Address correspondence to: Prof. Ferdinando Grandori, Istituto di Ingegneria Biomedica CNR, Piazza Leonardo da Vinci 32, I-20133, Milano, Italy, Email: isib.cnr@polimi.it.

Hearing Screening in Older Adults is Gaining Momentum.
The European Project AHEAD III on Adult Hearing

Ferdinando Grandori, Marta Parazzini, Gabriella Tognola, Alessia Paglialonga

Introduction

The Westernized world is facing the burden of its aging population and is living an era of unprecedented, rapid and inexorable global aging (in the EU, 28% of the population will be over 60 years old by 2020). According to the 2004 report from the World Health Organization, released in 2008 (World Health Organization, 2008) hearing loss is the first among the 20 leading causes of moderate-to-severe disability: 278 million people in the world suffer from moderate-to-severe hearing loss in both ears. In high-income countries, 18.5 millions of people aged 60 years and over experienced moderate-to-severe hearing loss whereas in low- and middle-income countries the number of people aged 60 years and over suffering from hearing loss is further increased to 43.9 millions.

Hearing disabilities are indeed one of the most common chronic health conditions in older adults, and have important implications for quality of life, such as functional decline, depression and social isolation. The diminished ability to hear and to communicate is frustrating in and of itself, but the strong association of hearing disability with depression and functional decline adds further to the burden on individuals who are hearing-impaired (Yueh et al., 2003).

In most cases, hearing loss in adults, as well as hearing disabilities, takes a long time to develop. It is a progressive process, and often does produce a sort of slow habituation to the impairment. At the beginning, only some types of sounds are not heard. There is the need to increase the volume level of the TV or to ask for repetition of a single word or a sentence, frequently in the presence of background noise such as traffic noise or in social gatherings. On the mid- and long-term run, relationships are greatly distorted and communication is greatly reduced. Another very important and mostly underestimated side effect is that delayed central processing of auditory and spatiotemporal information can affect balance maintenance, whose dysfunction is a primary risk factor for falls. One third of falls in older adults is produced by balance disorders (Duxbury, 1997; Murray et al., 2005), and bone fractures resulting from falls could lead to long-term disability.

Despite the prevalence and burden of hearing disabilities, they are still largely underdetected and underdiagnosed in older adults, and there is a lack of accepted guidelines, protocols and legislation. It is expected, however, that the situation will rapidly change in favor of an increased attention to the topic, mainly as a result of a more widespread awareness (see, e.g., Project AHEAD III, 2008; NIH/NIDCD Working Group, 2009).

Screening Programs

The reasons for the present lack of screening programs are multifactorial in character and include the usual difficulties of adding a supplementary screening test to an acute-care patient visit along with the lack of organizational structures to facilitate screening, such as reminder systems, together with the lack of guidelines and recommendations (Kiessling et al., 2003). For screening for hearing disabilities to become the rule rather than the exception, novel strategies should be explored to make screening a feasible part of routine care. In the absence of direct clinical trial data, screening programs can be advocated if evidence is provided to support each of the three commonly accepted criteria for a community screening program. These criteria are: (1) the burden of disability must be significant enough to justify the effort of screening, (2) an effective treat-
ment must be available for the detected condition, and (3) accurate, practical and convenient screening tests must exist. As early as 1991, Mulrow and Lichtenstein have argued that these conditions are satisfied for screening hearing impairment. Similar evidence is found also in significant large-scale initiatives of adult hearing screening programs in Europe (for details, see the Section “Pilot programs of hearing screening of older adults in the European Area” in this Chapter).

Certainly, one additional crucial reason is the lack of proper screening methods and of suitable testing devices to be used to screen what really should be screened, that is a hearing disability, and not simply a hearing loss.

