is likely that the PEHC-trained worker will be a CBR or PHC worker who has received additional training in PEHC with subsequent refresher training. At all levels, good trainees will become trainers, with selection of trainers occurring progressively from the basic levels. Training for trainers is essential.

However, many developing countries do not have the resources to do this and will not be able to do it for several years to come. In this situation selected Primary Care workers from communities and districts should be given further training to enable them to identify individuals who would benefit from using a hearing aid, to fit them with an aid and to sort out the common problems that may arise from

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**Primary level:**
- Questionnaire concerning ear and hearing health
- Ear examination – otoscopy
- Simple hearing test – characteristics known/proven
- Infants: Questionnaire to parents: response to sound – speech
- Voice test for adults

**Secondary level:**
- Physician – audiology technician
- History
- ENT – examination
- Frequency specific test of hearing thresholds in each ear
- Classification and degree of hearing loss
- Cause of hearing loss
- Interpretation of examination
- Decision on HA
- Referral to other services

**Identification and assessment**

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**Staff categories and their trainers**
use of the aid. Basic requirements for the training that will be required have been worked out.

Once the need to address the problems experienced by the hearing impaired is recognized in a developing country, it is hoped that development of services in secondary level health services will follow. In the ideal situation these services would relate to those by audiologists and ENT surgeons at this level but in practical terms will probably be based around services provided by a Medical Officer with some special training in basic ear disease and be provided by an Audiology technician able to do audiometry and able to custom fit hearing aids.

Many Developing countries already have Audiologists and ENT surgeons in their Tertiary level services. Better use should be made of their expertise to distribute knowledge and skills to the selected individuals in secondary level services and also to be the main source of training for the trainers of Primary Ear and Hearing Care.

The performance of the whole programme for provision of hearing aids should be monitored and evaluated using performance and outcome indicators for achievement of specified targets. A system of quality assurance should be set up.

Before implementing a programme for provision of hearing aids services in full, pilot project(s) should be set up to determine costs of the services, refine the model of service delivery, and assess the impact and effectiveness of the hearing aids and services being utilized.

- Hearing tactics: training the user to use their residual hearing and the hearing aid more effectively
- Identification of users having difficulties with their hearing aid, earmould, batteries; they may require the following:
  - re-instruction on use and care of the aid
  - replacement due to loss or breakage
  - advice on realistic expectations (user & carer)
  - trouble shooting and potential solutions
- Attention to the special needs of children, e.g. acceptance of aid, need for more information, support and other services
- Establishment of local support groups, using skills & experience of existing hearing aid users.
- Links with other services for deaf and hearing impaired people
- Provision of replacement batteries, earmoulds, and hearing aids as required
- Referral to other services e.g. reassessment, medical, social, educational.
- Use of record cards with each aid for individual problems, and "report-back" cards by the aid fitter for potential collective problems.
- Expectations of users and their family
- Hearing aid maintenance, repair or replacement

Items to be done at follow-up
7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Terminology and standardization

7.1.1 Terminology in this field in use worldwide should be internationally accepted, uniform and standardized. A glossary should accompany all papers and presentations to define terms used to avoid confusion.

7.1.2 A standard definition of the thresholds for hearing impairment should be determined.

7.1.3 An expert working group should be set up to address these and other issues concerned with terminology and standardization.

7.2 Epidemiology

7.2.1 Following the recent surveys conducted using the WHO Ear and Hearing Disorders Survey Protocol which have produced some useful statistics, epidemiological data from these and other properly-conducted studies on prevalence of hearing impairments should be widely disseminated in user friendly format;

7.2.2 Further surveys using the WHO Ear and Hearing Disorders Survey Protocol should be encouraged.

7.2.3 Surveys should generally not be conducted without the capacity to provide hearing aids and related services (technical, clinical, social, educational) to those found in the survey to need them. However there may be situations with only limited capacity for provision of hearing aids and services where a survey can be conducted if there is an urgent need to obtain data for programme development, and the programme developed would ultimately provide the necessary services to the surveyed population.

