Australian Government

Department of Health and Ageing

COMMUNITY AFFAIRS REFERENCE COMMITTEE

SENATE INQUIRY INTO HEARING HEALTH IN AUSTRALIA

SUBMISSION

DEPARTMENT OF HEALTH AND AGEING

OCTOBER 2009

EXECUTIVE SUMMARY

The prevalence of hearing loss in Australia is estimated to be one in six Australians[1]. For the adult population this is expected to more than double by 2050 to one in four, largely driven by the ageing population. Hearing loss is more common in adults, and prevalence increases with age.

It is estimated that in 2005 there were 3.5 million adults aged 15 years and older as well as 10,268 children aged under 15 years with hearing loss. Around half of those with hearing loss were between the ages of 15 and 64 years and considered of working age.

Males represented 60% of the population and were more likely to experience hearing loss at a younger age but this difference between the genders reduced with age. These gender differences are attributed to the differing levels of exposure to workplace related noise. Hearing loss was estimated to be predominantly mild in nature, with one third of people with hearing impairment experiencing a moderate to severe hearing loss. The growth in hearing loss by gender is expected to increase for males from 21% to 31.5% and for females from 14% to 22%.

Hearing loss may result from problems at any point in the hearing pathway and can be either congenital or acquired. Congenital hearing loss is one that is present at or soon after birth. An acquired loss is one that occurs later in life.

The most common causes of hearing loss are ageing and excessive exposure to loud sounds. The effects of age and noise exposure are additive so that noise exposure may cause hearing loss in middle age that would not otherwise occur until old age. Hearing loss is described as conductive or sensorineural, depending on where the problem occurs in the hearing pathway, or may be a mixture of both.

Hearing loss has significant social impacts on individuals and in particular the social, speech, language and educational development of children. Adults may also be impacted in social and work settings, earning and working less in paid employment.

Hearing impairment will affect a person differently depending on when the hearing loss occurred and the severity of the loss. The significant social impacts on an individual may include isolation, depression, anxiety, paranoia, exhaustion, loss of intimacy and anger. Research has demonstrated that hearing rehabilitation, including the provision of a hearing aid, lessens depression and negative emotions associated with hearing loss.[2]

Whilst children only represent a small proportion of the population of hearing impaired individuals, the impact on this group is particularly significant as they require a high level of support in developing communication skills and accessing education.[3] There are many factors which influence the impact that hearing impairment can have on a child, including when it occurs and the prevalence of other conditions.

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[1] Access Economics, 2006, pp. 5
[2] Mulrow, CD, Tuley, MR, and Aguilar, C, 1992
[3] Access Economics, 2006, pp 16-17

The occurrence of hearing loss prior to or during speech and language development can greatly influence the consequences of hearing impairment. Pre-lingual hearing loss involves the loss of hearing before a child has completely developed speech and language, which can affect the development of language skills.[4] Early identification of hearing loss can assist to ensure that decisions are made about which communication strategies to develop, which hearing technologies will be of most assistance, what support services are available and the types of educational settings the child may access.

The management of hearing health in Australia occurs through public initiatives of the Australian Government and state and territory governments, as well as through private arrangements. The Health and Ageing portfolio contributes to hearing health through a number of initiatives and strategies, including:

- Population health programs coordinating screening initiatives, such as the Universal Neonatal hearing screening program;
- The Australian Government Hearing Services Program;
- Assistance provided to state and territory governments under the National Health Care and other Commonwealth/State Agreements,
- Medicare benefits for hearing services;
- Support for private health insurance arrangements; and
- Funding and support of research, including the involvement of the National Health and Medical Research Council grants.

The Australian Government Hearing Services Program is the largest program providing hearing assessment, hearing aids provision and maintenance. In 2008-2009 the total Program expenditure for these components was about $309 million. The Program comprises:

- the Voucher Program;
- the Community Service Obligations (CSO); and
- the Hearing Loss Prevention Program, incorporating funding for hearing loss research and prevention activities.

The Voucher Program provides free hearing services and high quality hearing devices to eligible clients, as well as subsidised maintenance for devices provided under the Program. During 2008-009, over 500,000 clients received services through the Voucher Program.

The CSO component is designed as a safety net to meet the particular needs of designated client groups (clients with complex hearing losses, Indigenous clients over 50 years of age, children and young people less than 21 years of age). Special needs clients receive the same services as voucher clients and can also receive additional services that address their specific requirements. This includes access to some higher level technologies.

The Department of Health and Ageing provides support for the provision of hearing health service to Indigenous Australians through:

- Hearing provision in Aboriginal Medical Centres – provides primary health care services to Indigenous communities;
- Closing the Gap in the Northern Territory;
- Australian Hearing Specialist Program for Indigenous Australians (AHSPIA);
- Medicare items for health assessments for Indigenous people; and
- Pneumococcal immunisation programs to prevent otitis media.

[4] *Ibid.*, p.18

In addition, support for hearing health research and prevention is provided through a number of funding mechanisms including the:

- Program's Hearing Loss and Prevention Program funding both research and prevention activities;
- National Acoustic Laboratories (NAL) research funded under the CSO arrangements;
- National Health and Research Medical Council funding grants; and
- HEARing Cooperative Research Centre (CRC) research funded through the Cooperative Research Centres Program administered by the Department of Innovation, Industry, Science and Research.

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ACRONYMS

AABR	automated auditory brainstem response
ABS	Australian Bureau of Statistics
AMS	Aboriginal Medical Service
ACC	Accident Compensation Corporation
AH	Australian Hearing
AHSPIA	Australian Hearing Specialist Program for Indigenous Australians
AIHW	Australian Institute of Health and Welfare
ALD	Alternative Listening Device
AMS	Aboriginal Medical Services
ARIA	Accessibility/Remoteness Index of Australia
ASGC	Australian Standard Geographic Classification
Auslan	Australian Sign Language
BAHA	Bone Anchored Hearing Aid
BICROS	Bilateral Contralateral Routing of Signal
BTE	Behind-the-ear
CDEP	Community Development Employment Projects
CIC	Completely-in-the-canal
COAG	Council of Australian Governments
CODAs	Children of Deaf Adults
CPI	Consumer Price Index
CRC HEAR	HEARing Cooperative Research Centre
CROS	Contralateral Routing of Signal
CSO	Community Service Obligation
CSOM	chronic suppurative otitis media
DALYs	Disability Adjusted Life Years
dB	Decibel
DOHA	Department of Health and Ageing
DVA	Department of Veterans' Affairs
ECU	Edith Cowan University
EEG	electroencephalographic
ENT	Ear Nose and Throat
ESIA	Ear Science Institute Australia
FAHL	Frequency Average Hearing Loss
GDP	Gross Domestic Product
GP	General Practitioner
HLPP	Hearing Loss Prevention Program
Hz	Hertz
IGR2	Inter-Generational Report
ITC	In-the-canal
ITE	In-the-ear
LOCHI	Longitudinal Outcomes of Children with Hearing Impairment
MBS	Medical Benefits Schedule
MNZAS	Member of the New Zealand Audiological Society
MOU	Memorandum of Understanding
MSAC	Medical Service Advisory Committee
NAL	National Acoustic Laboratory
NHMRC	National Health and Medical Research Council
NHS	National Health Services
NTER	Northern Territory Emergency Response

NZ	New Zealand
OAE	otoacoustic emissions
OATSIH	Office of Aboriginal and Torres Strait Islander Health
OEA	Office of Evaluation and Audit
OHS	Office of Hearing Services
PBS	Pharmaceutical Benefits Scheme
PCC	Pension Concession Card
PCHI	permanent child hearing impairment
QP	Qualified Practitioner
RALD	Retiree Assistive Listening Device
RNID	Royal National Institute of Deaf People
RVRF	Return Voucher Request Form
SKA	Sickness Allowance
SSD	Statistical Subdivision
TAFE	Tertiary and Further Education
UK	United Kingdom
VA	Veterans' Affairs
Vicdeaf	Victorian Deaf Society
VRS	Vocational Rehabilitation Scheme

PART 1 INTRODUCTION

1.1 Overview of support for Hearing Health in Australia

The management of hearing health in Australia occurs through public initiatives of the Australian Government and state and territory governments, as well as through private arrangements. An individual with a hearing impairment may receive hearing services through various access points and utilise different mixes of funding (depending on their circumstances and needs).

There are a wide variety of activities undertaken to support hearing health. These include prevention, screening, hearing loss assessment, hearing aid fitting, cochlear implantation, hearing device management and maintenance and research.

There are also a number of players involved in this area. These include:

- The Australian Government - which contributes funding and provides services across the range of activities, with the involvement of multiple Portfolios, including Health and Ageing, Veterans' Affairs, Innovation, Industry, Science and Research, Human Services and Treasury.
- State and territory governments - who provide screening services, prevention activities, hearing assessments through community health services (including for Indigenous Australians), workers compensation arrangements and undertake cochlear implantation surgery through public hospitals.
- Other - which include a range of private providers, Aboriginal Medical Services, hearing device manufacturers, private health insurance funds, workers' compensation funds, charitable institutions, research institutes and universities, and private hospitals.

A diagram showing the various components of the system and their interaction is at Appendix A, and a diagram of the entry points for clients to the hearing health system is at Appendix B.

In relation to the Health and Ageing Portfolio, the major contributions are through:

- Population health programs coordinating screening initiatives such as the Universal Neonatal Hearing Screening Program, a collaboration between the Australian Government and state and territory governments to ensure national consistency in approach and data collection on congenital hearing impairment.
- Prevention programs funded through the Hearing Loss Prevention Program, specific initiatives funded by the Office for Aboriginal and Torres Strait Islander Health (OATSIH) and the National Immunisation Program;
- The Australian Government Hearing Services Program which provides assessment and aids through a voucher system for eligible clients as well as services for special needs groups through a Community Service Obligations (CSO) arrangement.
- Assistance provided to state and territory governments under the National Health Care and other Commonwealth/State Agreements, which contribute to the cost of hearing services delivered through public health services in each state and territory, including cochlear implantation surgery in public hospitals;
- Medicare benefits provided for hearing services provided by medical practitioners and allied health professionals including audiologists. Recompense for these services is provided through specific audiology related item numbers in the Medicare Benefits Schedule;

- Initiatives, programs and services to identify and address hearing health issues in Indigenous communities, funded through the OATSIH;
- Support for private health insurance arrangements; and
- Supporting and funding research, including through involvement of the National Health and Medical Research Council (NHMRC) grants.

In addition to this, the Health and Ageing Portfolio works in partnership with a number of other portfolios to ensure that appropriate arrangements are in place for hearing health. These include:

- Human Services Portfolio, with direct arrangements in place for contracting of hearing services with Australian Hearing (AH), research through the National Acoustic Laboratories (NAL), Medicare payments made through Medicare Australia and issuing of concession cards by Centrelink (which are used to determine eligibility for funding under the Australian Government Hearing Services Program).
- Treasury Portfolio, which makes a range payments to state and territory governments on behalf of the Australian Government, some of which support hearing heath activities and provides taxation offsets to assist people who incur medical expenses over the determined threshold as well as private health insurance rebates.
- Innovation, Industry, Science and Research Portfolio, which support innovation and research in the sector, including through the Hearing Health Cooperative Research Centre and assistance provided to Australian hearing device designers and manufacturers to encourage innovation and new product development.

The Australian Government Hearing Services Program is the most significant mechanism in the Health and Ageing Portfolio through which hearing assessment is undertaken and aids provided or maintained. This program provides access to hearing services and technologies through a network of contracted service providers to eligible Australians.

1.2 Australian Government Hearing Services Program

1.2.1 Background

The Australian Hearing Services Program began in 1947 in response to the high rate of hearing loss in returning World War Two veterans. The Commonwealth Acoustic Laboratory was established to undertake research into hearing loss and to provide services to veterans and school children. The Acoustic Laboratory, now known as AH grew to be arguably the largest single audiological provider in the world. It is also recognised internationally for the work of its research arm, the NAL. The diagnostic procedures developed by NAL are among the most widely used in the world.

In 1996, the Government announced the introduction of a voucher system for hearing services, greater private sector involvement in the provision of Government funded services, and some important administrative changes to separate the purchaser and provider roles.

In March 1997 the Office of Hearing Services (the "Office") was formally established as a unit within the then Department of Health and Family Services to consult with stakeholders and implement the reforms. The Office formally assumed responsibility for the regulation and administration of the Australian Government Hearing Services Program on 1 July 1997, and implemented the voucher system on 1 November 1997.

In addition to voucher services, the Office provides funding for services to special needs groups. Since 1997, AH has played a unique role in the provision of additional 'declared' hearing services through its Community Service Obligations (CSO). These obligations ensure access to quality hearing services by special needs groups which include all children and young adults under the age of 21, eligible clients with complex rehabilitation needs, eligible Indigenous Australians and eligible clients in remote areas.

The Government has made a significant commitment to the provision of hearing services within the Program. This is reflected in the increase in funding from $96 million in 1996 to an estimated funding of around $348.931 million in 2009-10.

In 2008-09, the Australian Government Hearing Services Voucher Program delivered hearing services to 525,427[5] clients at an administered cost of about $309 million. Under the Australian Government Hearing Services Community Service Obligations Program, services to clients included 28,710 children and young Australians, 8,170, Indigenous people and 19,127 adults with complex hearing needs.

Currently, services are provided to Voucher clients through 205 contracted hearing service providers across 2050 sites[6]. Of these, there are 706 permanent, 1304 visiting and 40 remote area sites that are staffed by 1,221 qualified practitioners.

1.2.2 Regulation of the Program

Provision for hearing rehabilitation services to be delivered to Voucher clients by contracted service providers is made under the *Hearing Services Administration Act 1997* (the Act). Hearing Service Providers are entities (individuals, partnerships, companies or government agencies) which have been accredited by the Minister for Ageing and contracted with the Office to provide hearing rehabilitation services to eligible clients of the Program.

The requirement for accreditation of entities stems from the fact that the hearing industry is unregulated, lacking practitioner licensing, or registration at State or Territory level or an industry wide accreditation scheme. Conditions of accreditation generally focus on qualifications of staff, standards of service and the entity's financial viability. Following accreditation of the applicant, entities become contractually responsible for establishing and maintaining approved clinics, employing Qualified Practitioners to provide clinical services to clients. Furthermore, entities must ensure that the services are provided in accordance with the contract and subordinate legislation made under the Act. Further information about the legislative framework for the Program is provided at Appendix C.

While this legislation applies only to the provision of services under the Program and the Office does not regulate the remainder of the industry in any way, in the absence of any other licensing or registration, the Program effectively sets the standards for the industry generally. In essence, the Program has adopted a quasi regulatory role for the Industry.

[5] Office of Hearing Services, 2009, *Unpublished Program Data*
[6] Office of Hearing Services, 2009, *Unpublished Program Figures*

1.3 The Hearing Service Industry

The current hearing service industry allows hearing impaired individuals to access services (excluding cochlear implants) in the following ways:

- through the Government Program, accessing free or subsidised services; or
- through the private hearing services market, paying for services at full commercial price.

There is little publicly available information about the private market. For example, there is no available data on the number of hearing service providers that practice solely in the private market, the numbers of professional staff that they employ, recommended retail prices for devices, client populations and the number of complaints against hearing service providers.

The Australian hearing industry can be characterised as small and fragmented. Research undertaken by the School of Biomedical, Biomolecular and Chemical Sciences, University of Western Australia[7] determined that 10 per cent of audiologists in Australia are self employed in their own private practice, with an additional 20 per cent being employed in audiological clinics. All but seven of the 205 hearing service providers contracted to the existing Program are small businesses with a local focus and generally small client base.

Table 1.1 provides a summary of the expenditure, client base and market share of providers in the Voucher Program. In 2008/09 there were 205 accredited contractors who provided services under the Voucher Program at a cost of $269 million.

The largest six hearing service providers provided hearing services to 1,062,000 clients at a cost of $198 million, representing nearly three-quarters of clients in the Voucher Program in 2008-09.

Table 1.1: Market Share of Contracted Service Providers under the Voucher Program, 2008-09

Hearing Service Provider	Total Expenditure ($)[1]	Total Clients	% Market Share ($)	% Market Share (Clients)
Big 6 Providers	$198,613,698	1,061,978	73.83%	75.77%
Other Providers	$70,386,075	339,663	26.17%	24.23%
Total	$268,999,773	1,401,641	100.00%	100.00%

1 Total expenditure has not been adjusted for the Department of Veteran's Affairs payments for maintenance and replacement fees for their clients and revenue from recovery of incorrect claims for services.