The present paper summarizes the objectives and the first results that were achieved by the European Project “AHEAD III – Assessment of Hearing in the Elderly: Aging and Degeneration – Integration through Immediate Intervention” (Project AHEAD III, 2008), a coordination action funded by the European Commission. The three-year project AHEAD III, started in 2008, is coordinated by the CNR Institute of Biomedical Engineering in Milan (Italy) and involves 17 partners from Europe and 28 research groups as independent experts, with a variety of scopes and roles. The purpose of this coordination action is to explore strategies and new solutions for screening and treatment of hearing disabilities in adults and older adults. AHEAD III has been specifically designed to:

- Provide evidence of the effects of hearing impairment in adults and older adults;
- Increase the awareness among administrators, policy makers, health care professionals and the public opinion about early detection and intervention for hearing impairment in adults and in older adults;
- Discuss and endorse the new concept of a bio-psychosocial model of disability to be applied to hearing disability and use this new model in adult hearing screening and intervention;
- Analyze costs and benefits associated with the implementation of integrated large scale, or nationwide, programs of hearing screening and intervention in adults and older adults;
- Provide minimum requirements for screening methods and the related diagnostic techniques;
- Develop new criteria for recently proposed new screening technologies and develop recommendations and guidelines on how to implement successful screening programs using the variety of available methods;
- Analyze protocols and models to be tuned to the local, social, and economical conditions of a country or region.

Five closely interconnected issues are addressed:
- Etiological assessment and epidemiology of age-related hearing loss
- Main effects of age-related hearing loss
- Screening and Diagnosis: methods and techniques
- Organization of the International Conference on Adult Hearing Screening AHS 2010 to be held on June, 10th–12th, 2010 in Cernobbio, Italy (www.ahs2010.polimi.it).
- Assistance to and monitoring of pilot programs of hearing screening in adults and older adults in the European Area.

Apart from the pilot programs for hearing screening, the other areas are managed by working groups, whose activity mainly consists of the organization of specialist meetings and/or workshops, literature reviews and data collection to discuss on the current status of knowledge, the identification of areas in which clear knowledge exists, the identification of areas of controversy and in which a consensus could be helpful and, finally, the identification of areas of insufficient knowledge with need of further research.

Below is the description of the main achievements of the AHEAD III project over the first 18 months (a detailed description of the results is given in the Project AHEAD III Midterm Report, 2009).

Revisiting the WHO ICF Model – A New Bio-Psychosocial Model of Hearing Disability

Intensive discussions were started among the partners and experts of the AHEAD III project on the International Classification of Functioning, Disability and Health (ICF) model (World Health Organization, 2001) which could be very fruitfully applied to plan, set goals, standards, and recommendations and to evaluate hearing screening and intervention for hearing disability. According to the ICF model, disability is a complex phenomenon that has consequences both on a person’s body and functions and on her/his activities and participation to the social life. Injury to body functions and structures leads to impairment, whereas the effects of the impairment on activities and participation lead to activity limitations and participation restrictions. Applying the ICF model to hearing brings the following concepts:

- Impairment means loss in hearing sensitivity (function) due to anatomical and physiological age-related changes (structure);
- Activity limitation means inability to understand spo-
studies on the actual prevalence of hearing loss in the population and on the consequences that hearing loss has on health. Etiological factors such as genetics (which accounts for up to 50% of all cases, van Eyken et al. 2007a), noise, middle ear inflammations, and cardiovascular diseases were identified as the most relevant for hearing loss in adults and older adults. Furthermore, other additional etiological factors of less overall significance and importance, such as smoking, diabetes, hormones and gender, ototoxicity, and diet were found to be relevant for hearing loss in older adults. Among the pathophysiological mechanisms, factors such as hair cell loss, strial and metabolic factors, cochlear conduction, changes of central auditory processing, peripheral and central neural degeneration, and cognitive decline have an impact on ARHL.

Analysis of the literature review showed also that the function of the peripheral hearing organ is declining with age most significantly because of cumulative damage to its sensory elements due to factors mentioned above. Decline of central auditory functions is a prominent, but much less well recognized, component of ARHL, which is not routinely assessed. Finally, while age related functional impairment due to vision losses has declined in the last decades, no such trend has been identified clearly for impairment because of ARHL.

Availability of data coming from the analysis made in the AHEAD III project contributes to clarify the role of different causes of hearing loss and to foster basic research on anatomical and physiological degeneration of the auditory system, also in relation to genetic aspects. Moreover, the dissemination of results of this literature review could increase the awareness of the relevance of ARHL and give evidence of the huge need to proceed toward a consensus on large-scale integrated programs of early detection and intervention for ARHL.