7.2.4 Because of the need and sometimes difficulty to differentiate between conductive versus sensori-neural hearing loss, and the effect of ambient noise in field surveys, an expert group should address these issues and also determine whether and when to retain the 0.5 KHz test frequency in the WHO Ear and Hearing Disorders Survey Protocol.

7.2.5 A detailed model manual to assist with correct implementation of the WHO Ear and Hearing Disorders Survey Protocol should be developed.

7.2.6 An expert working group should be set up to address the above issues and to upgrade the WHO Ear and Hearing Disorders Survey Protocol and Software in the light of recent developments.

7.3 Economic analysis

7.3.1 Studies should be conducted and available data collected to compare the cost-effectiveness of different hearing aid interventions in developing countries.

7.3.2 Cost-benefit studies should be conducted in developing countries to compare the benefit of the burden of hearing impairment prevented with the costs of goods and services needed to prevent it; such studies should focus especially on early provision of hearing aids to children.

7.4 Manufacture, sales, distribution

7.4.1 Non-profit and small, local hearing aid manufacturers should provide and disseminate a list of the products and services they offer.
7.4.2 Many countries charge heavy duties on hearing aids, parts and batteries. All hearing aids and accessories and related equipment should be exempt from such duties and other taxes such as value-added tax.

7.4.3 The hearing aids industry should be asked to respond as soon as possible to the contents of the guidelines to address the next phase of this exercise on the provision of an affordable appropriate hearing aid.

7.4.4 Hearing aid manufacturers and allied industries should consider establishing a philanthropic foundation to provide support for projects for hearing aids and hearing care in the developing world.

7.5 Technology research and development

7.5.1 Research should be promoted to evaluate the relative benefits and quality of lower compared to higher price hearing aids and digital compared to analogue hearing aids. Comparison should also be made of the repair record and durability.

7.5.2 Toy manufacturers should be consulted regarding design for usability and sturdiness of hearing aids for children.

7.5.3 Any comparative analysis should be conducted in developing countries to factor in conditions specific to these countries.

7.6 Provision, follow-up

7.6.1 Service providers and patients should be counselled to have realistic expectations for the provision and wearing of hearing aids.

7.7 Programme development and implementation

7.7.1 Participants attending this meeting should raise awareness with their own governments and encourage local persons needing these services to persuade their government of the urgent need to provide appropriate and affordable hearing aids and services in their own country.

7.7.2 Governments should be made aware that the costs of hearing aids and services to the hearing impaired are offset by the gain in income tax revenue from increased employment / productivity, and the reduction of the social and economic burden on the State.

7.7.3 Governments should be made aware of all the resources that should accompany a hearing aid delivery service, which should be part of a total rehabilitation package.

7.7.4 Pilot projects should be set up on different continents in selected developing countries, or areas within countries. These should be model programmes for co-operation between government, NGO service providers and users for the provision and follow-up of affordable hearing aids. They should have a timeframe for implementation, and have proper monitoring and evaluation.

7.7.5 Governments and NGOs should be encouraged to identify specific areas in a particular region for implementation of projects and programmes.

7.7.6 In the short-term, INGOs, with government cooperation, should consider cooperative bulk buying of existing hearing aids provided that adequate support services exist.

7.8 Training

7.8.1 Training programs should be comprehensive and linked to a career path.
7.8.2 Suitable primary healthcare workers should be trained to become hearing aid dispensers provided the training is appropriate.

7.8.3 Personnel trained in audiology should be encouraged to continue working in this field in their developing country.

7.9 Task Force (see annex for further details)

7.9.1 A task force or working group should be convened by WHO to find ways to enable within 2 years the provision of affordable, appropriate hearing aids and accessories, and the services to fit them in large enough numbers to commence to satisfy the need in developing countries.

7.9.2 The proposed Task Force should also include in its deliberation affordable evaluation instruments, batteries, earmoulds and other accessories, marketing and promotion as well as other support services as a package.