It has been estimated that those businesses contracted under the Program represent roughly 70% of the industry as a whole. Based on the Australian Bureau of Statistics 1997-98 Audiology and Audiometry Services publication, the Office estimates that there could be up to 60 hearing services businesses not contracted to the Program.

[7] Goulois, H, and Patuzzi, RB, 2007

The Department does not know the profitability of these businesses. However, there does not appear to be any significant issue given:

- new businesses continue to contract their services. Since 1 January 2009, 15 new businesses have chosen to contract to the Government Program. Additionally, in the same period 204 provisional and qualified practitioners have registered to provide services; and
- existing businesses are expanding, evidenced through their registering new sites with the Program. In 2008-09 an additional 80 new permanent sites opened.

1.4 Australian Government Hearing Services Program Workforce

There are two practitioner groups working within the hearing industry. Audiologists have a Masters degree in Audiology and Audiometrists a Technical and Further Education (TAFE) Certificate IV and from January 2009, a Diploma in Hearing Device Prescription and Evaluation. Both practitioner groups are recognised as Qualified Practitioners (QPs) under the Australian Government Hearing Services Program.

The number of QPs has increased by 178% from 440 in 1997/98 to 1221 in 2008/09 reflecting the industry's response to increased client demand in the Voucher Program. The Office understands that the number of places for student audiologists doing Masters Degrees has increased over the last couple of years with a resultant increase in the number of graduate audiologists entering the Program.

The number of audiometrists in the Program has been slowly but steadily increasing since the commencement of the Program. Currently there are 238 Qualified Audiometrist Practitioners compared to 984 Qualified Audiologist Practitioners in the Program. Fewer audiometrists in the Program and the industry in general, may partly be attributable to the fact that training for audiometrists in Australia has in recent years has been provided by only one Technical and Further Educational institution based in Sydney.

The ratio of QPs to clients has continued to fall since a peak in 1999/00 of 553 clients per QP to only 404 per QP in 2008-09. Though the number of QPs in training appears to be declining in recent years suggesting a possible workforce shortage issue if client demand continues to grow.

Of the type of business sites registered from which a contractor can provide hearing services, Visiting sites are the most preferred representing over 63.9% of sites. However in 2008/09 the number of permanent sites showed the greatest increase of 88 sites to a total of 696 sites in 2008-09.

Table 1.2 provides a summary of the workforce information under the Program.

Table 1.2

Annual Time Series
Practitioners/Clients and Contracted Service Providers

Practitioners

	1-Jul-98	1-Jul-99	1-Jul-00	1-Jul-01	1-Jul-02	1-Jul-03	1-Jul-04	30-Jun-05	30-Jun-06	30-Jun-07	30-Jun-08	30-Jun-09
Category												
Audiologists (QP)	322	368	430	516	606	680	656	698	768	831	894	983
Audiometrists (QP)	118	128	136	140	148	172	170	170	190	196	212	238
Provisional Audiologists	6	5	54	89	81	88	89	96	95	117	121	114
Provisional Audiometrists	0	0	0	9	20	23	24	53	53	56	82	91
Student Audiometrists	0	0	0	11	24	28	79	99	111	115	73	70
Trainee Audiometrists	7	51	42	31	29	14	9	3	0	0	0	0
Total (QP)	440	496	566	656	754	852	826	868	958	1027	1106	1221
% Increase/ Year	0%	12.73%	14.11%	15.90%	14.94%	13.00%	-3.05%	5.08%	10.37%	7.20%	7.69%	10.40%
Total Training	13	56	96	140	154	153	201	251	259	288	276	275
% Increase/ Year	0%	330.77%	71.43%	45.83%	10.00%	-0.65%	31.37%	24.88%	3.19%	11.20%	-4.17%	-0.36%
Total all Categories	453	552	662	796	908	1005	1027	1119	1217	1315	1382	1496
% Increase/ Year	0%	21.85%	19.93%	20.24%	14.07%	10.68%	2.19%	8.96%	8.76%	8.05%	5.10%	8.25%

Contracted Service Providers

Contracted Service Providers	0	126	130	135	139	142	163	181	200	199	196	205
% Increase/ Year	0%	0%	3%	4%	3%	2%	15%	11%	10%	-1%	-2%	5%

Clients

Total active clients *	124,990	219,478	313,134	326,218	351,833	373,167	393,842	411,631	424,955	442,909	465,393	494,046
Total (QP)	440	496	566	656	754	852	826	868	958	1027	1106	1221
Total ratio (clients/practitioner)	284.1	442.5	553.2	497.3	466.6	438.0	476.8	474.2	443.6	431.3	420.8	404.6

Sites

Permanent	274	285	303	320	351	374	421	463	504	539	608	696
Visiting	1040	998	916	869	897	877	980	1078	1189	1237	1322	1302
Remote	23	28	30	31	39	31	38	33	38	37	33	39
Total	1337	1311	1249	1220	1287	1282	1439	1574	1731	1813	1963	2037
% Increase/ Year	0%	-2%	-5%	-2%	5%	0%	12%	9%	10%	5%	8%	4%

* Total active clients = the number of new clients and maintenance clients per financial year
** Trainee Audiometrist category terminated at 31 December 2005
Note: 1 July 2004 - OHS update of database to remove QPs who have either left the industry or not worked for 2 or more years.

1.5 International Comparisons

The Australian Government Hearing Services Program has some similarities with hearing health programs in other jurisdictions such as the United Kingdom (UK), United States of America (US) and New Zealand (NZ). All programs offer access to hearing assessments and devices, although the eligibility (and therefore coverage) varies, as does the range of devices available and the waiting time for services.

The UK National Health Services (NHS) offers universal access to hearing services and devices to UK citizens and permanent residents. A suite of programs in NZ provide universal access to subsidised hearing devices and children aged under 18 years (or under 21 if studying full time) are able to access fully subsidised hearing devices. The US Veterans Affairs Hearing Aid Program (VA program) offers access to eligible veterans to hearing services and devices. Eligibility under the Australian Government Program is provided to special needs groups such as pensioner concession card holders (the largest group), veterans and their dependants, children under 21 and Indigenous Australians aged over 55 years.

Waiting times in these jurisdictions vary from at least eight weeks to process the subsidy application in NZ to a maximum of 18 weeks under the UK NHS. On average, there is approximately 10 weeks between the time a voucher is issued under the Australian Government Program and a claim for service is received.

The range and cost of devices under each program also varies. The US VA program has the largest range of devices that includes some currently listed as non-standard devices in the Australian Government Program. The range of devices offered under the UK NHS is similar to the Australian Government Program. All devices are offered free of charge to eligible clients in the UK.
In Australia, hearing assessments, devices and other rehabilitation services are free of charge. Clients may also elect to pay a small annual fee to enter into a maintenance agreement with a hearing service provider. For this fee service providers will supply and fit batteries, clean

and service the aid and replace any worn or broken parts. The Program supplements this fee to keep the client's contribution as low as possible. Some hearing service providers waive this fee and accept Program payment only. Further information about these international programs is provided at Appendix D.

1.6 Communities

1.6.1 Deaf Culture

People who use Australian Sign Language (Auslan) to communicate are most commonly referred to as belonging to the Australian Deaf Community similar to those from a Culturally and Linguistically Diverse background who belong to their own ethnic communities. With capital 'D' in its written form, the word 'Deaf' is used to emphasise the identity of this culturally and linguistically diverse minority group that encompasses a vast network of social, political, religious, artistic and sporting groups.

Generally, those belonging to the Deaf Community include:

- People who use Auslan.
- People deaf from birth or an early age.
- CODAs (hearing Children of Deaf Adults).
- Some hearing people who live and work with Deaf people.

The single most unifying factor of the Deaf community is the use of Auslan. The fact that a person is deaf does not automatically mean membership of the Deaf Community as many do not use Auslan. Members of the Deaf community exhibit a sense of pride in their deafness and advocates strongly discourage the view that Deaf people are a disabled group, but promote themselves as a linguistic minority group[8]. The intrinsic belief that they are normal and not of abnormal hearing is central to the Deaf Communities cultural model of deafness.

United in their attitude, beliefs and similar life experiences, the Deaf community communicate by using Auslan, a visual and spatial language that has its own grammar, syntax and idioms quite different from that of English. Auslan uses a variety of ways to convey meaning, including hand shapes, orientation, location, movement, facial expression, natural gestures, body language and finger spelling.

1.6.2 Hearing Impaired

The "hard of hearing", "hearing impaired" and "people with hearing loss" are all terms commonly used to describe those people who experience various degrees of hearing loss (i.e. from the effects of ageing, industrial accidents or exposure to excessive noise) that identify with the dominant 'hearing' culture[9]. This is primarily due to the fact that they generally align their views with the medical disability model of deafness which considers hearing loss as a deficit and uses technological and behavioural means to assist communication. The 'hearing impaired' can be readily differentiated from the Deaf community by their preference to communicate using spoken language. More commonly, those that identify themselves as hearing impaired have sufficient residual hearing that enables them to participate in oral/aural communication.

[8] Deaf Services Queensland, 2007
[9] Deafness and Mental Health, 2008

PART 2 HEARING IMPAIRMENT IN AUSTRALIA

2.1 Hearing Impairment

Hearing is the sensory ability that allows meaningful response to sounds in the environment. Sounds provide spatial awareness, warnings of danger and most importantly a communication modality. A loss of hearing limits responsiveness to the environment commensurate with the degree of hearing loss and may therefore affect communication and ability to interact with society.

Hearing loss involves a multifaceted loss of hearing ability including:

- Decreased audibility – people with hearing impairment do not hear some sounds at all, depending on the severity of hearing loss. This affects a person's ability to understand speech as some essential parts are inaudible.
- Decreased dynamic range – the dynamic range of an ear is the level of difference between the threshold of audible sound and the threshold of loudness discomfort. A person with a hearing impairment will have a smaller dynamic range than that of a person with normal hearing.
- Decreased frequency resolution – separating sounds of different frequencies may also present a difficulty for the hearing impaired. A person with normal hearing is able to separate speech from background noise; however a hearing impaired person is unable to differentiate between speech and noise where the frequencies are close together. Additionally, if frequency resolution is decreased some low frequency parts of speech may obscure the weaker higher frequency components which affect the intelligibility of speech.
- Decreased temporal resolution – intense sounds can mask weaker sounds that immediately precede or follow them and inability to perceive the weaker sounds adversely affects speech intelligibility. The ability to hear weak sounds during fluctuating background noise gradually decreases as hearing loss worsens.

In combination, the above deficits can cause a reduction in intelligibility of speech for a hearing impaired person compared to a normal-hearing person in the same situation.[10]

Hearing levels are determined by testing the range of sounds one can hear and how softly one can hear such sounds. The range of sounds is measured in hertz (Hz) or waves per second and the intensity or strength of sound is measured in terms of a scale of decibels (dB). Decibels range from 0 to 140 where 0 represents the lowest level of sound accessible to a healthy human ear and 140 indicates the point at which physical damage occurs[11]. In terms of severity, hearing loss is categorised as mild, moderate, severe, or profound depending on how intense a sound has to be before a person can hear it. For children aged under 15 years, AH defines the severity of hearing loss as:

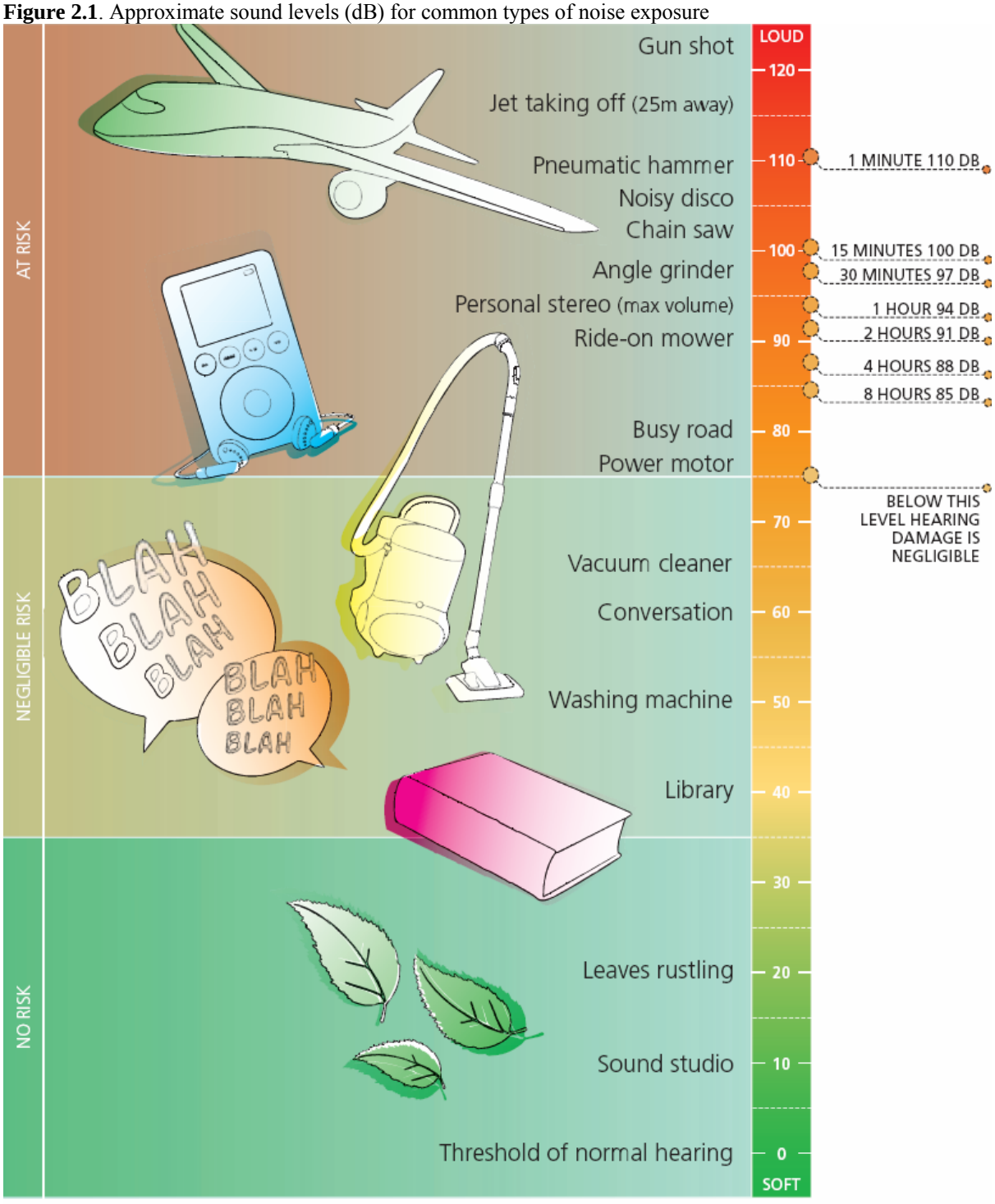
- Mild 0-30 dB
- Moderate 31-60dB
- Severe 61-90dB;
- Profound ≥91dB

[10] Dillon, H, 2001
[11] Access Economics, 2006, pp. 11-12

For people aged 15 years and over, severity of hearing loss is defined as:

- Mild ≥ 25dB and <45dB
- Moderate ≥ 45dB and <55dB; and
- Severe ≥ 65dB.[12]

Figure 2.1. Approximate sound levels (dB) for common types of noise exposure



Source: http://www.hearing.com.au

[12] Access Economics, 2006, p. 12

2.2 Prevalence of Hearing Impairment[13]

2.2.1 Prevalence of Hearing Loss

Access Economics estimated that the prevalence of hearing loss in Australia in 2005 was one in six Australians was affected by hearing loss, including:

- 10,268 children aged under 15 years;
- 3.5 million adults aged 15 years and older.

Of the adult population, 50% of people estimated to have hearing loss were between the ages of 15 and 64 years and considered of working age. Males represented 60% of the population and were more likely to experience hearing loss at a younger age but this difference between the genders reduced with age. These gender differences are attributed to the differing levels of exposure to workplace related noise. Hearing loss was estimated to be predominantly mild in nature, with one third of people with hearing impairment experiencing a moderate to severe hearing loss.

2.2.2 Prevalence Projections

Access Economics estimate the prevalence of hearing impairment in children is likely to increase to 11,031 by 2050, an increase of 7.4% based on population growth and increased detection through universal neonatal screening.