Main Effects of ARHL**

Hearing impairment is an important psychosocial problem. Its effects on speech communication can reduce a person’s physical, functional, emotional and social well-being. Isolation and depression is often associated to hearing loss. All of this can be frustrating, embarrassing and even dangerous. In addition to affecting basic psychoacoustic abilities, sensorineural and/or central hearing impairment affects listening (i.e. the process of hearing with intention and attention), comprehending (i.e. reception of information) and commu-
nicating (i.e. bi-directional transfer of information).

AHEAD III project has started to collect and review
data from the literature on psychological and social im-
 pact of hearing loss with special emphasis on: i) psy-
chosocial effects (i.e., the impact of presbyacusis on
everyday life) (see e.g. Arlinger 2003; Cacciato et al.,
1993; Chia et al., 2007; Dalton et al., 2003); ii) impair-
ment of listening and communication plus aural rehabili-
tation (see e.g. Chisolm et al., 2004; Golding et al., 2004;
Gussekloo et al., 2003; Hawkins 2005; Hickson et al.,
2003; 2007; Kramer et al., 2005); iii) central age-related
hearing loss (see e.g. Golding et al., 2006; Stach et al.,
1990; Sommers et al., 1997; Pichora-Fuller 2003; Cas-
pary et al., 2005; Alain et al., 1999; Frisina et al., 2006;
Kricos 2006); iv) non-auditory additional effects of
ARHL (interaction with other health conditions in the
elderly, i.e. decline in cognition, spatial orientation and
alerting) and genetics of ARHL (see e.g. Kricos 2006;
Kramer et al., 2002; Lee et al., 1999; Pichora-Fuller et al.,
2006; VanEyken et al., 2007a; Garringer et al., 2006;
deStefano et al., 2003; Fransen et al., 2008; Saunders et
al., 2007; Baloh et al., 2001; Basta et al., 2007); v) public
and patients’ awareness of ARHL and promotion of
awareness of ARHL (prospective measures and actions
in the past) (see e.g. Eriksson-Mangold et al., 1991);
vii) promotion of hearing aid use (evaluation of the impact
of being ashamed of hearing loss and how to promote
the use of hearing aids) (see e.g. Popelka et al.,1998;
Lupsakko et al., 2005; Gusseklo, 2003; Davis 2003).

Based on the literature review, health conditions
such as depression and loneliness, loss of vision, distur-
bances of gait and balance, and somatization were found
to interact with ARHL.

Parallel to the literature review, a pilot study, coordi-
nated by partners of AHEAD III, was performed in
60 adults (65-90 years) to evaluate the major effects of ARHL
and the central component of this process (Freigang et al.,
Central Auditory Processing in the Elderly, Exp Gerontology, in press). In this study, subjects were first
screened by a Mini-Mental Test (MMT) (Folstein et al.
1983) and then by a central auditory test battery (LIPP
testing, Leipzig Inventory for Psychophysics). The ma-
 jor results of this pilot study were that: i) central audi-
tory processing disorders in this sample of subjects was
largely characterized by an impairment of temporal pro-
 cessing and encoding; ii) dichotic tests were most sen-
sitive to identify this central component; iii) central au-
ditory processing can be impaired while peripheral
(tonal) hearing is normal; iv) the processing of speech
signals (as assessed by speech audiometry) is only im-
paired in noise or while being tested with background
noise (+5 dB white noise) so that speech testing in gen-
eral – as it is influenced by cognitive and intellectual
characteristics as well – is not very helpful to identify
central auditory processing disorders in the elderly.

Also, partners of the AHEAD III were invited to de-
sign the hearing test protocol (with special emphasis on
major effects of ARHL and central auditory processing
disorders) for the BASE II study. BASE II is a new study
design, financed by the German Ministry of Education
and Research, for a longitudinal study in elderly at age
70 covering the period June 2009–2039.