7.9.3 The task force should also evaluate the usefulness of provision of second-hand hearing aids for developing countries.

7.10 Tasks for WHO

7.10.1 WHO should coordinate and network with initiatives in developing countries for delivery of appropriate and affordable hearing aids and services in order to disseminate awareness on progress in this field.

7.10.2 WHO should help to raise awareness amongst national governments to the problem of hearing impairment and the needs for hearing aids and services and appropriate training.

7.10.3 WHO should co-operate with other organizations, such as international and local NGOs, to identify projects to sensitize and encourage governments to determine the need for hearing aids.

7.10.4 Press Releases of the launch of the WHO Guidelines for Hearing Aids and Services for Developing Countries should be released to national press agencies of all countries and where appropriate with names of contact persons/participants in each country in order to provide links in those countries for further follow-up.
ANNEX 1: AGENDA

Wednesday 11th July 2001

Opening by Dr Derek Yach, Executive Director, Cluster for Noncommunicable Diseases and Mental Health, WHO
Officers appointed: Chairperson: Dr A. S. Bais; Rapporteurs: Dr R. Brouillette, Prof G. Mencher, Dr S. Swart.

Agenda item 1: Scope, purpose, outputs of consultation.
Dr A. W. Smith, WHO

Agenda item 2: What is the size of the problem?
Presentation of recent data from developing countries
1. Oman: Dr Mazin Al-Khabori.
2. Nigeria: Professor Philip Okeowo, Dr Clement Nwawolo.
3. Indonesia: Dr Bulantrisa Djalantik.
4. India, Myanmar, Sri Lanka: Dr Ian Mackenzie
5. China: Professor Xingkuan Bu.

Agenda item 3: Implications of hearing loss in developing countries
1. Developmental and Social Implications: Professor Valerie Newton, UK
2. Economic implications: Dr Andrew Smith, WHO

Agenda item 4: What does it mean to be hearing-impaired in the developing world?
1. Bangladesh: Dr Badrul Amin
2. Gaza: Ms Gerry Shawa
3. South India: Professor Prabakar Immanuel

Agenda item 5: How can hearing aids help? Assessment and benefits of hearing aids
1. Seychelles, Philippines, Vietnam: Dr Ron Brouillette,
2. Nepal: Professor Rakesh Prasad Shrivastav
3. IFHOH: Dr Claus Harmsen,

Agenda item 6: Presentation of the WHO Guidelines for Hearing Aids and Services for Developing Countries
1. Professor Agnete Parving.
2. Mr Mike Martin.
3. Professor Christopher Prescott.
4. Ms Clare Litzke.

Thursday 12th July 2001

Agenda item 7: PANEL DISCUSSION: Role of the WHO guidelines in stimulating adequate numbers of appropriate and affordable hearing aids and services for developing countries
Panel members:-
Chairman: Professor Stig Arlinger, Sweden.
Hearing Health care provider from a developing country: Professor A. S. Bais, India
Service provider from a developing country: Brother Andrew De Carpentier, Jordan
Representative of the donor community: Reverend Christian Garms, Germany
Representative of the hearing aids industry: Mr Sören Larsen, Switzerland
Service provider from a developing country: Mr Joseph Morrissey, Uganda
Coordinator of the WHO Hearing Aids Working Group: Professor Agnete Parving, Denmark
Service provider from a developing country: Professor Suchitra Prasansuk, Thailand
User: Mr Chris Shaw, France.

Agenda item 8: Conclusions and recommendations
Closure of meeting.
Afterwards: Press conference at the UN Palais des Nations (invited participants only)
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ANNEX 3: PROPOSED TASK FORCE

Purpose:
To find and implement ways to enable adequate provision of affordable, appropriate hearing aids and accessories, and the services to fit them in developing countries according to the principles and methods set out in the WHO Guidelines for Hearing Aids and Services for Developing Countries.