Hearing loss prevalence in the adult population is expected to more than double by 2050 to one in four, largely driven by the ageing population. In the absence of a substantive prevention program the severity of hearing loss is not expected to change. The growth in hearing loss by gender is expected to increase for males from 21% to 31.5% and for females from 14% to 22%.

2.3 Causes of Hearing Impairment[14]

Hearing loss may result from problems at any point in the hearing pathway and can be described as either congenital or acquired. Congenital hearing loss is one that is present at or soon after birth. An acquired loss is one that occurs later in life.

The most common causes of hearing loss are ageing and excessive exposure to loud sounds. The effects of age and noise exposure are additive so that noise exposure may cause hearing loss in middle age that would not otherwise occur until old age. Hearing loss is described as conductive or sensorineural, depending on where the problem occurs in the hearing pathway, or may be a mixture of both.

[13] Access Economics, 2006, pp. 26-43
[14] Australian Hearing, 2003

2.3.1 Conductive Hearing Loss

Damage or blockage to the outer and/or middle ear may prevent sound getting to the middle ear. This is known as conductive hearing loss and may be either congenital or acquired.

Some causes include:

- blockage of the ear canal by impacted wax or foreign objects;
- outer ear infection (otitis extrema);
- middle ear infection (otitis media);
- perforated ear drum;
- ostosclerosis, a hereditary condition where bone grows around the sound conducting bones in the middle ear; and
- partial or complete closure of the ear canal (artesia).

The severity of hearing loss caused by these problems varies but conductive hearing loss does not cause any more than a moderately severe hearing impairment. This type of hearing impairment leads to a loss of loudness and can often be improved by medical or surgical treatment. If medical treatment is not possible, people with conductive hearing loss benefit from the amplification provided by hearing aids.

2.3.2 Sensorineural Hearing Loss

This type of loss results from damage to, or malfunction of, the cochlea (the sensory organ that translates sound into nerve impulses to be sent to the brain) or the hearing nerve. Acquired sensorineural hearing loss can be caused by:

- the ageing process;
- excessive noise exposure;
- diseases such as meningitis or Meniere's disease;
- viruses, such as mumps or measles;
- drugs which can damage the hearing system; or
- head injuries.

A congenital sensorineural hearing impairment may be caused by:

- inherited hearing loss;
- prematurity, lack of oxygen at birth, or other birth traumas;
- damage to the unborn baby due to virus, such as German measles (rubella); and
- jaundice, particularly when serious enough to require blood transfusion.

This type of loss generally leads not only to a loss of loudness but to a lack of clarity as well, therefore the quality and quantity of sound is affected. This can limit the benefit a hearing aid can offer as sounds may be loud enough but distorted. There is rarely any medical treatment of a sensorineural hearing loss and it is therefore permanent.

2.3.3 Mixed Hearing Loss

This type of hearing loss occurs where there is a problem in both the conductive pathway and the nerve pathway. As an example, mixed hearing impairment may occur where there is a conductive loss due to a middle ear infection and a sensorineural loss due to the ageing process.

2.3.4 Noise Induced Hearing Loss[15]

Common sources of noise injury include workplace noise and recreational noise, although it is unclear to what extent these contribute to hearing loss. The extent of noise induced hearing loss is under-appreciated. A study in South Australia conducted by Wilson et al (1998) indicated that the audiograms of 37% of the population over 15 years indicate damage due to noise exposure.[16]

2.3.4.1 Recreational Hearing Loss

Recreational noise may include use of personal music players, domestic use of power tools and attendance at motor sport events.

The use of personal music players have received media attention for the potential damage these systems may cause to a person's hearing. Research has shown that short term or minor hearing loss may result from personal stereo systems and music exposure more generally; however there have been no long term studies that document permanent measurable and significant hearing loss. There is also no consensus on the contribution recreational hearing loss makes to the overall prevalence of hearing impairment.

For recreational hearing loss to occur, the extent of exposure must be loud enough and sustained over a sufficient period. Research evidence supports that exposure through personal stereo systems is loud enough to pose a danger for hearing loss. There is no evidence that exposure occurs over a sufficient period to result in a hearing impairment.

2.3.4.2 Occupational Hearing Loss

Access Economics report that official rates for workers' compensation claims were falling in 2005 and notes that this was occurring in the absence of significant prevention programs.[17] The explanation offered for this is the introduction of a minimum threshold for eligibility to compensation in response to rising workers' compensation claims.[18] However, the Australian Safety and Compensation Council (ASCC) noted a slight increase in claims for noise induced hearing loss between 2002-03 and 2004-05.[19]

In April 2006, the ASCC reported on occupational hearing loss in Australia. Based on claims for compensation in 2001-02, the principle cause of occupational hearing loss in Australia was sound and pressure, with 96% of claims for compensation for this cause. The occupations with the highest number of claims in this period, accounting for 88% of all claims, were labourers, tradespersons and intermediate production and transport workers. The three highest industry sectors affected by occupational hearing loss were identified as manufacturing, construction, transport and storage.[20]

Exposure to certain chemicals in the workplace may also result in hearing loss. These chemicals are known as ototoxins and are chemical substances that may damage the cochlear or auditory pathway. Damage is more likely if a person is exposed to a combination of substances or to a combination of substances and noise.

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[15] Access Economics, 2006, p. 18
[16] Wilson, DH, Walsh, PG, et al., 1998
[17] Access Economics, 2006, pp. 19-20
[18] Australian Safety and Compensation Council (ASCC), 2006, *Report on Indicators for Occupational Disease*
[19] ASCC, 2008, *Occupational Disease Indicators*
[20] ASCC, 2006, *Work-related Noise Induced Hearing Loss in Australia*

The principle characteristics of occupational hearing loss are:

- the hearing loss is usually on both sides as most noise exposures are symmetric;
- symptoms may include gradual loss of hearing, hearing sensitivity and tinnitus, the experience of noise or ringing in the ears where no external physical noise is present;
- noise exposure alone does not usually produce a loss greater than 75dB at high frequencies and 40 dB at low frequencies, however hearing impairment may be worse where age-related losses are superimposed;
- the rate of hearing loss due to chronic noise exposure is greatest during the first 10-15 years of exposure.

2.3.4.3 Acoustic Shock and Acoustic Trauma

Acoustic shock refers to the physiological and psychological symptoms a person may experience after hearing a sudden, unexpected and loud sound via a telephone headset or handset. These incidents may result in temporary hearing loss but the extent to which permanent damage occurs is debated.

Acoustic trauma occurs due to exposure to a very high sound level for a short period of time, such as an explosion or gunfire. Generally, repeated exposures are required for permanent hearing loss to be sustained.

2.3.5 Tinnitus

Tinnitus is a condition that frequently accompanies hearing impairment and may affect hearing loss management. It is described as a sensation of sound in the head which may be localized in one or both ears or perceived in the cranial region. This sensation may be perceived as a throbbing, hissing, whistling, booming, cracking, clicking, buzzing, roaring, high pitched tone or noise. While tinnitus frequently accompanies hearing loss, people with normal hearing may also experience this sensation. The sensation of sound can be present constantly or intermittently, and in various levels of loudness with effects ranging from slight to seriously disabling. Those conditions that tend to have the highest incidence of accompanying tinnitus include noise induced losses and Meniere's Disease, a condition in which excess fluid in the inner ear disrupts the ear's balance and hearing mechanisms.

2.4 Impacts of Hearing Impairment

2.4.1 Individual

Hearing impairment will affect a person differently depending on when the hearing loss occurred and the severity of the loss. Hearing loss also has significant social impacts on an individual, and may include:

- isolation;
- depression;
- anxiety;
- paranoia;
- exhaustion;
- loss of intimacy; and
- anger.

Research has demonstrated that hearing rehabilitation, including the provision of a hearing aid, lessens depression and negative emotions associated with hearing loss.[21]

[21] Mulrow, CD, Tuley, MR, and Aguilar, C, 1992

The impact of hearing impairment on individuals also differs greatly between childhood and adulthood and various areas of recent research have focused on addressing concerns during each stage of life.

2.4.1.1 Children

Whilst children only represent a small proportion of the population of hearing impaired individuals, the impact on this group is particularly significant as they require a high level of support in developing communication skills and accessing education.[22] There are many factors which influence the impact that hearing impairment can have on a child, including when it occurs and the prevalence of other conditions.

The occurrence of hearing loss prior to or during speech and language development can greatly influence the consequences of hearing impairment. Pre-lingual hearing loss involves the loss of hearing before a child has completely developed speech and language. It may be congenital or acquired in the first few years of life and can affect the development of language skills.[23] Early identification of hearing loss can assist to ensure that decisions are made about which communication strategies to develop, which hearing technologies will be of most assistance, what support services are available and the types of educational settings the child may access.

The language development of children with hearing impairment identified in the first 6 months of life is significantly higher than for those identified after 6 months, with 'early-identified' children having language development at 80% of the typical development of children with no hearing impairment. Children diagnosed with hearing impairment after 6 months have language development at only 60% of typical development.[24]

Children who receive interventions for their hearing loss in the first 6 months of life develop expressive and receptive language abilities that are more in keeping with their chronological age than children who receive intervention after 6 months of age. Further research in this area is demonstrating that this effect is greatest where the intervention involves a cochlear implant rather than a hearing aid.

However, early diagnosis does not automatically confer benefits - early diagnosis is only useful if followed by early intervention. Children with hearing loss who receive very early intervention have better language skills than those with later intervention, independent of the severity of hearing impairment, intelligence, and socioeconomic status.[25][26] After diagnosis, factors that may affect outcomes in language development and speech perception include the age of fitting with a hearing device, the type of device used (most commonly a hearing aid, but also cochlear implants), the communication and education mode (sign, total communication or talking-listening), and the cause of the child's hearing impairment.[27]

[22] Access Economics, 2006, pp 16-17
[23] *Ibid.*, p.18
[24] Yoshinaga-Itano, C, 2003
[25] Kennedy, CR, McCann, DC, Campbell, MJ, et al., 2006
[26] Yoshinaga-Itano, C, 2003
[27] Dahl, H, Wake, M, Sarant, J, et al., 2003

Early results of the Longitudinal Outcomes of Children with Hearing Impairment (LOCHI) study at the National Acoustic Laboratories, NSW indicate that early intervention specifically before twelve months of age has a significant affect on the development of speech and language skills and shows little difference between hearing and non-hearing impaired children.

The prevalence of other conditions can also impact on the management of hearing loss. Children with a hearing impairment often have an additional disability, with 27% of hearing impaired children reporting an additional disability.[28] The most common additional disabilities are learning difficulties and visual impairment.[29]

2.4.1.2 Adults

Similarly as in childhood, there are also many factors influencing the impact of hearing impairment in adults, including an increased risk for a number of health conditions. For example:

- diabetes;
- stroke;
- elevated blood pressure;
- heart attack;
- psychiatric disorders;
- affective mood disorders;
- poorer social relations;
- higher sickness impact profiles; and
- reduced health related quality of life, particularly those with more severe hearing loss.

Although hearing impairment can impact on other arising physical health conditions, it affects social interaction and communication.

For individuals who develop a hearing loss in adult life, the most common problem resulting from a hearing impairment is the loss of social participation. The inability to follow conversations in a social setting for example, made individuals feel stigmatised and isolated. It has been suggested this discourages individuals from taking up the services on offer for fear of embarrassment at not being able to fully participate in discussions.

Hearing loss may also impact on the type of employment opportunities available. Access Economics report that people with a hearing loss are 25% less likely to earn higher incomes than people without hearing loss. Of the people in paid work only 72.1% of people with a hearing impairment report earning more than $40,000 per year compared to 77.9% of people with normal hearing. Based on 1994 data 55.6% of people of working age who have a hearing impairment reported being in paid employment compared to 62.4% of people with normal hearing.[30]

[28] Fortnum, H, Marshall, DH, and Summerfield, AQ, 2002, in Access Economics, 2006, p.24
[29] Access Economics, 2006, p.24
[30] *Ibid.*, p. 53

2.4.2 Community

Hearing impairment reduces a person's ability to participate in the community to the same extent as people with normal hearing. Consequently, the contribution hearing impaired people make to taxation revenue may be reduced and their reliance on social welfare increased.

The 2003 Disability Census indicated that 2,414 people with hearing impairment used an employment service. This survey focused on Commonwealth funded disability service programs, 84% of which were employment services. This survey suggested that 81% of people with a hearing impairment received welfare benefits. The Disability Support Pension was the main source of income for people who reported having a hearing impairment and were receiving work-related Commonwealth benefits.

Support services for people with a hearing impairment are provided in areas such as education, interpreter services, telecommunication services, captioning, family support, community support and aged care. These services are provided through public and private bodies.

Additionally, there are informal support services provided to people with a hearing impairment through family and friends. This often involves assisting a hearing impaired person to communicate with others or communicating on behalf of a person with a hearing impairment. Family and friends of a hearing impaired person may also sacrifice participation in some activities that would be difficult for people with a hearing impairment and may feel frustrated, embarrassed and tired. Access Economics estimated that in 2005 informal care was provided to people with a hearing impairment for 5.75 hours per week.

2.4.2.1 Mental Health

There is a growing body of research being conducted, both locally and overseas, examining the prevalence of mental illness within the population of hearing impaired people, however much of this research presents conflicting data. The Princess Alexandra Hospital South Brisbane Health District, Deafness and Mental Health Statewide Consultation Service suggests that, at a minimum, people who are hard of hearing experience mental illness at the same rate as those within the hearing population.[31]

Other studies have alternately suggested that the probability of a hearing impaired individual experiencing a mental illness is dependent on a range of issues including:

- increased social isolation and emotional vulnerability, leading to a higher risk of abuse;
- communication issues surrounding the family of the affected individual, if this is a first time experience of a hearing impairment;
- reduced cultural capital as a result of poor education opportunities and limited social expectations;
- linguistic and cultural barriers preventing access to and participation in existing mental health treatment and recovery services;
- lack of knowledge within the mental health industry about the special considerations for hearing impaired people; and
- limited knowledge and acceptance of mental health issues within the hearing impairment industry.

[31] Deafness and Mental Health Service, 2008

Reports suggest that there is a lack of research available on intervention programs around mental health and outcomes for hearing impaired individuals, resulting in the mental health industry in Australia being ill-equipped to adequately meet the needs of people with a hearing difficulty. The introduction of a set of guidelines for the provision of services to the hearing impaired within a mental health setting would provide a basic grounding for practitioners. The success of therapeutic interventions could then be measured and explored further by each individual mental health service provider.

2.5 Costs of Hearing Impairment

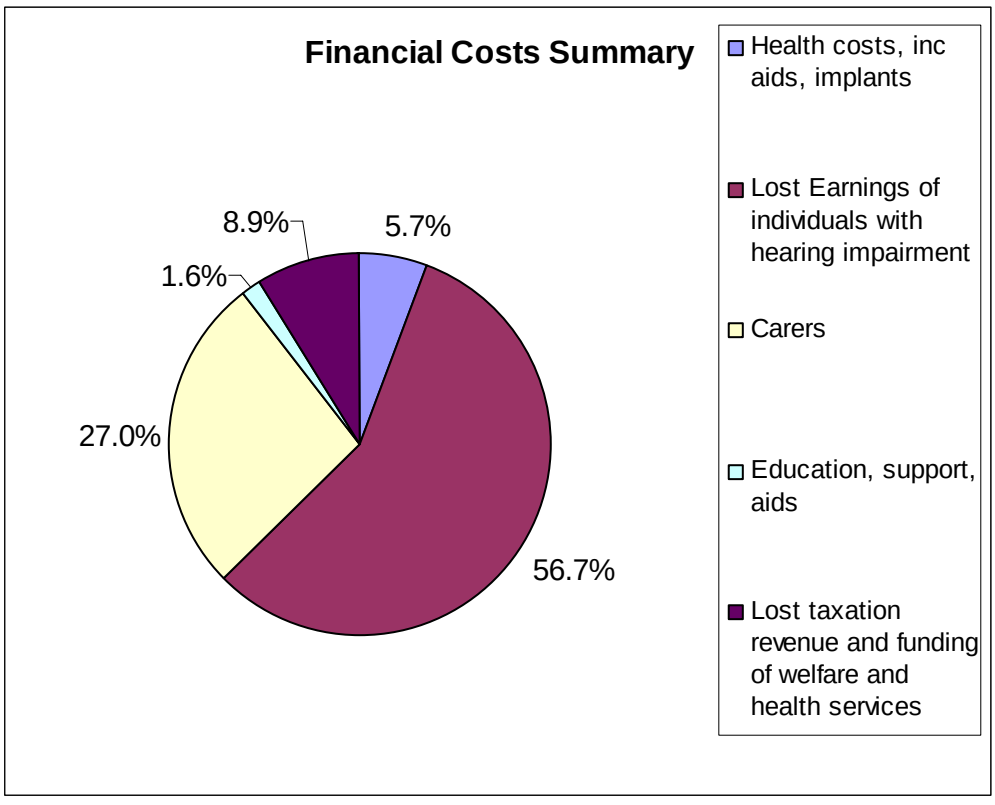
2.5.1 Estimate of Total Cost of Hearing Impairment

As a result of collaborative work between CRC HEAR and Vicdeaf in 2006-07, Access Economics was commissioned to produce *'Listen Hear! The economic cost and impact of hearing loss to Australia'* which reported a total of $23 billion was used to address hearing loss in Australia per annum. Of this, $11.75 billion attributed to direct economic costs (57% from lost productivity due to effects of hearing loss on communication) and $11.8 billion in lost wellbeing or disease burden (measured in Disability Adjusted Life Years (DALYs).