Screening, Diagnosis and Intervention
for Hearing Disability in Older Adults:
Methods and Techniques*

Activities of AHEAD III project were also devoted to
define and evaluate screening methods and technolo-
gies for adult hearing screening (AHS). The technolo-
gies which have been considered and reviewed for AHS
were: (1) Pure tone audiograms/screening audiograms,
(2) Questionnaires, (3) Speech tests, (4) Central audi-
tory tests, (5) Otoacoustic emissions, (6) Auditory-
evoked potentials, (7) Internet and telephone-based
screening, and (8) Genetic screening. These technolo-
gies and their feasibility in AHS have been explored in
terms of the target of the test (i.e., identification of hear-
ing impairment or communication disorders), sensitiv-
ity, specificity, reliability, and duration of the test, limita-
tion of age range, requirements of functions and skills
other hearing functions, needs for instruction and train-
ing to the subject to be tested, requirements of the ex-
pertise and training of the examiner, needs for interpret-
ing the test results, dependence of the education, cul-
ture and language of the test subject, needs for a con-
trolled environment for performing the test, capability of
the test to give a reliable screening outcome (pass/re-
fer), handling of the technology, hygienic issues, accept-
ance of the available knowledge by the test subject, and
test costs per person.

Except for genetic testing, where the technology at
present has not matured as usable for AHS because only
a few genes for ARHL have been identified and much

* Based on reports from AHEAD III Workpackage WP5 “Classical screening
devices: quality standards and minimum requirements”, coordinated by
Thomas Janssen (Munich), WP6 “Newly proposed screening technologies”,
coordinated by Stefan Stenfelt (Linköping) and WP7 “Intervention Strategies”,
coordinated by Sophia E. Kramer (Amsterdam).
more research is needed (Ateş et al. 2005; van Eyken et al. 2007a, 2007b; van Laer et al. 2002), all technologies can be used to assess some aspects of auditory function.

In particular, pure tone audiograms and especially screening audiograms provide a fast assessment of the auditory sensitivity to frequency and have a large bulk of normative data in the literature (see e.g., ASHA 1997; Bienvenue et al. 1985; Davis et al. 2007; Schow 1991). The major drawback of this technology is that it only assesses the individual’s ability to detect pure tones that may not be directly related to the individual’s communication ability/problem. Questionnaires assess whatever the questions target but always as that perceived by subject (Clark 1991; Gates et al. 1990; Stephens et al. 1990; Sindhusake et al. 2001; Ventry and Weinstein 1982; Yueh et al. 2003; Weinstein 1986). This is both a strength and a weakness: the strength is that it is valid regarding the frequency sensitivity of the subject but the weakness is that the results can be influenced by a multitude of human variables that can be unrelated to the detection of “hearing disability” as defined in the previous section. Speech-based tests, especially speech-in-noise tests, have face validity since they target the key problem: communication ability (Akeroyd 2008; Bilger 1984; Cox et al. 1987; Hagerman 1982; McArdle et al. 2005; Mendel 2007; Nilsson et al. 1994; Wilson 2003; Wilson et al. 2007). One minor problem associated with speech based tests is that they are language dependent and need to be developed for each language. Also, problems may arise for individuals who are tested in their second language.

As there is a decline in higher order processing with age, central auditory tests can target problems with communication that are linked with aging in the elderly (Chisolm et al. 2003; Neijenhuis et al. 2001; Yueh 2003). However, they may not be as sensitive to problems that are situated more peripherally in the auditory system. Thus, the outcome may be more related to age than status on the peripheral hearing organ. Oto-acoustic emissions have successfully been used for newborn hearing screening; as they test the function of the outer hair cells, they could be used for AHS as well (Jupiter, 2009). Even if the response is not directly related to hearing thresholds as seen in the audiogram, pathological emissions do indicate hearing impairment (see, e.g., Bertoli and Probst 1997; Boege and Janssen 2002; Collet et al. 1990; Dorn et al. 2001; Gates et al., 2002; Glattke and Robinette 2002; Lonsbury-Martin et al. 1991; Oeken et al. 2000; Stenklev, and Laukli 2003; Uchida et al. 2008). Measurement of auditory evoked potentials, e.g. auditory brainstem responses (ABR) or auditory steady state responses (ASSR) is a good way to assess the peripheral hearing function in the elderly (Arai et al. 2000; Picton et al. 2003; Prosser and Rosignoli 1992). However, they require special equipment and locations and are both relatively time-consuming and costly. As a result, they do not seem to be acceptable in an AHS program.