Tasks:
1. To enable the setting up of a public private partnership to provide affordable, appropriate hearing aids and accessories, and the services to fit them in large enough numbers to commence to satisfy the need in developing countries.
2. To promote the development of projects to implement the provision of hearing aids and services for fitting, follow-up, repair and training. These would initially be pilot projects in different regions and levels of development of the developing world and would be models for co-operation between governments, non-governmental development organizations (NGDOs), service providers and users. They would include identifying ways to sensitize governments and assess and determine needs for hearing aids and their marketing and distribution, and the necessary appropriate training.
3. To assess and promote mechanisms to enable hearing aids and accessories to be exempt from import and other taxes,
4. To promote studies to compare cost-effectiveness of hearing aid interventions, and assess cost benefit to countries of early provision of hearing aids especially to children.

Members:
Policy makers, service providers (government and NGOs), trainers and users in developing countries, industry representatives, and major donors.

Time frame: Initially 2 years.

Convenor: WHO
ANNEX 3: PRESS RELEASES (English, Français)

WHO CALLS ON PRIVATE SECTOR TO PROVIDE AFFORDABLE HEARING AIDS IN DEVELOPING WORLD 250 Million People in the World affected by Hearing Loss

25-fold decrease in hearing aid prices in developing countries possible

Hearing aid manufacturers, service providers and donors will come together for a meeting in Geneva, on 11-12 July, to evaluate the possibility of private-public partnerships to provide affordable hearing aids in developing countries. The World Health Organization (WHO), convener of the meeting, will launch its new guidelines on hearing aids and services for developing countries at the same time.

The current cost of appropriate hearing aids in developing countries ranges from US$200 to over US$500. "These prices are prohibitive for the majority of people living in these countries," said Dr Derek Yach, Executive Director for Non-Communicable Diseases and Mental Health at WHO. "What we would like to do for these people is see the price there come down to US$10-20 per hearing aid."

It is estimated that there are currently 250 million people world-wide with hearing loss who could benefit from hearing aids. Two thirds of these are in developing countries. Current annual production of hearing aids is thought to be less than 10% of global needs and less than one out of every forty hearing aids needed in developing countries actually goes there.

"In addition to the shortages and high prices, there is a huge lack of services in developing countries to fit hearing aids and ear moulds correctly and very few trained personnel," said Dr Yach. The guidelines WHO will issue at the July meeting provide detailed requirements for the manufacture of affordable and appropriate hearing aids, the provision of services, and the training of personnel in developing countries.

Although hearing loss is generally associated particularly with ageing, people in the developing world are more susceptible to this problem at a young age. Middle-ear infection, from which many children suffer, can cause long-term hearing loss if not treated. Meningitis, common in West Africa, and other infections will also impair hearing. Ototoxic drugs (drugs that damage hearing, such as certain antibiotics) are a problem in some areas and noise-induced hearing loss is increasing in many developing countries. Hearing problems can also be inherited. Most sectors of developing country populations do not have access to preventive interventions or treatment for these conditions, and are therefore likely to have hearing loss. When it starts in childhood it can lead to life-long disability.

In society as a whole the burden of hearing loss leads to huge economic costs. A recent study from the US suggests that the cost of communication disorders in that country (due to rehabilitation, special education and loss of employment) is almost 3% of the gross national product. Hearing loss in adults affects their ability to obtain, perform and keep a job. Throughout the life course hearing loss causes people to be isolated and stigmatized.

In children, hearing loss affects language formation and cognitive and social development. In developing countries, where there is a strong need for trained people to increase productivity, this impairment can affect the development of entire communities.

WHO is already addressing the problem by encouraging developing countries to perform population surveys of hearing loss and needs. It is also developing tools for preventing major causes of avoidable hearing loss (for example chronic middle ear disease, excessive noise and improper use of ototoxic drugs), and for training for ear and hearing care at the primary level of health care.