Chart 2.1 illustrates the distribution of real financial costs in 2005 as estimated by Access Economics. Of the annual real financial cost of hearing impairment ($11.75 billion):

- $6.7 billion in lost earnings to individuals with hearing impairment;
- $3.2 billion in costs of carers;
- $1 billion in losses from taxation revenue and alternative sources of taxation to fund welfare and health services;
- $674 million in direct health costs, including hearing aids and cochlear implants; and
- $191 million for education and support services and non-health communication aids.

Chart 2.1: Summary of Distribution of Real Financial Costs



Source: Access Economics (2006) *Listen Hear! The economic impact of and cost of hearing loss in Australia*

2.5.1.1 Direct Health Costs

The estimate of direct health costs by Access Economics can be further broken down into health system costs, costs of hearing devices and cochlear implants. In 2005, the allocated health costs arising from hearing impairment was estimated to be $247.5 million. The largest component of this expenditure is towards allied health services, including audiology and speech therapy services, at $130.2 million or 53% of health expenditure.

Outpatient expenditures, encompassing ear examinations, advanced assessments of ear disease and procedures such as the removal of wax, were the second largest at $45.7 million or a further 19% of health expenditure. Medical specialists accounted for $32.9 million or 13% of health expenditure, with the remaining expenditure as follows:

- inpatient costs at $8.8 million (3.5%) covering small numbers of surgeries to correct ossicular problems and perforations of the ear drum, implant surgeries (excluding devices) and other forms of ear surgery and treatment;
- health research at $10.2 million;
- pharmaceuticals at $13.2 million;
- general practitioner services at $3.5 million;
- aged care homes at $2.7 million; and
- diagnostic imaging and pathology services at $0.4 million.

The following table reflects the current levels of usage of hearing assessments in Hospitals.

Table 2.1: Number of patients, services and benefits paid for hearing tests (excluding newborn screenings) under Medicare, 2002-03 to 2008-09 by financial year.

Other Hearing Tests	Actual	Actual	Actual	Actual	Actual	Actual	Actual
	02-03	03-04	04-05	05-06	06-07	07-08	08-09
Patients	233,840	230,284	234,779	228,597	224,626	219,568	221,022
Services	465,420	457,956	467,951	458,048	453,453	446,628	454,930
Expenditure	$9,352,966	$9,514,967	$10,280,947	$10,323,557	$10,377,534	$10,684,961	$11,260,880

Source: Medicare

2.5.1.2 Costs of Hearing Aids and Cochlear Implants

The costs of hearing prostheses, such as hearing aids and cochlear implants, are estimated to account for the largest element of health expenditure in 2005 at $376.7 million.[32]

Audiological interventions, including hearing tests and the supply of ear moulds and hearing aids, provided under the Australian Government Hearing Services Program to eligible adults accounted for $243 million in 2004-05. Access Economics estimate that in 2005, the total cost of hearing aids in the private market was $133.7 million and the costs of implantable devices for hearing loss approximately $10 million per annum.[33]

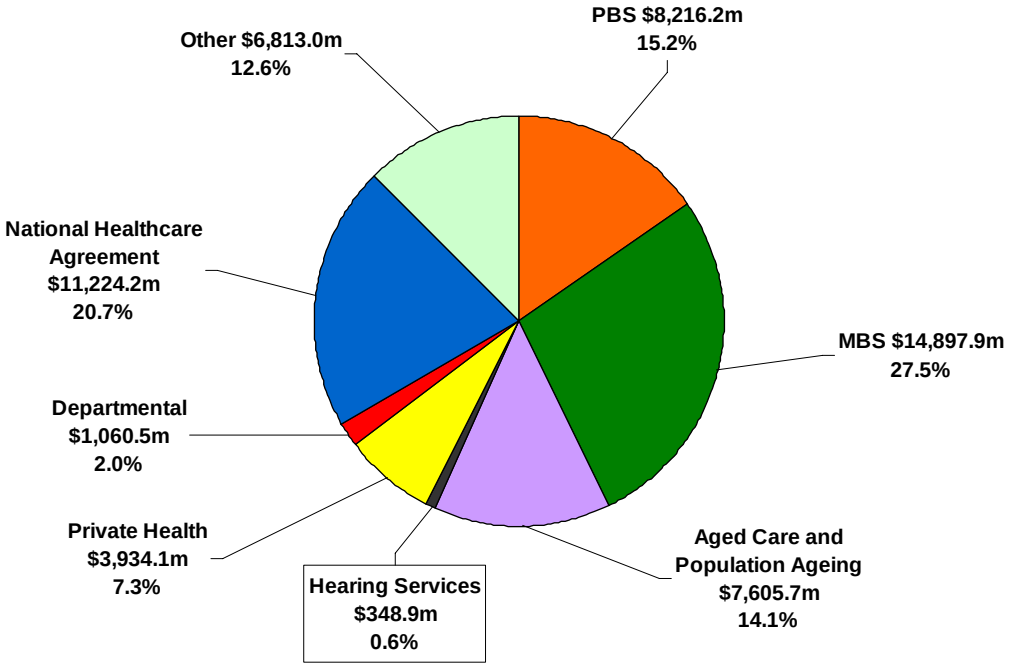
[32] Access Economics, 2006, p.49
[33] Access Economics, 2006, pp. 49-50

2.5.2 Funding Arrangements for Hearing Services

Funding for hearing services is provided by Commonwealth and State governments, private health insurance, private consumers and charitable organisations.

Australian Government expenditure on hearing services represents 0.6% of the total $55.3 billion health budget in 2009-10. Chart 2.2 describes the allocation of health expenditure for the 2009-10 financial year.

Chart 2.2 Portfolio of Health and Ageing Programs: Commonwealth appropriations by major program 2009-10 ($m and %)

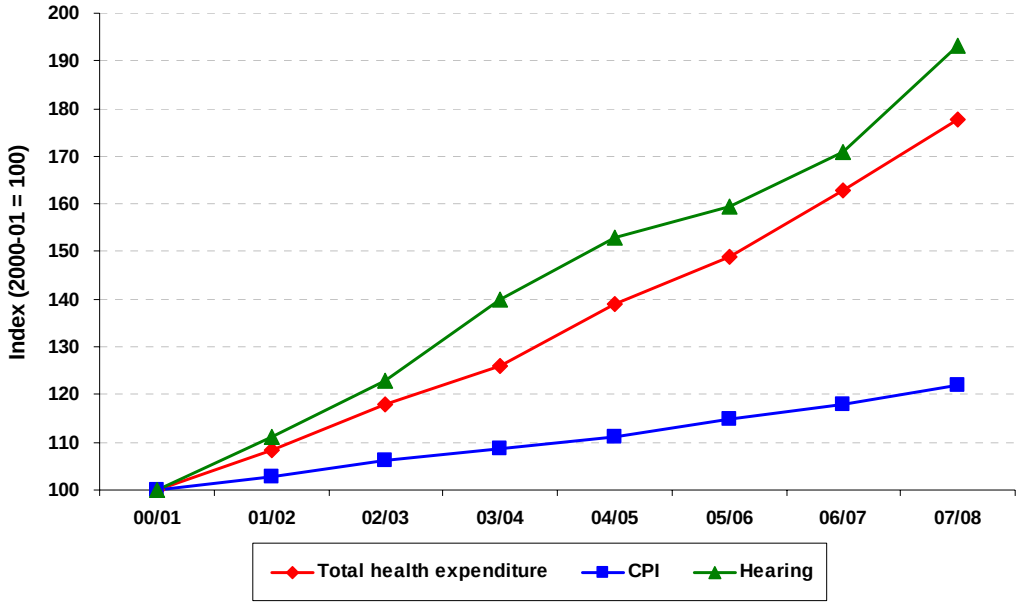


Source: Portfolio of Health and Ageing 2009-10 Portfolio Budget Statements

Between 2000-01 and 2006-07 growth in health expenditure has been substantially higher than inflation as measured by the Consumer Price Index (CPI). In this period, inflation has increased by 18% while health expenditure grew by 61%. Furthermore, expenditure on hearing services grew by 79%. This growth and comparison is illustrated in Chart 2.3 on the following page.

This chart indicates that general CPI explains only about 28% of the increase in total health expenditure. Other drivers of health expenditure include health price inflation, total population growth, an ageing population and increasing demand for and utilisation of health services.

Chart 2.3: Index of growth in total health expenditure, Australian Government Hearing Services Program expenditure compared to increase in CPI, Australia, 2000-01 to 2007-08.



Source: ABS, Consumer Price Index and AIHW, Health Expenditure Australia 2007-08

Growth in expenditure under the Australian Government Hearing Services Program is consistent with overall health expenditure growth and is largely driven by the ageing of the population. In the early stages higher levels of growth were due to the establishment arrangements for the Program.

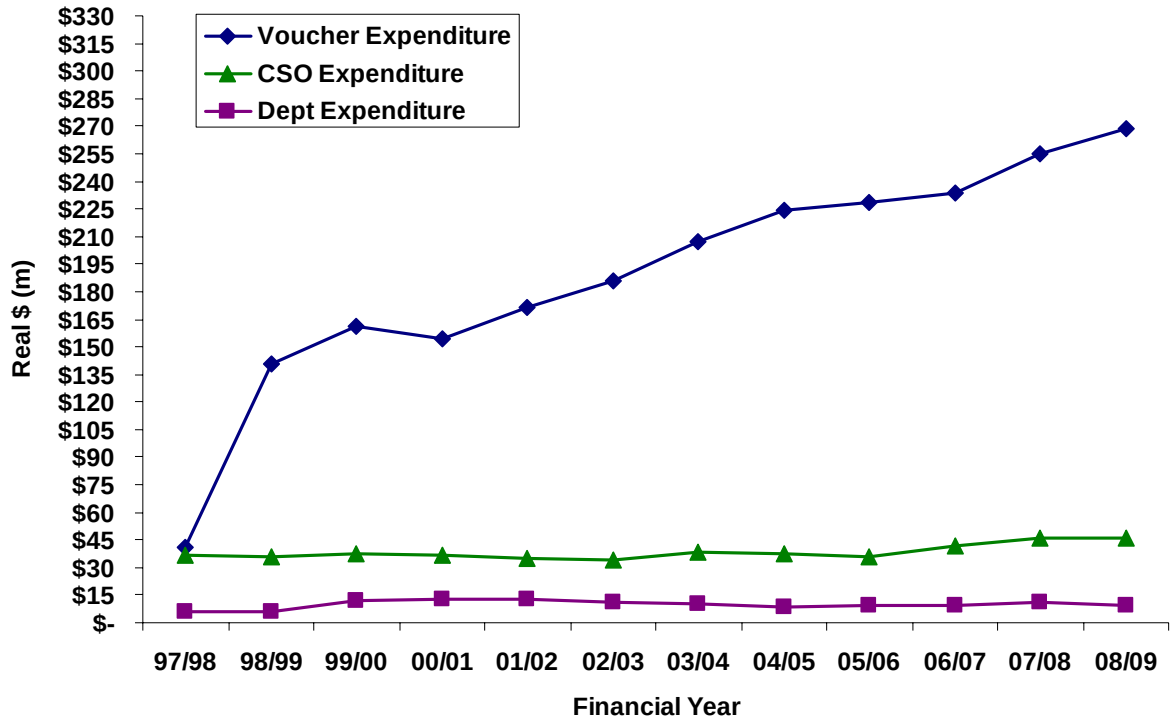
While there was high demand, growth was limited by the availability of qualified practitioners. These practitioners joined the program at an average of 15% per year between 2000/01 to 2003/04, enabling hearing service providers to increase the availability of hearing services to meet increased demand. In 2007-08 the hearing services index increased again due to an increase in the base funding of the CSO Program.

Treasury's second Inter-Generational Report (IGR2) in 2007 projected that growth in health expenditure is set to continue, with Australian Government spending on health rising from less than four per cent of GDP in 2006-07 to more than seven per cent in 2046-47. The ageing population is expected to account for around one quarter of the projected increase in health spending over that period.

Non-demographic factors, such as the development of new drugs and medical technologies, are expected to be the most significant components in the projected increase in health spending. IGR2 also projected that Australian Government spending on aged care would increase from 0.8 per cent of GDP in 2006-07 to 2.0 per cent of GDP by 2046-47. As age related hearing loss is one of the most common causes of hearing impairment it can be expected that the demand for hearing services will also increase during this period.

Australian Government funding of hearing services is provided through two programs, the Australian Government Hearing Services Program (the Voucher Program) and the Community Service Obligations Hearing Services Program (the CSO Program). Chart 2.4 illustrates the real program expenditure on both the Voucher Program and CSO Program.

Chart 2.4: Real OHS Program Expenditure by Financial year 2000-01 to 2008-09 (adjusted for inflation using CPI index – Base year 2008-09)



Source: Department of Health and Ageing Annual Reports, ABS CPI (Cat.no. 6401.0)

When the effects of inflation are removed, the real increase in costs of the Voucher Program is 75% from $154.1 million in 2000-01 to $268.9 million in 2008-09. A smaller increase of 23% was observed during the same period for the CSO Program, from $36.2 million in 2000-01 to $45.9 million in 2008-09.

The sudden increase in expenditure in the Voucher Program in 1998/99 was due to the fact that:

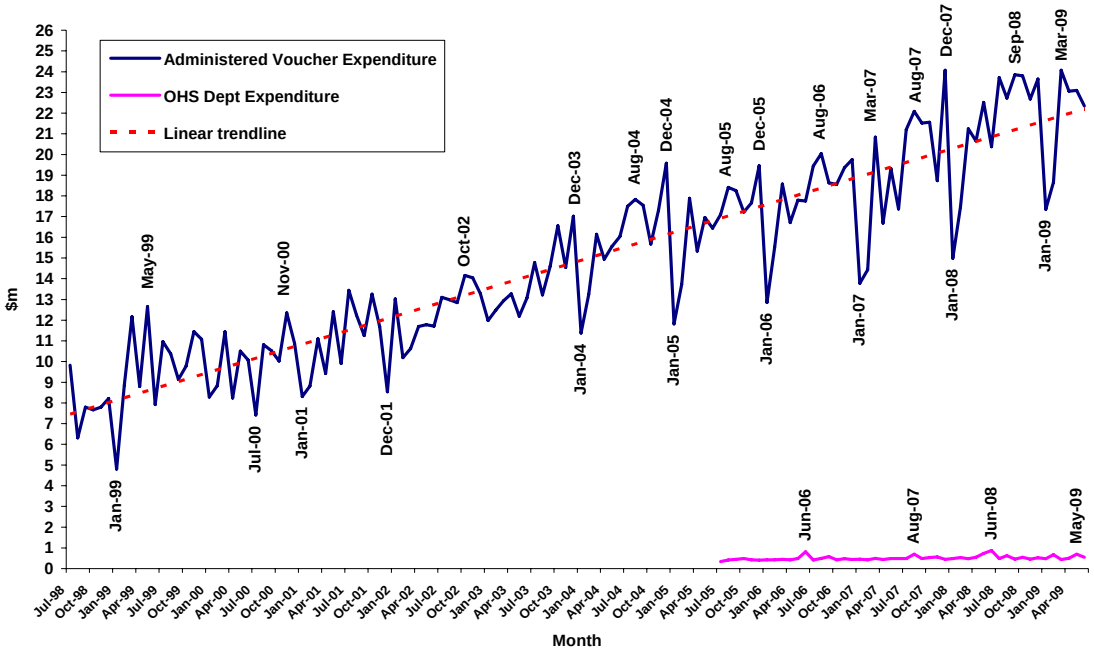
- the program started in November 1997 and in the first 18 months the program started new providers were starting up;
- clients had a one year voucher; and
- clients from AH were transferred into the Voucher Program.