Recently, hearing testing via telephone or the internet has become increasingly popular (Choi et al. 2007; Givens et al. 2003; Project Hearcom; Smits et al. 2004; Smits and Houtgast 2005). Such a test approach can make use of questionnaires, speech-in-noise tests, or spatial separation tests. The benefit of testing via telephone or the internet for AHS is high accessibility, but such an approach may require technical skills of the individual taking the test and, most noticeably, there is generally less control of the participant and follow-up may be problematic.

From this preliminary review of available practical knowledge, it is clear that no single method is the ultimate choice. On the contrary, a reliable hearing screening method must be chosen depending on how an AHS program is implemented. Also, hearing healthcare culture is important when deciding on an appropriate method for AHS. It may even be wise to consider more than a single measure to assess the targets for AHS. It may be important to balance between “hearing disability” more than just “hearing abilities”, according to the ICF model.

AHEAD III activities have also been focused on the evaluation of intervention strategies following screening. Based on the clinical experience of AHEAD III partners as well as contacts with screening programs under planning, a list of interventions following screening was defined. This list was used as a starting point for the Expert Survey which was the next step to explore various forms of intervention. A letter was written and a short questionnaire was designed for circulation among experts. Recipients were asked about any local screening, their views on screening for hearing, and were invited to contribute relevant case histories. The documents were sent to 150 experts around the world, and were also posted on the AHEAD III website (http://www.ahead.polimi.it/). A total of 22 experts (from 15 countries) responded. None of them reported any systematic hearing screening for adults in their country. Of the 15 respondents to the questionnaire, 12 of them would consider introducing screening. Many commented on the cost and cost effectiveness
of screening. There was a general agreement that intervention following screening should include much more than hearing aids.

Parallel to the Expert Survey, evaluation of intervention strategies was also based on the preliminary results coming from a pilot screening program for adults that was set up in Cyprus. Hearing aid fitting was considered as the main intervention, but additional information about hearing and communication tactics was provided to the referrals. Experiences with the program will be documented below (see Section “Pilot programs of hearing screening in older adults in the European Area”).

Possibilities of intervention following screening for hearing were explored also through the re-examination of data of an earlier Welsh study (Stephens et al, 1990; Stephens and Meredith, 1991) on the use of screening in facilitating hearing aid fitting. Whereas the main focus of this earlier study was on the use of hearing aids, alternative interventions (e.g. hearing tactics, lip reading, tinnitus therapy, further investigation) were offered, mainly to those not meeting the criteria for hearing aid fitting. Most of the problems reported by those who ended up not using their hearing aids could have been addressed using other types of intervention other than hearing aids.

Finally, a systematic review of the scientific literature to list and describe all types of aural rehabilitative intervention that were offered to adults with hearing impairment identified through a hearing screening procedure in a general adult population was started. A search strategy was developed to search all relevant databases (e.g. EMBASE, PubMed, CINAHL). The systematic review was performed according to the Cochrane guidelines. Review of the scientific literature is currently in progress.

Pilot Programs of Hearing Screening of Older Adults in the European Area*

Activities of project AHEAD III are contributing to homogenize the quality of screening programs and the standards of care in the EU, starting for example from the health models launched in the United Kingdom and (partially) in the Netherlands, where a hearing screening program specifically for older adults has already started, or collecting data in Cyprus and in Italy, where it has been possible to start the implementation of pilot programs of hearing screening in adults and older adults that could serve as a model for other areas or countries. Details of these pilots are below.

Cyprus

The Health system in Cyprus provides health coverage at-no-charge to public employees, people with lower income, and people with disabilities. Hearing Health Care is included in the system in terms of evaluation. Intervention (hearing aids) is available for some categories: people with congenital hearing loss receive vouchers for amplification every four years, based on recommendations and approval of the Public Hospitals System. Pensioners receive a nominal compensation for amplification every four years, based on Public Hospitals System recommendation and approval. There were no adult hearing screening services in Cyprus prior to this initiative.