For further information, journalists can contact Ms Daniela Bagozzi, WHO, Geneva. Telephone (+41 22) 791 45 44; Fax (+41 22) 791 4858; Email: bagozzid@who.int All WHO Press Releases, Fact Sheets and Features as well as other information on this subject can be obtained on Internet on the WHO home page http://www.who.int/
L’OMS DEMANDE AU SECTEUR PRIVE DE FOURNIR DES APPAREILS ACOUSTIQUES D’UN PRIX ABORDABLE AUX PAYS EN DEVELOPPEMENT

250 millions de personnes dans le monde souffrent de pertes de l’audition

Il serait possible de diviser par 25 le prix des appareils acoustiques dans les pays en développement.

Les fabricants d’appareils acoustiques, les prestataires de services et les donateurs se réuniront à Genève les 11 et 12 juillet pour étudier la possibilité de forger des partenariats public-privé pour pouvoir fournir aux pays en développement des appareils à des prix abordables. L’Organisation mondiale de la Santé (OMS), organisatrice de la réunion, publierà à cette occasion de nouveaux principes directeurs sur les appareils acoustiques et les services de soins auriculaires dans les pays en développement.

Le coût actuel d’appareils acoustiques adaptés aux pays en développement va de US $200 à plus de US $500. « Ces prix sont prohibitifs pour la plupart des habitants de ces pays », a déclaré le Dr Derek Yach, Directeur exécutif pour les Maladies non transmissibles et la santé mentale à l’OMS. « Nous aimerions faire quelque chose pour ces personnes en ramenant ce prix à US $10 à 20 par appareil. »

On estime qu’actuellement 250 millions de personnes dans le monde souffrent de pertes de l’audition et pourraient bénéficier d’appareils acoustiques. Les deux tiers de ces personnes vivent dans des pays en développement. La production annuelle d’appareils acoustiques ne couvre actuellement que moins de 10 % des besoins mondiaux, et on estime que moins d’un appareil sur les quarante dont auraient besoin les pays en développement leur est effectivement destiné.

« Outre les pénuries et les prix élevés, les pays en développement se heurtent à un manque criant de services capables d’adapter correctement les appareils et les prothèses, et ne disposent que de très peu de personnel qualifié », a ajouté le Dr Yach. Les principes directeurs que l’OMS publiera à l’occasion de la réunion de juillet proposeront des spécifications détaillées pour la fabrication d’appareils acoustiques adaptés et abordables, ainsi que pour la fourniture de services et la formation du personnel dans les pays en développement.


Dans la société, le poids des pertes auditives entraîne des coûts économiques énormes. Une étude américaine récente suggère que les coûts des désordres auditifs dans ce pays à cause des coûts de la réadaptation, de l’éducation spécialisée et de la perte de l’emploi avoisinent les 3% du PNB. Les pertes de l’audition chez l’adulte compromettent son aptitude au travail car il lui sera plus difficile d’obtenir et de conserver un emploi. L’isolement et l’exclusion sont le lot des personnes souffrant de pertes de l’audition leur vie durant.

Chez l’enfant, les pertes de l’audition compromettent l’acquisition du langage ainsi que le développement social et cognitif. Dans les pays en développement, où l’on a particulièrement besoin de personnes qualifiées pour accroître la productivité, ce handicap peut entraver le développement de communautés entières.

L’OMS s’attaque déjà à ce problème en encourageant les pays en développement à effectuer des enquêtes dans leurs populations sur les déficiences auditives et les besoins. Elle
s'emploie également à mettre au point des outils afin de prévenir les principales causes évitables de pertes de l’audition (par exemple, l’otite moyenne chronique, le bruit excessif et la mauvaise utilisation des médicaments ototoxiques) et à former aux soins auriculaires au niveau primaire des soins de santé.

Pour plus d’informations, les journalistes peuvent prendre contact avec Mme Daniela Bagozzi, Bureau du porte-parole de l’OMS, Genève. Tél.: (+41 22) 791 4544; télecopie: (+41 22) 791 4858; adresse électronique: bagozzi@d@who.int Tous les communiqués de presse, aide-mémoire OMS et d’autres informations sur le sujet peuvent être obtenus sur Internet à la page d’accueil de l’OMS: http://www.who.int