Analysis of the client intake into the Voucher Program using age-standardisation indicates since 1998/99 client growth has been approximately 4% higher per year than the expected level of growth due to the ageing of the Australian population. It is assumed that this growth is due to increases in services to cover unmet need.

2.5.2.1 Voucher Program Expenditure

Expenditure on hearing services under the Voucher Program is demand driven and follows a seasonal pattern. Expenditure drops in January as a result of many contracted service providers closing for the holiday period. To ensure cash flow is maintained during this period service providers submit more claims in December. There is also a peak in expenditure in August of each year that may be associated with existing clients being encouraged to receive hearing services as a result of Hearing Awareness Week. This seasonal pattern of expenditure is illustrated in Chart 2.5 below.

Chart 2.5: OHS Program Expenditure by month, July 1998 to June 2009 ($nominal)



Source: OHS unpublished statistics

2.5.3 Private Health Insurance

Private health insurance coverage extends to a contribution to the cost of hearing aids, cochlear implants, bone anchored hearing aids and ear prosthesis. While benefits paid vary by provider, minimum and maximum benefits payable are set in the Department's Prosthesis Guide Lists. Table 2.2 on the following page lists the range of benefits that are paid for these hearing services.

Table 2.2: Range of benefits for hearing related prostheses under private health insurance arrangements

Item	Minimum Benefit	Maximum Benefit
Cochlear Implant –	$10,600	$13,570
Initial Cochlear Speech Processor	$11,500	$12,950
Cochlear Implant Accessory Pack	$500	
Replacement Cochlear Speech Processor	$6,790	$9,065
Hybrid Cochlear Speech Processor	$12,950	
Baha snap coupling	$895	
Baha Flange fixture	$1,035	$1,930
Baha cover unigrip	$142	
Baha sound processor	$6,000	
Ear Prosthesis	$104	$350
Ear Canal Wall Prostheis	$104	$675

Source: http://www.health.gov.au/internet/main/publishing.nsf/Content/health-privatehealth-prostheseslist.htm

Utilisation data for hearing aids funded through private health insurance are included in the table below.

Table 2.3: Number of services and benefits paid by Private Health Insurance companies to clients, Australia 2007-08 by State and Territory

	NSW & ACT	VIC	Qld	SA	WA	TAS	NT[1]	AUS
Number of Services ('000)	12	7	6	3	6	1	-	36
Benefits paid for Hearing Aids ($000)	$6,693	$2,592	$3,137	$1,851	$2,733	$861	$52	$17,920

Note: The number of services in Northern Territory have been confidentialised as they are below 1,000.
Source: 2007-08 Private Health Insurance Administration Council Annual Report

2.5.4 Burden of Disease

Adult onset hearing loss ranked eighth in the 20 leading specific causes of burden of disease and injury in Australia in 2003. This burden of disease is calculated using an estimate of years of healthy life lost due to disability caused by disease and is measured in Disease Adjusted Life Years (DALYs). In 2003, Adult onset hearing loss contributed to 64,853 DALYs, equating to 2.5% of the total DALYs for Australia that year[34]. For 2005, Access Economics reported an estimated 95,005 DALYs were lost due to hearing loss, representing 3.8% of the total burden of disease from all causes of disability and premature death[35].

[34] Australian Institute of Health and Welfare, 2008
[35] Access Economics, 2006, p. 7

PART 3 ACCESS TO HEARING SERVICES

There are a number of access points for Australians to obtain hearing services. Australians access various components of hearing services through public and private providers. Depending on the clinical pathway and whether the client is eligible for public services, support for services may be provided through the Medical Benefits Scheme, private health insurance, the Australian Government Hearing Services Program, the state based public health system, charitable organisations or a combination of these mechanisms, state-based WorkSafe agencies, or may be largely privately funded.

3.1 Client pathways into hearing services in Australia

A hearing loss may be identified by preliminary screening in the public health system, or by private hearing service providers, or self identified. Screening can be undertaken through the Universal Neonatal Hearing Screening Program in public hospitals; other screening services for older children and adults in public hospitals, community health centres; or by services offered by private hearing service providers.

If a hearing loss is identified through a private hearing service provider, the client will be referred to a GP for medical assessment. If the hearing loss is identified through public health screening, or by a GP, clients with potential medical conditions, or whose hearing loss may be able to be corrected by surgery, will be referred to an Ear, Nose and Throat Specialist (see Part 4).

Those without medical indicators will be referred to allied health hearing services, for an in-depth assessment of the extent of hearing loss, and whether hearing rehabilitation services, which may include the fitting of a hearing device, would assist in improving the client's hearing. These services may be provided by the government provider, Australian Hearing, or private hearing service providers.

If a client was screened by a private hearing service provider, they would be given an indication of likely eligibility for publicly funded assistance. Should the client wish to access publicly funded services through the Australian Government Hearing Services Program, need to apply to the Office as described below in section 3.2.

A client who does not wish to make an application, or who is already aware that s/he does not meet the Program's eligibility criteria, may choose at this point to continue to use the services of a private hearing services provider. The client would be responsible for all costs, and may be eligible for tax and private health insurance benefits.

The Australian Government assists people who purchase their hearing services privately and satisfy certain taxation rules. Subject to an individual's taxation status, a taxpayer may be able to claim a medical expenses tax offset including artificial appliances such as hearing aids, if he or she has out-of-pocket medical expenses over $1,500 in an income year. For the 2009-10 income year, the tax offset is 20% of net medical expenses over the $1,500 threshold amount – that is, the amount paid less any refunds received from Medicare or a private health fund.

Workers with a hearing loss arising from an identified compensable work-related injury or illness may be eligible for allied health hearing assessment and rehabilitation through state-based WorkSafe agencies. WorkSafe pays for reasonable costs (i.e. a scheduled fee) for hearing services through a network of WorkSafe contracted services providers.

3.2 Accessing the Australian Government Hearing Services Program.

The Australian Government Hearing Services Program is by the Office. The Program aims to reduce the incidence of hearing loss in the wider community and the consequence of hearing loss for eligible clients. Table 3.1 below is an overview of expenditure under the Program.

Table 3.1 Expenditure and Client Summary, Australian Government Hearing Services Program 2008/09

Expenditure	**Category**	**$**
	Voucher Payments	$262,446,000
	- New clients	$102,580,000
	- Return clients	$159,866,000
	Community Service Obligations	$45,843,000
	- Children	$21,531,000
	- Adults	$17,719,000
	- Indigenous	$6,074,000
	Total Government Expenditure[1]	**$309,489,000**
Clients	**Category**	**Number**
	Voucher - New	86,855
	Voucher - Return	407,191
	Community Service Obligations	47,837
	-CSO (Children)	28,710
	-CSO (Adult)	19,127
	Indigenous Component	8,170
	-CSO (Children)	5,372
	-CSO (Adult)	2,798
	-CSO (Total Indigenous)	8,170
	Total active Government Clients	**541,883**

1 Total Govt Expenditure includes $1.199m on the Hearing Loss Research & Prevention Program.

Free hearing services are only available to Australian permanent residents and citizens.

3.2.1 The Voucher Program

The Voucher Program provides free hearing services and devices to eligible clients as well as subsidised maintenance for devices provided under the Program. . It is funded as a Special Appropriation, as it is demand driven. Eligibility criteria for access to the Voucher Program are defined by regulation under the *Hearing Services Administration Act 1997*.

Eligibility for free hearing services through the Voucher Program is targeted at Australian citizens and permanent residents who are 21 years of age or older and in one of the following categories:

- a holder of a Pensioner Concession Card;
- a person receiving sickness allowance from Centrelink;
- a holder of a Gold Repatriation Health Card;
- a holder of a White Repatriation Health Card issued for conditions which include hearing loss;
- a partner (including married, de-facto or same sex partner) of one of the above people;
- a dependant child of one of the above people who is 21 or over and under 25 years of age and undertaking full time study;
- a member of the Australian Defence Force; or
- a person in an Australian Government Vocational Rehabilitation Services who is referred by an approved Vocational Rehabilitation Service Provider.

3.2.1.2 Application process to use the Voucher Program

Prospective clients can obtain a new client voucher application form from their GP, medical centres, community health organisations or a Hearing Service Provider. They must complete the application form including certification by a medical practitioner (usually a General Practitioner) that the client can be referred for a hearing assessment and that there are no medical contraindications to the fitting of a hearing device, and post it the Office.

Upon receipt of a correctly completed application form, the Office processes the form, checks the client's eligibility and, if the client is eligible, will arrange for a printed Hearing Services Voucher. A directory of providers in the client's local area and an information booklet about the Program is posted to the client's registered mail address.

The Hearing Services Voucher entitles the client to receive a range of free hearing services for a period of two years from the date of the voucher issue. Once a voucher expires, clients will be automatically sent a Return Voucher Request Form (RVRF) from the Office, which they simply need to sign and post to the Office of Hearing Services. If a client does not receive a RVRF they can either ring the Office to request a new form or their Hearing Service Provider can request a RVRF be issued on the client's behalf.

3.2.1.3 Services available under the Voucher Program

Free hearing services are available to eligible clients including:

- a hearing assessment,
- hearing rehabilitation and,
- where necessary, supply and fitting of hearing aids.

In addition to this, maintenance services for devices provided under the Voucher Program are subsidised.

Eligible clients can take advantage of comprehensive hearing rehabilitation carried out by a qualified hearing health practitioner. Included, is access to a range of high quality hearing aids and assistive listening devices (ALDs) free to the client.

These devices come with a number of features designed to assist clients in overcoming common problems associated with hearing impairment and to help clients meet their particular listening goals.

Voucher clients can choose to be fitted with a device that has additional features considered to be beyond those necessary to achieve satisfactory clinical outcomes. These devices are referred to as "Top Ups" and should a client wish to be fitted with "Top Ups", the cost is a matter of negotiation between themselves and the service provider. The client pays the difference between the Governments contribution and the service provider's charge for the device.

Apart from initial assessments and fittings, clients under the Voucher Program have access to a range of rehabilitative services to help determine and manage hearing loss. These include follow up consultations with a qualified hearing health practitioner and guidance on how to get the maximum benefit from their hearing aids.

In January 2008, the Department introduced the Rehabilitation Plus service item to the program, to help new clients develop skills to maximise their communication abilities and use their devices effectively. This service is an extension of rehabilitation that begins when a client is first assessed and continues through fitting and follow-up appointments. It allows for two additional rehabilitation sessions which clients may access either on an individual basis or in group sessions.

In order to extend access to hearing services in rural and remote areas, services providers are able to establish both permanent sites and visiting sites. Visiting sites offer flexible provision of services in rural and remote areas where it would not be financially viable to establish a permanent site. Providers may also establish remote sites to cater for clients in designated remote areas where it is not possible for service providers to visit frequently. Clients in remote areas may also access hearing services through the Community Service Obligations.

3.2.2 Community Service Obligations (CSO)

The CSO component of the Program provides services to about 8% of the clients in the Program, and was designed as a safety net to meet the particular needs of designated client groups (clients with complex hearing losses, Indigenous clients, children and young people less than 21 years of age and to provide support for hearing impaired Australians in remote areas.

AH is the sole provider of CSO services. Australian Hearing Services is a statutory authority established under the *Australian Hearing Services Act 1991* (the Act). The Act underpins the delivery of hearing services by AH to clients with special needs.

Unlike the Voucher Program, which is demand driven, AH receives a fixed appropriation from the Australian Government for the provision of CSO (i.e. $46.1 million in 2009-10). On 1 July 2007, additional funding of $ 30.1 million over four years was provided to Australian Hearing to meet the increased demand and cost of services provided under the CSO Program and the cost of devices with additional features to address the complex hearing needs of CSO clients.

Arrangements for the provision of CSO funding are set out in a Memorandum of Understanding (MOU) between the Australian Government (represented by the Office) and AH. The current MOU commenced on 28 February 2009 and will expire on 30 June 2012. The MOU defines the relationship, objectives, principles and mechanisms between the Office and AH for the delivery of the services, as well as research and related activities undertaken by the NAL.

Under the MOU, CSO funding is provided as a pool of funds covering a range of services. AH is able to use the pool flexibly to direct services to those with greatest need, within the best available evidence, and to make the most significant difference.

In 2008-09, AH expenditure was within 2% of its CSO allocation. Nonetheless, AH has indicated that anticipated increases in child client numbers, requests for new outreach delivery sites by Indigenous communities and changes in technology may impact on resources and on the delivery of CSO services. The Department is considering these issues.

In 2008-2009, 47,837 clients received services under the CSO component of the Program, compared to 47,692 people in 2007-2008.

3.2.2.1 Service availability under CSO

Special needs clients receive the same services provided to voucher clients and also receive additional services that address their specific requirements. The following services are being provided under CSO:

- hearing assessment and rehabilitation including the fitting of hearing devices;
- upgrades of Bone Anchored Hearing Aids (BAHA) for children and CSO adults;
- provision and fitting of higher grade hearing devices to CSO clients with a clinical need;
- upgrades of cochlear speech processors and processor replacements for clients under 21 of age; and
- cochlear speech processor repairs and maintenance for children and eligible adults;
- batteries, upgrades, maintenance and repairs of hearing aids.

3.2.2.2 Eligibility for CSO

Eligibility for free hearing services through the Community Service Obligation (CSO) component of the Program is targeted at people who are Australian citizens or permanent residents and are:

- under 21 years of age (including replacement of cochlear implant speech processors);
- eligible for the Voucher Program but who have complex hearing needs;
- eligible for the Voucher Program and live in remote areas; or
- Indigenous people who:
  - are eligible for the Voucher Program;
  - are over 50 years of age;
  - are a participant in a Community Development Employment Projects (CDEP) program; or
  - was a participant in a CDEP program between 1 December 2005 and 30 June 2008 (until 1 July 2012).

3.2.2.3 Children

Children and young people under 21 years with hearing loss have access to free hearing services under the CSO program to enable children to fully benefit from educational and social development opportunities. In 2008-09, the CSO program provided children with hearing services, FM system upgrades, repairs, maintenance and/or upgrades of speech processors associated with cochlear implants.

In 2008-09, there was a strong growth in the number of children accessing services under the CSO program; Australian Hearing exceeded its target of 26,260 children with 28,710 children receiving services including 5,372 Indigenous children. This can be compared with 28,100 children in 2007-08 including 4,935 Indigenous children. In 2009-10 the target for Australian Hearing is to provide hearing services to 26,400 children.

3.2.2.4 Eligible People with Complex Needs

The CSO program also provides additional support to adult clients who are identified as having complex hearing rehabilitation needs. Complex clients enter the CSO Program through the Voucher Program. A complex client is defined as having either profound hearing loss[36], or hearing loss and severe communication impairment[37].[38] In 2008-09, AH delivered services to 19,127 adults with complex needs under the CSO program. During 2009-10, the Department will provide funding for a target of 20,000 clients with complex rehabilitation needs.

3.2.2.5 Indigenous Australians

For Indigenous Australians the CSO Program provides services such as individual hearing assessment and rehabilitation programs, as well as community education and information sessions on the causes and effects of hearing loss.

In 2008-09, the CSO Program delivered services to 8,170 Indigenous Australian clients, including, 5,372 Indigenous children, 140 Indigenous complex adults, 132 otherwise eligible Indigenous Australians, and 2,526 Indigenous Australians over 50 or on CDEP (against a target of 2,650 for the latter group).

Additional CDEP reforms were implemented on 1 July 2009. Under the reform model, CDEP ceased to be available in non-remote locations from 1 July 2009, with universal employment services becoming primary provider of employment services for Indigenous job seekers in urban and regional areas. As eligibility of some Indigenous Australians is tied to CDEP, the Office of Hearing Services is working with the Department of Employment, Education and Workplace Reform to identify an alternative measure for eligibility for the CSO Program.