The pilot adult hearing screening program (AIIA - Greek acronym for Screening-Intervention-Hearing-Participation to life) launched by AHEAD III through the Cyprus Audiology Center (CAC) is addressed to adults older than 63 years of age (limit for retirement in Cyprus). Public announcements through pensioner magazines and newspapers, as well as participation in television shows were initially implemented in order to publicize AIIA project. The program consists of screening hearing at scheduled dates, following agreement with pensioner organizations and municipalities. Pensioner organizations and municipality newsletters announce the specific dates when screening is held at particular locations, and members register for screening. Screening sessions are held at pensioner organization gatherings and activity centers, as well as municipality activity centers.

Participating adults fill out a demographic/short history form, accompanied by a five-item list extracted from the Hearing Handicap Inventory for the Elderly (Screening Version) (Weinstein 1986), and the informal question “do you believe that you have a hearing loss?”. Screening includes otoscopy, and pure tone audiometry at 250–4000 Hz at 35 dB HL. Transiently evoked otoacoustic emission screening was performed at the beginning of the project. However, due to high failure rates it was omitted from the screening procedure. A screening device (by Siemens) was part of the battery in selected sites in order to compare outcomes. Speech audiometry with signal-to-babble stimuli has been

* Based on reports from AHEAD III Workpackage WP9 “Outcome measures” and personal communications (2009) by Chryssoula Thodi for Cyprus, Adrian Davis and Pauline Smith for United Kingdom and Gabriella Tognola for Italy.
planned for the second half of the project. By the end of October 2009, 800 adults were screened by the AIIA program. Of the people screened, a total of 43% were referred. Cerumen removal was recommended for 35% of participants, audiological evaluation/hearing aid evaluation was the suggested outcome for 36% of participants, and 2% were referred for medical evaluation based on either otoscopy or unilateral findings. There is an overlap between the “cerumen removal” and hearing/hearing aid evaluation groups due to non-occluding cerumen findings. Participants who failed the hearing screening were also offered suggestions for improving visibility of the speaker, seating suggestions for noisy environments, and assertiveness reinforcement.

The next AIIA phase includes continuation of the screening project, as well as structured follow-up interviews in order to assess the project impact on people’s perspective on hearing, decisions on intervention, and quality of life.

**United Kingdom**

Significant large-scale initiatives are being planned in a national program in the UK also in the framework of project AHEAD III. Specifically, a conceptual model of hearing screening has been developed by Davis and colleagues (Davis et al. 2007; see also the Chapter by A. Davis in this volume).

His work has shown that screening programs are effective and provide good value for money. In the UK, where they are targeted at a specific hearing deficit about ten years earlier than the average person who consults would have done so. However this model cannot be easily applied to other countries and it should be tuned to local, social, and economical conditions of a country or region. UK is almost ready to legislate on ad-hoc screening program.

Another activity in the UK is the project conducted in Leicester which aims to evaluate the use of a hearing screener manufactured by Siemens (for details on the hearing screener, see Parving et al. 2008). In this project, the screener is mainly used as a tool to establish a triage system rather than as a screening device. The patients get into the system by visiting their GP with complaints about their hearing problems. Once they are in, the screener is being used in identifying those who would benefit from an open fitting carried out during a 90 minute “assess and fit” appointment as opposed to those who need a more traditional approach to intervention, which is a 60 minute assessment appointment, followed later by a 60 minute hearing aid fitting appointment. Data are being collected on screener results, as well as pure tone thresholds, intervention, and eventual outcome. Moreover, a questionnaire survey (in collaboration with Siemens UK) to find out how people are using the screeners is being carried out.

**Italy**

During the years 2009 and 2010, two initiatives of adult hearing screening were conducted in Italy. The first adult screening program was administered to people attending courses at three Universities of the Third Age. Screening was administered to 488 people, ranging from 50 to 88 years, mean age 65 ± 5 years. A battery of screening tests was used, which included pure tone audiometry at 1, 2, and 4 kHz and a novel adult hearing screening test – the Hearing Screening Disability test (HDS) – a test based on the recognition of consonants. In one of the three Universities of the Third Age, the test battery included also speech audiometry with Italian disyllabic words. Subjects were tested monaurally. The duration of the full screening session was about 15 minutes per subject (both ears tested). Results of the screening revealed that 75% of subjects had no hearing disability, whereas 15% were identified with serious hearing disabilities.