The Indigenous specific measures include funding for outreach service delivery through the Australian Hearing Specialist Program for Indigenous Australians (AHSPIA). AHSPIA consists of over 200 Outreach Sites (against a target of 139 sites), established across Australia to provide culturally appropriate hearing services to eligible Indigenous Australians. For further information on AHSPIA see section 7.3.

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[36] Profound hearing loss for this purpose is defined as a hearing loss where the average hearing threshold level for 0.5, 1 and 2 kilohertz in the person's better ear that is greater than, or equal to, 80 decibels

[37] A severe communication impairment means that the person has difficulty communicating effectively in their daily environment, or is caused or aggravated by significant physical, intellectual, mental, emotional or social disability

[38] Subsection 3(3) *Declared Hearing Services Determination 1997*.

3.2.2.6 Clients living in remote areas

The CSO program may also be used to fund services for eligible people who live in remote locations. This includes clients who live in remote areas and are eligible for the Voucher Program, or who are Indigenous. Alternatively clients can access available private providers contracted to the Voucher Program.

3.3 Proportion of the Australian population accessing allied health hearing services

Based on 2008-09 data from the Government Voucher and CSO Programs, the Office estimates that approximately 26% of the Australian population who have a mild or greater level of hearing loss are obtaining services through the Australian Government Hearing Services Program.

For those eligible for the Voucher Program, the equivalent rate is nearly 53%. That is, in 2008-09 an estimated 1,794,539 people would have been eligible for the Program and have a mild or greater hearing loss. Of these, the total number of clients in the Voucher Program was 945,000. Refer to table 3.2 below.

Table 3.2: Overview of Persons receiving hearing services in Australia by Sector, 2008/09

Population Group	Count of Persons	Estimated persons in population group with mild or greater hearing loss who would benefit from hearing services[1]	Total number of persons in population group who are obtaining hearing services	Number of eligible persons in population group not obtaining hearing services	% of eligible population group receiving hearing services	Estimated current expenditure in population group to address hearing loss [3] ($million)
Australian Population	21,339,472	3,825,737	N/A	N/A	N/A	N/A
Existing Government Voucher Program[39]	3,525,716	1,794,539	945,000	849,539	52.66%	$280.165 m
CSO Program - Children <21 years	5,862,269	14,874	28,710	_	_	$24.587 m
CSO Program – Indigenous >50 years	69,772	11,285	2,526	8,759	22.38%	$3.408 m
Remaining[2]	11,881,715	2,005,039	N/A	N/A	N/A	N/A

1This population would benefit from receiving any hearing services (rehabilitation, hearing aids).
2 The remaining population who have a mild or greater level of hearing loss who may access services from other sources such as Private Health Insurance, Cochlear and Baha Implants, and other Government services.
3 The estimated current expenditure does not include $17.847m of other CSO Program expenditure because it is difficult to attribute expenditure to specific population groups.
Source: ABS Population Projections, OHS unpublished statistics.

[39] CSO complex clients included in these figures – to enter the CSO Program, complex clients are identified through the Voucher Program.

It should be noted that not all people with hearing loss require services. In particular there are people with mild hearing loss that find it does not significantly interfere with their ability to engage in the community.

It should be noted that while 15,000 children would have been likely to have had a hearing loss, AH is provided services to 28, 710 children of whom 5,372 are Indigenous children.

For Indigenous people over 50 years old, participants of CDEP or living in remote areas, based on projections of mainstream levels of hearing loss, it appears that only 25% of those eligible for the CSO Program are obtaining hearing services from the Program. However, while the uptake for Indigenous clients appears to be very low, a number may in fact be accessing the Voucher Program as an eligible client or accessing service through state or territory, or other Australian Government programs. While this data has not been collected historically, the Office has very recently amended its client forms to include self-identification.

Alternatively, although the Office of Evaluation and Audit (OEA) audit of AHSPIA (see section 7.3) found that AHSPIA is delivering flexible, culturally appropriate services, such services may not be available widely enough for this highly mobile client group. Another contributor to low take up may be inadequate referrals from primary screening services to Australian Hearing or private provider voucher services, or inadequate linkages between primary screening and allied health hearing services. This latter issue was identified by the OEA Audit and is being addressed by AH.

3.4 Other free or supported hearing services

There are separate hearing services available that may assist in reducing the consequence of hearing loss for people who are not eligible for the Australian Government Hearing Services Program. These services fit hearing aids for free or at reduced cost.[40]

3.4.1 Hearing Aid Banks

Hearing Aid Banks generally fit reconditioned hearing aids; however, the Hearing Aid Bank in the Northern Territory also fits new aids. Each Hearing Aid Bank has its own eligibility criteria but they all focus on people who do not qualify for Government assistance and have insufficient funds to purchase private hearing aids. All Hearing Aid Banks depend on volunteer support to remain operational.

3.4.2 Subsidised Hearing Services

Subsidised hearing services provide new hearing aids to clients at a reduced cost. They are not hearing aid banks. These subsidised services generally are operated by charitable organisations and target people on low incomes who do not qualify for Government assistance.

3.4.3 WorkSafe

Where hearing impairment has occurred as a result of occupational noise exposure, a person may be entitled to compensation and hearing services under the relevant state or territory workers' compensation schemes.

[40] Hearing Aid Banks and subsidised hearing services are not available in every state or territory.

These schemes typically provide for assessment and rehabilitative services, including provision of hearing devices, and may also provide lump sum compensation for permanent impairment.

Each state and territory has introduced industrial deafness thresholds that define the level of hearing impairment required before a person is entitled to workers' compensation. These are summarised in Table 3.3 below.

Table 3.3: Industrial Deafness Thresholds across Australian Jurisdictions

Jurisdiction	Threshold
Comcare	5% binaural loss
Seacare	10%
Victoria	10%
New South Wales	6% binaural loss
South Australia	5%
Western Australia	10% (above baseline hearing loss previously assessed)
Queensland	5% (a further application may be considered only if lodged more than three years after the previous application and the claimant has sustained a further hearing diminution of more than 1%
Tasmania	5% binaural hearing impairment
Northern Territory	5% whole person impairment (percentage of loss of whole body)
Australian Capital Territory	A worker is not entitled to compensation if the total hearing loss is less than 6%

Source: Australian Safety and Compensation Council *Work-Related Noise Induced Hearing Loss in Australia: April 2006.*

3.5 Universal Neonatal Hearing Screening Program

There are 270,000[41] births in Australia annually. While 75% of all children have neonatal hearing screening in Australia, coverage (98% in Queensland to less than 15% Northern Territory) and approaches vary. An overview of state and territory neonatal hearing screening is provided at Appendices E and F.

Approximately 65,000 newborns are not being screened to detect permanent childhood hearing impairment. Delays in the identification and treatment of permanent childhood hearing impairment can profoundly affect the quality of life of children in terms of their language acquisition and subsequent education and employment prospects.

The estimated prevalence of congenital bilateral permanent hearing loss ranges from 1–3 per 1,000 live births (US Preventive Services Task Force 2008). Until the last decade, congenital hearing impairment among children was usually detected late, not until the age of 2 years or beyond (Wake 2002).

3.5.1 The Neonatal Hearing Screening Test

There are two screening tests used in Australia to identify infants with possible permanent child hearing impairment (PCHI) that may require further diagnostic assessment - the otoacoustic emissions (OAE) and the automated auditory brainstem response (AABR) tests. These two methods may be used alone or in combination.

[41] Australian Institute of Health and Welfare, 2008

Otoacoustic Emissions Testing
Measures sounds generated by the outer hair cells of the cochlea in response to clicks or tone bursts emitted and recorded by a tiny microphone placed in the infant's external ear canal. The presence of these sounds indicates a functioning inner, middle or outer ear.

Automated Auditory Brainstem Response Testing
For screening with AABR methodology, soft ear phones are placed on the infant's ears and a series of soft clicks introduced at the 30-40 DB level. The auditory brainstem response in the form of electroencephalographic (EEG) waves is measured through electrodes attached to the infant's scalp. The technology of AABR is evolving and the second generation AABR technology is now available.

Both these methods of screening are non-invasive, relatively quick and easy to perform. The OAE is affected by fluid or debris in the infant's ear canal. The AABR requires the infant to be in a quiet state, but is not as affected by the state of the ear canal. Currently, conventional auditory brainstem response testing is the gold-standard for the diagnosis of hearing impairment in infants.

Where a hearing impairment is suspected, children should have a comprehensive audiological evaluation at no later than 3 months of age. This allows for intervention (eg cochlear implants, hearing aids and speech therapy) during the first six months of life which is critical to the development of speech and language skills.

Table 3.4: Number of patients, services and benefits paid for Newborn Hearing Screening Tests, Australia, 2002-03 to 2008-09 by financial year.

Newborn Hearing Screening Test	Actual 02-03	Actual 03-04	Actual 04-05	Actual 05-06	Actual 06-07	Actual 07-08	Actual 08-09
Patients	654	553	561	505	712	735	896
Services	702	610	615	548	775	792	958
Expenditure	$27,913	$25,012	$27,674	$25,031	$35,648	$37,262	$45,439

Source: claims for Medicare item, 11332, MBS online.

3.5.2 A national approach toward neonatal hearing screening

At the Council of Australian Governments (COAG) meeting of 2 July 2009, Premiers agreed to fast track the introduction of newborn hearing screening for all Australian newborns by the end of 2010.

In March 2002 the National Health and Medical Research Council released a report titled *Child Health Screening and Surveillance: A Critical Review of the Evidence*. The Report found that there was fair evidence to recommend national neonatal hearing screening. The Report urged serious consideration of the logistics and quality of the testing system, and follow up system for neonates who test positive before implementing national neonatal hearing screening.

In July 2002 Australian Health Ministers Conference requested the Medical Service Advisory Committee (MSAC) undertake an assessment on the safety, effectiveness and cost-effectiveness of universal neonatal hearing screening. In 2008 MSAC released the *Universal Neonatal Hearing Screening Assessment Report* (November 2007 – MSAC reference 17) which provided an assessment of the safety, effectiveness and cost-effectiveness of universal

neonatal hearing screening. The report did not, however, make specific recommendations on these issues with a view to establishing a national neonatal hearing screening program.

3.5.3 Neonatal Hearing Screening Working Group

In March 2008 the Screening Subcommittee of the Australian Population Health Development Principal Committee agreed to examine the feasibility of implementing a national approach to neonatal hearing screening. The Neonatal Hearing Screening Working Group was established to progress this work with the following terms of reference:

1. Assess neonatal hearing screening against the Population Based Screening Framework.
2. Develop minimum national standards for screening services and post screening follow-up with regards to audiology, medical intervention, family counselling, early intervention and education.
3. Consider and develop screening pathway to improve population coverage for neonatal hearing screening in Australia.
4. Develop a national quality and reporting framework for consideration by the Screening Subcommittee of the Australian Population Health Development Principle Committee and Australian Health Minister' Advisory Council.
5. Establish an agreed national approach to data collection and management and data sharing.

The development of a screening and post screening pathway, national minimum standards for screening and post screening services and a national quality reporting framework to improve the consistency and quality of neonatal hearing screening in Australia is well underway.

It is anticipated that the program will be implemented by states and territories across Australia from the end of 2010. Each state and territory will be responsible for the delivery of their individual program.

3.5.4 Agreed national approach to data collection, management and data sharing

A national data set for state and territory neonatal hearing screening and post screening services is in the process of being developed.

A national data set will:

1. Allow for the monitoring and evaluation of neonatal hearing screening programs.
2. Underpin the development of a nationally consistent quality and standards framework.
3. Permit for national and international benchmarking and collaboration.
4. Enable research into risk factors and health conditions associated with permanent childhood hearing impairment.

Currently most jurisdictions are in the formative stage of introducing state-wide universal neonatal hearing screening programs and are actively examining data collections and quality issues. A national data set will be required prior to establishing national standards and quality framework in neonatal hearing screening.

3.5.5 National Register

A national register will be established as part of the national approach to neonatal hearing screening and will be a central point for the collection and management of all data. The data parameters of a national register are yet to be finalised and consultation with key stakeholders will be undertaken to determine the most appropriate national register for neonatal hearing screening data.

Consideration will also be given to the ethics of allowing academic and other researchers accessing data held on a national register for appropriate research projects.

PART 4 ACCESS TO HEARING TECHNOLOGY

There are a range of devices that address hearing impairment including:

- hearing aids;
- alternative listening devices, such as listening wands;
- implantable devices, such as Cochlear Implant systems and Bone Anchored Hearing Aids; and
- hybrid technology that combines hearing aid and cochlear implant technologies.

The type of device that will be of most benefit to clients depends on the type of hearing loss experienced. Hearing loss can be described in terms of 'quantity', such as mild, moderate, severe or profound, or a loss of 'quality' - a person may hear sounds but not understand them or may hear well in some situations and not others. Hearing devices assist people to hear sounds more clearly and are fitted to meet the individual client's requirements. However, generally hearing devices will not improve a person's hearing back to "normal" but will assist the person to enjoy an improved quality of life.

Loss of quantity is more readily addressed through the amplification offered by hearing devices than loss of quality. Particular device features that modify how amplification is delivered in the ear may assist in addressing some of the qualitative aspects of hearing loss.

4.1 Hearing Technologies

4.1.1 Hearing Aids

A hearing aid is essentially a miniature public address system with the following key components:

- a microphone to convert sound to electrical signals;
- an amplifier to increase the strength of this signal and will also alter the balance of the sound, usually giving more emphasis to high-frequency sounds than low-frequency and intense sounds;
- a miniature loud-speaker called a "receiver" to turn the electricity back into sound;
- a means of coupling the amplified sound into the ear canal; and
- a battery to provide the power needed by the amplifier.[42]

There is a wide range of devices available covering all styles and types; including:

- Behind-the ear (BTE) (high powered, regular, and open-fit) hearing aids – these are two piece devices where the hearing device is mounted in the characteristic banana shaped case that sits behind the ear and the sound is conveyed to the ear canal via a tube to a custom ear mould.
- Open-fit BTE – as for BTE devices but the earpiece is not custom made.
- In-the-ear (ITE) – hearing devices that sit in the concha (the external part of the ear leading to the ear canal) and extends into part of the ear canal.
- In-the-canal (ITC) – these hearing devices are smaller than in-the-ear devices that sit in the ear canal and extend partly into the concha.
- Completely-in-the-canal (CIC) – these devices fit entirely in the ear canal and do not protrude into the concha.
- Body aids - devices worn on the body and connected via a cable to a receiver that is plugged into an earmold.

[42] Dillon, H, 2001

- Contralateral Routing of Signal (CROS) aids – suitable for people with hearing in only one ear, the device has two components. A microphone is worn on the worse ear and a second hearing aid is worn on the good ear that picks up sound from the remote microphone and plays it into the good ear.
- Spectacle aids – these are a combination of spectacles and one or two hearing aids.

4.1.2 Alternative Listening Devices

These devices commonly consist of headphones and a microphone that can be pointed at the sound source, or are connected to a television or other electronic device by a wire or electronically. These devices can amplify sound but their primary purpose is to place a microphone close to the sound source so that it becomes louder compared to the other sounds in the environment.

4.1.3 Implantable devices

The Office is aware that there are a range of complex existing and emerging technologies for example cochlear implants and hybrid implantable devices. The issue of extending Australian Government supported hearing services to include these technologies would have significant policy and funding implications that require broader consideration.

4.1.3.1 Cochlear Implants

A cochlear implant is a surgically implanted device to assist children and adults with at least a severe to profound level of sensorineural hearing loss. A cochlear implant is different to a hearing aid due to the fact that it does not amplify sound. cochlear implants by-pass the damaged part of the ear, directly stimulating the auditory nerve inside the cochlear, this electric stimulation of the auditory nerve is then interpreted by the brain as sound.

The cochlear implant system is made up of two parts: external parts and internal parts. External parts include:

- Microphone – this is worn behind the ear (BTE); it picks up sounds and therefore replaces the function of the outer ear.
- Speech processor – this can be included in the microphone and worn BTE, or can be a small box that can be worn on the waist. This part converts sounds received from the microphone into electronic codes.
- Transmitting Coil – this is worn on the head slightly behind the ear and is a small coil approximately 3cm in diameter. It is held in place by a magnet placed on either side of the skin. This coil transmits electronic codes (FM radio signals) through the skin to the internal part of the cochlear implant system called the Receiver –stimulator.

Internal parts include:

- Receiver – Stimulator – This is a small computer that the codes received as radio waves into electrical signals that are then transmitted along the array of electrodes.
- Electrodes – an electrode array is surgically implanted into the persons cochlear. The electrodes receive the electronic signals and then stimulate the auditory nerve; the brain then interprets this as sound. Each electrode is individually connected to the receiver. This allows the electrodes to deliver different signals that represent varying degrees of loudness and pitch of sound by stimulating the appropriate nerve fibres which then send this signal to the brain. [43] [44]

[43] Powerhouse Museum, *The Cochlear Implant*

The sound a cochlear implant provides the patient is different to the sounds experienced by those with normal hearing. The effectiveness of the cochlear implant varies from patient to patient depending on various factors such as:

- Whether the patient developed spoken language before going deaf - People who have learned to speak before going deaf usually benefit the most.
- The patient's level of motivation.
- The time since deafness first occurred.
- The environment in which the patient lives – if the patient lives/works in a supportive environment they are more likely to achieve more benefits.
- The patients level of damage to the auditory nerve. [45]

Although the benefits of a cochlear implant vary from patient to patient, recipients of a cochlear implant are expected to receive the following benefits:

- Increased environmental awareness – patients will be able to hear a greater range of sounds in the environment providing them with a feeling of safety.
- Improved face to face communication – patients will be able to combine auditory signals received via the implant with visual cues such as lip reading to significantly increase their understanding and fluency in a conversation.
- Greater confidence to interact and socialise – with patients now understanding others easier, it increases their confidence allowing them to contribute to conversations with others. This interaction which was once restricted to the hearing impaired patient provides them with a greater sense of belonging in the community.[46]

Table 4.1: Number of persons receiving a Cochlear Implant in Australia by broad age group, 2006/07 to 2008/09.

Persons receiving a Cochlear Implant in Australia	Actual 2006/07	Actual 2007/08	Actual 2008/09
Persons with a Unilateral Cochlear Implant			
Less than 21 years of age	199	211	224
21-64 years of age	200	231	250
65 years and older+	153	179	184
Total	**552**	**621**	**658**
Persons with Bilateral Cochlear Implants			
Less than 21 years of age	63	90	105
21-64 years of age	29	34	50
65 years and older+	13	14	20
Total	**105**	**138**	**175**
All persons with a Cochlear Implant			
Less than 21 years of age	262	301	329
21-64 years of age	229	265	300
65 years and older+	166	193	204
Total	**657**	**759**	**833**

Source: unpublished data provided by Cochlear Ltd, September 2009.

[44] Australian Academy of Science, 2009
[45] *Ibid*.
[46] The Cochlear Implant Clinic, 2009

4.1.3.2 Funding Arrangements for cochlear devices

In the year of implantation, the cost of a cochlear implant for an adult is approximately $50,000, including the cost of the device system at about $25,000. The costs for children are slightly higher at approximately $70,000 due to the increased need for rehabilitation. Ongoing costs associated with the cochlear implant system are the processor upgrades required approximately every three years at a cost of approximately $8,000, as well as costs for maintenance and repair of the system.

There is no single funding source for implantable devices with funding sourced from private clients, private health insurance, public health funding and charitable arrangements. In most cases it is a combination of funding sources that contribute to the costs of implantable devices. About 30% of cochlear implants for children are done privately, a small number are done under charitable arrangements and the balance is carried out in the public system.

The device itself is treated as a surgically implanted prosthetic device and it is funded either through public hospital arrangements or private health insurance. The surgery and follow-up treatment is partially funded through Medicare benefits.

4.1.3.3 Bone Anchored Hearing Aids

Bone anchored hearing aids (BAHA) are a surgically implanted system that is used to assist those who experience hearing loss due to chronic ear infections, malformation of the external auditory canal or middle ear and those with single sided deafness who cannot benefit from conventional hearing aids. The BAHA system works by allowing sound to be conducted through the bone rather than the middle ear. This function is known as direct bone conduction.

Benefits of the BAHA system include:

- Improved understanding of speech – allows the patient to recognise where sounds are coming from and elimination of background noise.
- Cosmetic appearance – the device is small and worn behind the ear under the hair. It is not perceptible to others.

BAHA device costs are similar to those for cochlear implant systems.

Table 4.2. Number of patients, services and benefits paid under the Medicare system for Bahas, Australia, 2006-07 to 2008-09 by financial year.

Medicare data for Bone Anchored Hearing Aid Implants			Actual 2006-07	Actual 2007-08	Actual 2008-09
Patients			40	118	107
Services	BAHA Implant		40	123	110
	Other Items in BAHA Episode	Pre Anaesthesia Consultation	31	102	92
		Surgical Operation (Including Skin grafts)	73	198	192
		Assistance at Operations	7	14	12
		Anaesthesia	46	126	115
Expenditure	BAHA Implant		$9,993	$31,829	$28,698
	Other Items in BAHA Episode	Pre Anaesthesia Consultation	$912	$3,026	$2,911
		Surgical Operation (Including Skin grafts)	$22,839	$41,975	$37,463
		Assistance at Operations	$1,409	$2,026	$1,425
		Anaesthesia	$10,121	$26,232	$23,089

Source: Claims for Item 41603, MBS online.

4.1.3.4 Hybrid Implantable Devices

Hybrid implantable devices are starting to enter the cochlear implant market. These devices provide electrical stimulation via a cochlear implant, coupled with acoustic stimulation via a hearing aid to ears that have good residual low frequency hearing and a profound high frequency loss. The main advantage of these devices is that residual acoustic hearing is preserved allowing a greater understanding of speech in noise.

Whilst it is too early to predict the likely success of such devices, it is possible that in about 10 years time the device will be suitable for 12 – 13% of the paediatric client base (clients with a 3FAHL of 61-90dBHL). [47]

4.1.4 Emerging technologies

Some recent research developments have been in the areas of trainability, further refinement of directional microphone technology, and wireless connectivity to other external devices such as mobile phones and portable listening devices.

These emerging technologies are already becoming part of the Program and it is anticipated that they will become widespread over the coming years.

4.2 Hearing Technology under the Australian Government Hearing Services Program

Eligible clients under the Program have access to free-to-client hearing devices that will meet their clinical needs, including hearing aids and alternative listening devices. At 18 September 2009, 220 free-to-client hearing devices were available from 13 different manufacturers and suppliers. The quality of hearing devices supplied free-to-client under the Program is world class and as new technology is introduced it is made available to clients. Also provided under the Program are devices that offer features beyond those required for a client to achieve

[47] Dewberry, M, 2009, Personal Communication

a good fitting outcome. These devices are known as "Top-up" devices and at 18 September 2009, 908 devices are approved on the top-up schedule.

The Office manages a Deed of Standing Offer (the Deed) with the manufacturers and suppliers to ensure hearing devices are available at an affordable price to the Australian Government. These arrangements ensure hearing devices that offer the latest features are available to clients of the Program at an affordable price to Government.

The Deed includes device specifications for both free-to-client and top-up devices under the Program which are reviewed approximately every 18 months to ensure devices available under the Program incorporate technological advances. These reviews are undertaken in consultation with key stakeholders, including manufacturers and suppliers.

Devices become available to clients of the Program by being approved by the Minister and listed on the Device Schedule by meeting the minimum specifications outlined in the Deed. When seeking to have devices approved, manufacturers and suppliers provide technical information and supporting literature that demonstrates the features the device offers and how it meets the minimum specifications. The Office evaluates the suitability of the device and confirms whether the device meets the required specifications. The evaluation process takes approximately three weeks. The schedules of approved devices are regularly updated as new devices are approved and obsolete devices removed.

For eligible people who have unusual clinical needs their hearing service provider may submit a request to the Office to approve fitting of a non-standard device under the Program. These requests are considered on a case-by-case basis and expert advice is provided to ensure that the client's circumstances are managed appropriately. Non-standard devices include body work hearing aids, spectacle aids, bone conduction aids and alternative listening devices. Of the total Program fittings for 2008-09, 0.0001% was for non-standard devices not listed on the schedules of devices.

4.2.1 Free to Client Devices under the Program

Under the Program a range of BTE, ITE and ITC devices are offered free-to-client. This range of devices will meet the needs of the vast majority of clients. Devices supplied free-to-client are of a high standard and include features such as:

- directional microphones that may automatically adapt to the listening environment;
- adaptive noise reduction (identifies noise and modifies hearing aid response accordingly);
- feedback (or whistle) cancellation;
- multi-memory enabling the device to vary the way signals are processed depending on the listening environment;
- automatic volume control; and
- telecoil that detects electronic signals representing sounds and converts them back to sound signals in the ear thereby reducing interference from unwanted background noise and used, for example, in theatres, telephones and public address systems.

Technical detail that describes this range of features is shown in the table at Appendix G. These features offer proven benefits and assist clients to achieve a satisfactory rehabilitation outcome.

Manufacturers have elected not to offer CIC style hearing aids on the free to client range. These devices are generally fitted as a cosmetic option only and are often unsuitable for an older clientele because of management requirements.

4.2.2 Top-Up Devices under the Program

In addition to including features available in free-to-client devices, top-up devices will include one or more additional features. Examples of these additional features include:

- directional microphones that adapt to a range of listening environments,
- the ability to wirelessly connect to external blue-tooth compatible devices such as mobile phones or portable music/listening devices, or
- the ability of the device to adapt its sound according to user preference.

The additional features available in top-up devices are newer technologies. While these may provide advantages to some people in some situations, they are not considered necessary to achieve a good outcome for clients and may not have been fully validated through independent scientific research. A detailed technical description that describes this range of features is shown in the table at Appendix H.

Clients may choose to purchase Top-Up aids approved under the Program. A client who decides to purchase a Top-Up device pays the difference between the provider's charge for the Top-Up hearing aids and the Australian Government contribution.

Clients are under no obligation to purchase a Top-Up device but if they wish to do so the cost of entering into a Top-Up arrangement is a matter for negotiation between a client and their hearing service provider. However, service providers are required to explain to clients when discussing their hearing device options that there are devices available free-to-client that will meet their hearing rehabilitation needs.

Of clients in the Voucher Program, 22% elect to purchase Top Up devices. Out of pocket costs for clients who elect to purchase Top-Up devices are between nil and $17,000, with the average price being $832[48]. The amount paid by a client for Top-Up devices does not reflect market price as the costs for these devices under the Program are negotiated as part of the Deed and includes a Government subsidy.

4.2.3 Non-Standard Devices under the Program

Where a client has unusual clinical needs, non-standard devices such as body aids, CROS aids, spectacle aids, bone anchored hearing aids and alternative listening devices may be approved for fitting under the Program.

People with additional needs may be fitted with accessories such as FM systems under Australian Hearing's Community Service Obligation funding. An FM system comprises a transmitter and receiver and is used by clients who need to hear someone talking at a distance where hearing aids do not provide adequate help, such as in a classroom, lecture or meeting. The transmitter is worn by the person whose voice the user wants to hear, and the receiver is worn by the client.

[48] The out-of-pocket cost of a top-up hearing aid is collected by the Office as part of our payment process. These estimates are based on 2007/08

It has been suggested that some people with a hearing impairment may benefit from the fitting of additional devices that work in conjunction with their hearing aids to enhance their performance, for example FM systems. The Office is currently exploring this issue.

Remote controls can be connected to some hearing devices and are also available free of charge to Clients who may have trouble managing the controls of regular hearing devices.

Combination hearing aid/noise generators, which are devices designed to reduce the effect of tinnitus (ringing in the ears), may be available to clients where hearing loss is also present. In such cases a non-standard request process may be followed.

Assistive devices that are used in conjunction with hearing devices (for example, portable loop systems for telecoil access, flashing light smoke alarms, amplified phones, mobile phones) are not available under the Program. These accessories are generally available through alternative funding avenues and the Program does not currently have the capacity for them to be listed.

4.2.4 Access to implantable device upgrades, maintenance, repairs and replacement

The CSO Program provides upgrades for cochlear implant speech processors for children under 21 years of age only. Upgrades for BAHA are available under the CSO Program for children and eligible adults. Repair and maintenance costs of implantable devices are covered for both eligible adults and children under the CSO Program.

The CSO Program has some inconsistencies in regards to what is provided for upgrades of devices. Cochlear upgrades are only available for children under 21 years, while BAHA upgrades are available for children and adults (BAHA devices costs are similar to cochlear), and there is no funding available for upgrades of hearing aids. In addition AH also covers the cost of cochlear repair and maintenance for children and eligible adults, which is confusing to adult clients as upgrades of cochlear are only funded for children.

4.3 Access to Advanced Technologies under CSO Arrangements

In recognition of the fact that CSO clients will have greater technology requirements than Voucher clients due to their complex needs, devices containing more advanced technologies are provided free to these clients. These devices contain features that are not available on the Voucher Program free to client device list.

PART 5 STATISTICAL INFORMATION

5.1 Age Cohort

The age and sex structure of the clients in the Voucher Program when compared with ABS population projections for June 2009 reveals that the clients of the Voucher Program are predominantly elderly. (See Charts 5.1 and 5.2 below.)

The average age of clients in the Voucher Program is 79 years and the continued ageing of the Australian population will continue to increase demand for hearing services.

Chart 5.1: Age and Sex distribution of Australian Population, June 2009

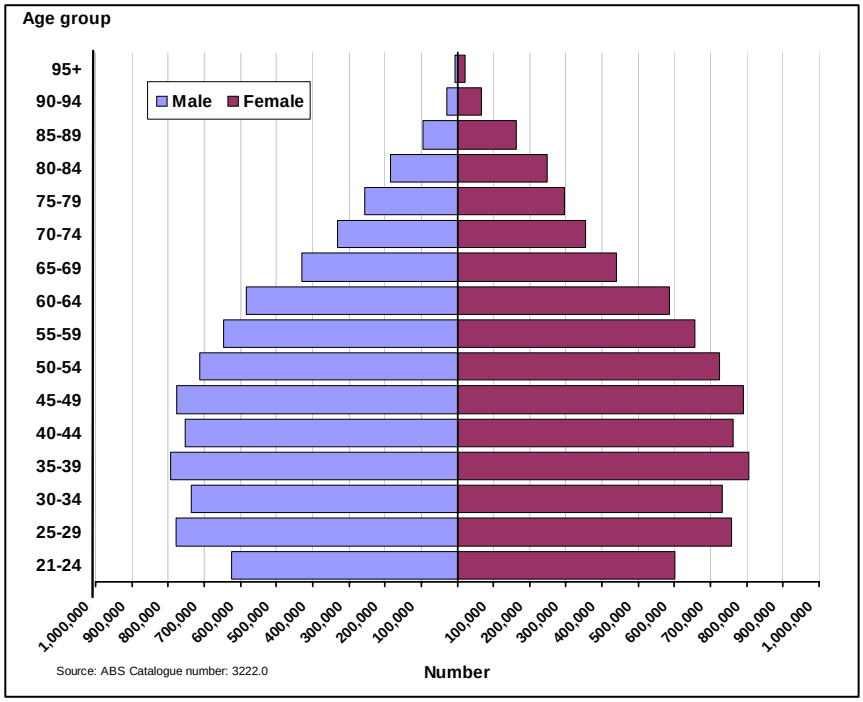
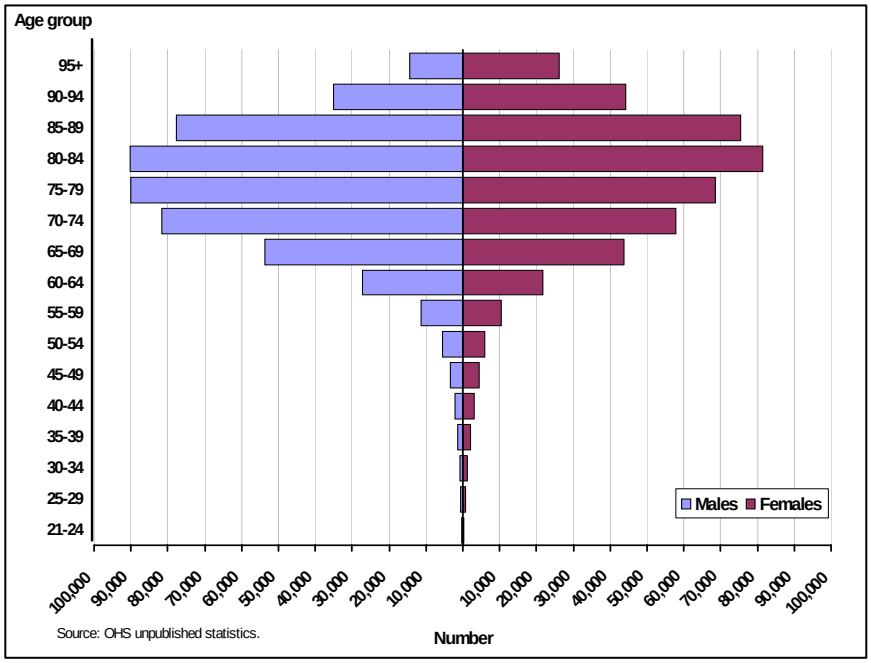