The second adult hearing screening program was performed during the months of October and November 2009 in the city of Milan as a result of a protocol agreed with the municipal Health Care Authority (Assessorato Sanità). Screening was administered to 1052 people, ranging from 17 to 89 years, mean age 53 ± 16 years. The test battery included pure tone audiometry at 1, 2, and 4 kHz, the Hearing Handicap Inventory for the Elderly HHIE-S questionnaire (10 questions, Weinstein 1986) and the HDS test. Subjects were tested monaurally. The duration of the screening session was about 15 minutes per subject (both ears tested). The screening campaign was advertized through regional broadcasting, newspapers and internet.

Results of the screening revealed that 1160 ears were found with PTA thresholds within 25 dB HL at all the three audiometric frequencies 1–4 kHz, 411 ears had thresholds greater than 25 dB HL at one of the three audiometric frequencies 1–4 kHz, 119 ears had thresholds greater than 25 dB HL at two of the three audiometric frequencies 1–4 kHz, and 333 ears had thresholds greater than 25 dB HL at all of the three audiometric
Screening (AHS) has been scheduled on June, 10th–12th, 2010 in Cernobbio (Como, Italy). This conference is the first international meeting entirely focused on a comprehensive spectrum of issues and disciplines related to early identification and treatment of auditory dysfunctions and communication disorders in adults and older adults. The conference includes keynote addresses by top-notch scientists and clinicians as well as platform and poster presentations. It is the firm belief of all partners in AHEAD III that this event will establish a truly international forum networking scientists, clinical researchers and technicians in the area of early intervention of adult hearing loss. Etiology and epidemiology of ARHL, main effects of ARHL, screening technologies and protocols, assessment strategies, and intervention techniques are the main topics. This conference brings together specialists in audiology, otolaryngology, hearing sciences, communication disorders, biomedical engineering, psychology, genetics, neurology, gerontology, health care administration, epidemiology and other related areas.

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Summary and Conclusions

Overall the following achievements have been reached by the AHEAD III project:

- Application of the International Classification of Functioning, Disability and Health model (ICF) in the context of adult/elderly hearing. This resulted in targeting hearing disability as the goal of screening programs and intervention strategies.
- Identification of the most relevant aetiopathological factors and pathophysiological mechanisms for hearing loss in adults and older adults.
- Identification of the most important psychological and social impact of hearing loss in adults and older adults.
- Evaluation of adult hearing screening methods and technologies, and intervention strategies following screening for hearing disability in adults and older adults.
- Implementation of pilot adult hearing screening programs.

This project is triggering research in an area that is gaining an increasing momentum, but still has remained in stand-by for decades.

The AHEAD III network is convinced that a big benefit from this project is that it will contribute significantly to the definition of protocols, programs and models for a variety of health care systems to be tuned to the local, social, and economical status of a country or region, particularly in the EU area.

It is becoming a common feeling that it is now the time to advocate for hearing screening for adults and older adults. Findings from the scientific literature indicate that screening and early treatment of hearing loss have the potential to significantly improve the quality of life and extend the functional status of adult population. It is the opinion of all the AHEAD III participants that it is now the time to provide state-of-the-art scientific and clinical information on this rapidly changing landscape. Therefore, it was decided to organize at the end of the second year of the project lifetime an international conference on adult hearing screening. This conference is intended to prepare the ground for a Consensus Development Conference on universal AHS to be organized later, probably not before 2012.

The international conference on Adult Hearing Screening (AHS) has been scheduled on June, 10th–12th, 2010 in Cernobbio (Como, Italy). This conference is the first international meeting entirely focused on a comprehensive spectrum of issues and disciplines related to early identification and treatment of auditory dysfunctions and communication disorders in adults and older adults. The conference includes keynote addresses by top-notch scientists and clinicians as well as platform and poster presentations. It is the firm belief of all partners in AHEAD III that this event will establish a truly international forum networking scientists, clinical researchers and technicians in the area of early intervention of adult hearing loss. Etiology and epidemiology of ARHL, main effects of ARHL, screening technologies and protocols, assessment strategies, and intervention techniques are the main topics. This conference brings together specialists in audiology, otolaryngology, hearing sciences, communication disorders, biomedical engineering, psychology, genetics, neurology, gerontology, health care administration, epidemiology and other related areas.

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