Chart 5.2: Age and Sex distribution of OHS Voucher Program clients, 30 June 2009

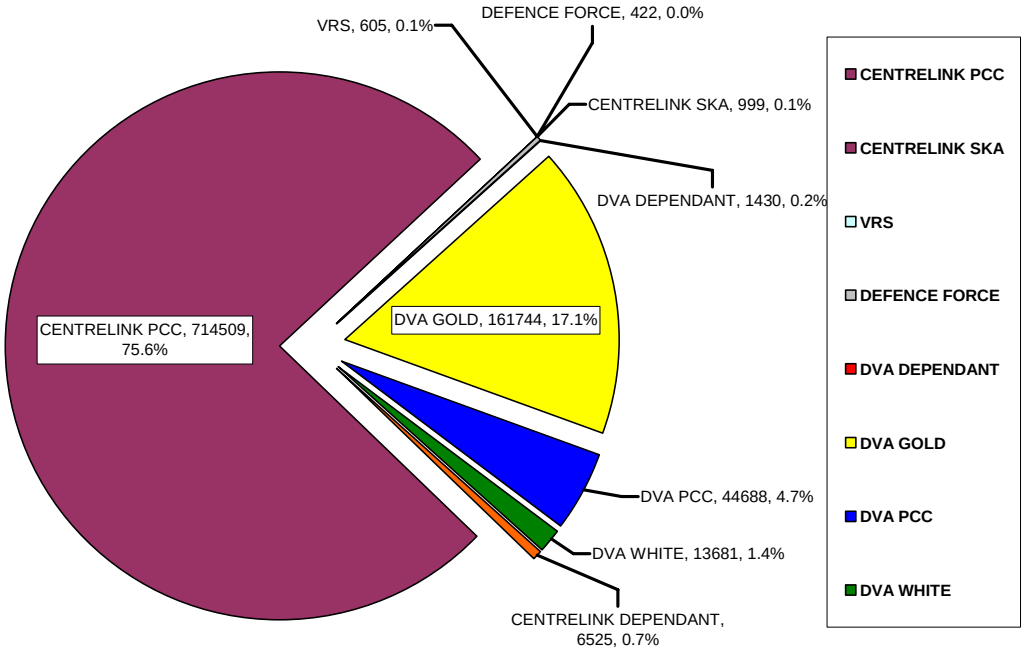


5.1.1 Eligibility profile of the Voucher Program

Over 1.38 million clients have received a voucher entitling them to access the Program since November 1997. Of this number approximately 945,000 (68%) are still eligible to receive hearing services. 494,000 (36%) of clients actually received hearing services in 2008/09.

By far the largest eligible client group are those who have a Centrelink Pensioner Concession Card (76.8%), followed by those who have a DVA Gold Card (17.1%) and a DVA PCC card (4.7%). The remaining one percent of clients re made up of eligible dependants, defence force personnel, DVA White card holders and clients on a Vocational Rehabilitation Scheme. (See chart 5.3).

Chart 5.3: Eligibility Profile of the Voucher Program

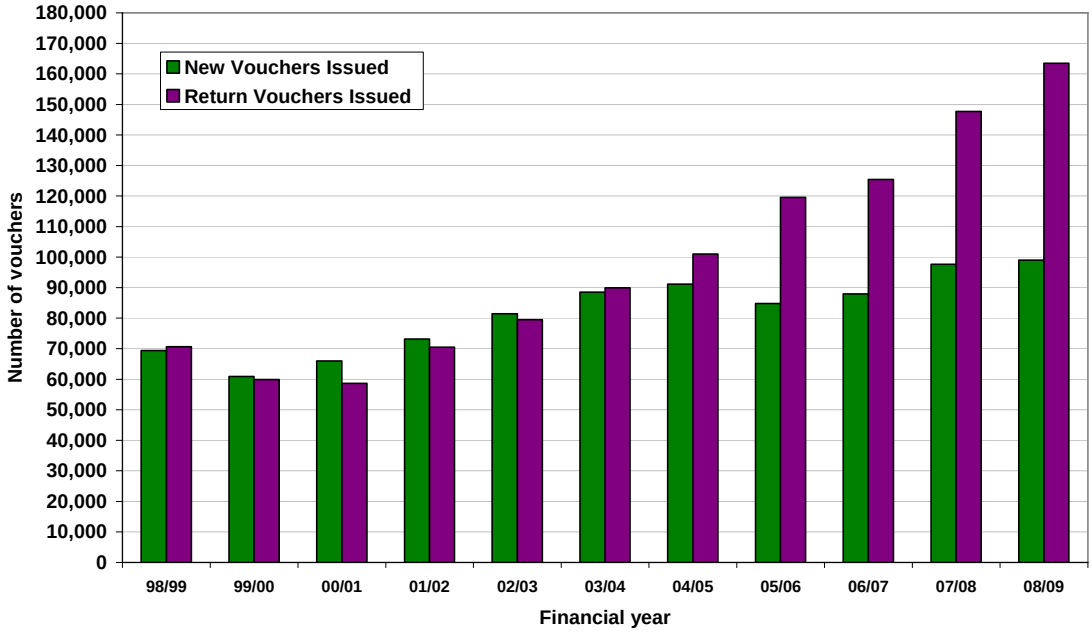


5.2 Take-up rates

The Voucher Program has grown steadily since it was created in November 1997 with an overall take-up rate for eligible clients of 27.6% in 2008/09. This reflects a declining DVA card holder population and the increased number of Australians on an Aged Pension. The trend in the number of vouchers issued to return clients in the Voucher Program shows a steady increasing upwards trend compared to the much slower growth in new client vouchers.

In 2008-09 the OHS issued over 162,000 vouchers to return clients and 100,000 vouchers to new clients. (See chart 5.4).

Chart 5.4: New and Return Vouchers Issued by Financial Year



5.2.1 Examination of the population cohort (Nov 1997 to Jun 2005)

To determine the actual usage of hearing services in the Voucher Program an analysis of the new clients who joined the Program between November 1997 and June 2005 reveals that only three quarters of clients who were assessed went on to be fitted with a hearing device. During this period the Program did not have a minimum hearing loss threshold so these clients have had a low level of hearing loss and therefore did not require hearing devices.

A third of these clients remained active in the Voucher Program which again reflects the average life of a hearing aid (5 years).

Table 5.1

Cohort analysis of Usage of OHS Voucher Program by Eligibility type for clients who joined the program from 1998/99 to 2004/05

Data Eligibility	Total Issued	Assessed	Fitted	Normal Fitted	Top-Up Fitted	ALD Fitted	Active @ 30/06/09	Re-Assessed
CENTRELINK DEPENDANT	3,534	3,238	2,369	1,468	883	22	1,216	1,567
CENTRELINK PCC	404,010	371,060	305,444	213,801	89,451	2,465	137,267	189,327
CENTRELINK SKA	505	452	373	276	95	2	135	205
CRS	1,523	1,378	1,114	834	277	3	33	102
DEFENCE FORCE	323	228	43	26	17	1	12	16
DVA DEPENDANT	855	780	680	411	267	2	337	438
DVA GOLD	71,728	66,487	59,937	45,336	14,195	460	28,561	37,536
DVA PCC	21,792	20,040	16,928	12,080	4,753	106	7,616	10,513
DVA WHITE	5,889	5,526	4,989	3,750	1,186	54	2,819	3,165
Grand Total	***510,159***	***469,189***	***391,877***	***277,982***	***111,124***	***3,115***	***177,996***	***242,869***

% Distribution of Total Issued Eligibility	Total Issued	Assessed	Fitted	Normal Fitted	Top-Up Fitted	ALD Fitted	Active @ 30/06/09	Re-Assessed
CENTRELINK DEPENDANT	3,534	91.6%	67.0%	41.5%	25.0%	0.6%	34.4%	44.3%
CENTRELINK PCC	404,010	91.8%	75.6%	52.9%	22.1%	0.6%	34.0%	46.9%
CENTRELINK SKA	505	89.5%	73.9%	54.7%	18.8%	0.4%	26.7%	40.6%
CRS	1,523	90.5%	73.1%	54.8%	18.2%	0.2%	2.2%	6.7%
DEFENCE FORCE	323	70.6%	13.3%	8.0%	5.3%	0.3%	3.7%	5.0%
DVA DEPENDANT	855	91.2%	79.5%	48.1%	31.2%	0.2%	39.4%	51.2%
DVA GOLD	71,728	92.7%	83.6%	63.2%	19.8%	0.6%	39.8%	52.3%
DVA PCC	21,792	92.0%	77.7%	55.4%	21.8%	0.5%	34.9%	48.2%
DVA WHITE	5,889	93.8%	84.7%	63.7%	20.1%	0.9%	47.9%	53.7%
Grand Total	***510,159***	***92.0%***	***76.8%***	***54.5%***	***21.8%***	***0.6%***	***34.9%***	***47.6%***

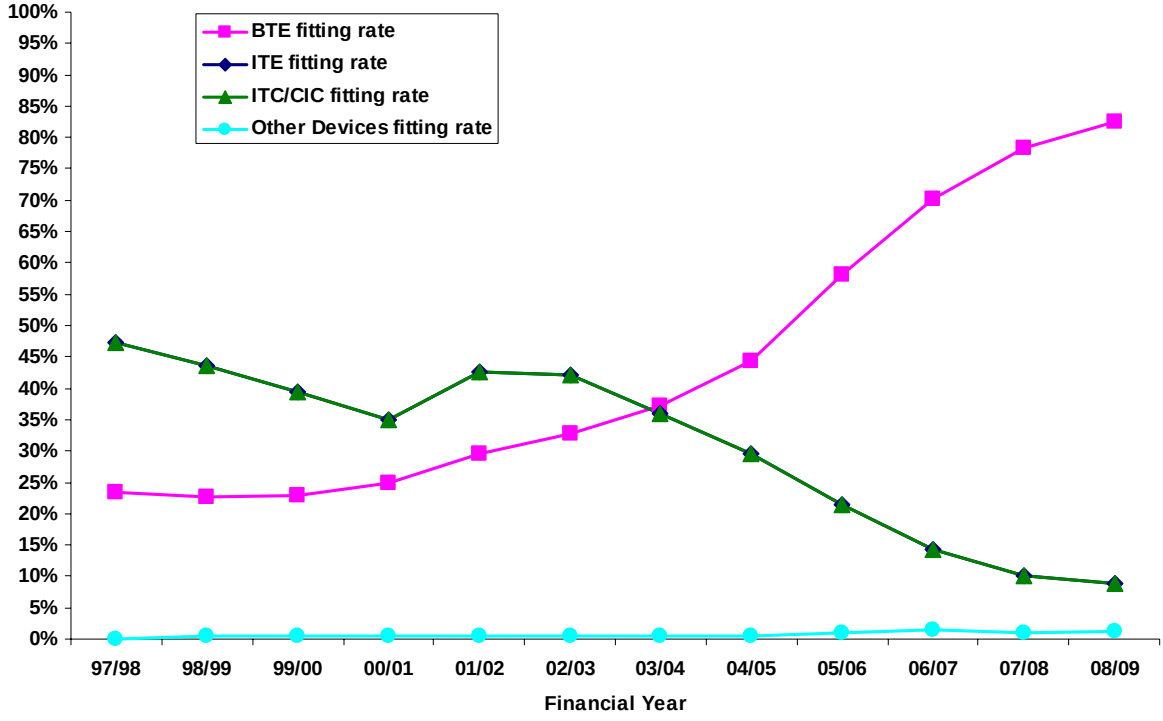
Date Run: 29 September 2009

5.2.2 Hearing Devices issued in the Voucher Program

The trend in hearing devices has shown significant increases in the rate of behind-the-ear fittings from 23.4% in 1997-98 to 82.5% in 2008-09 and a corresponding decline in the rate of In-the-Ear, In-the-Canal and Completely-in-the-Canal hearing device fittings from 47.3% in 1997-98 to 8.8% in 2008-09. Chart 5.5 illustrates this trend.

This may reflect the trend towards fitting open-ear BTEs. However, due to the inconsistencies in the way that Contractors report on open-ear fittings, it is difficult for the Office to accurately report the real number of these devices. The number of other devices such as Alternative Listening Devices has remained at a constant low rate.

Chart 5.5: Fitting rates of hearing devices in the Voucher Program



5.2.3 Hearing impairment in the Voucher Program

Data on the average 3FAHL (frequency average hearing loss) hearing loss level for both the left and right ear is collected for every claim for a hearing assessment under the Voucher Program. Using data based on a client's most recent assessment which identifies the hearing loss in their worst ear it is possible to identify the distribution of hearing loss for clients in the Voucher Program.

In 2008-09 approximately 22,000 had a normal level of hearing loss, 74,000 had mild hearing loss, 70,000 had moderate hearing loss and 42,000 had serious hearing loss.[49] Data analysis shows a slightly upwards trend in assessed clients who have mild or normal levels of hearing loss and a corresponding decline in the numbers of clients with moderate or serious levels of hearing loss. On a July 2010, a minimum hearing loss threshold will be implemented. The fitting of hearing devices will be restricted to clients with a hearing loss with 3FAHL level of 24 db or greater unless a clinical need is demonstrated. For more detailed data by age group refer to Appendix I.

[49] Refer to section 2.1 for further information about hearing loss categories.

Table 5.2: Current OHS Voucher Program client hearing loss levels by year of assessment, severity, Australia, 1998-99 to 2008-09, by financial year.

Number	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Normal	2,180	4,975	8,290	12,614	18,689	28,551	41,604	54,406	69,177	90,611	115,631
Mild	5,771	12,959	21,034	31,591	45,967	66,456	95,425	134,044	181,629	254,175	334,206
Moderate	4,764	10,663	16,894	24,806	34,712	48,307	68,182	98,712	139,229	206,813	280,958
Serious	2,218	4,824	7,495	10,690	14,614	20,035	27,950	40,159	57,981	87,636	119,380
Profound	1,004	2,147	3,269	4,459	5,938	7,844	10,589	14,702	22,442	33,243	43,587
Total	15,937	35,568	56,982	84,160	119,920	171,193	243,750	342,023	470,458	672,478	893,762

Cumulative%	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Normal	13.7%	14.0%	14.5%	15.0%	15.6%	16.7%	17.1%	15.9%	14.7%	13.5%	12.9%
Mild	36.2%	36.4%	36.9%	37.5%	38.3%	38.8%	39.1%	39.2%	38.6%	37.8%	37.4%
Moderate	29.9%	30.0%	29.6%	29.5%	28.9%	28.2%	28.0%	28.9%	29.6%	30.8%	31.4%
Serious	13.9%	13.6%	13.2%	12.7%	12.2%	11.7%	11.5%	11.7%	12.3%	13.0%	13.4%
Profound	6.3%	6.0%	5.7%	5.3%	5.0%	4.6%	4.3%	4.3%	4.8%	4.9%	4.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: OHS unpublished data.

5.2.4 Geographic distribution of clients in the Voucher Program

The Office of Hearing Services has a very limited dataset of client address data geo-coded using the Accessibility/Remoteness Index of Australia (ARIA) at the suburb and postcode level. The Voucher Program provides hearing services to approximately 1.2 million Australians. Almost two-thirds of these clients live in major cities and one third live in regional Australia. The remaining 2% of clients live in remote and very remote regions of Australia. (See table below).

Table 5.3: Geographic distribution of OHS Voucher clients using ARIA by major area, Australia, 2008-09

ARIA Category	OHS Voucher Client Numbers	% Distribution of OHS Voucher Clients	ABS June 07 Estimated Resident Population	OHS clients as % of Australian population
Major Cities	736,875	62.8%	13,328,844	5.5%
Inner Regional	267,905	22.8%	4,379,211	6.1%
Outer Regional	142,537	12.1%	2,504,609	5.7%
Remote	17,057	1.5%	435,057	3.9%
Very Remote	4,606	0.4%	296,863	1.6%
No Rating	5,122	0.4%	70,431	7.3%
Grand Total	**1,174,102**	**100.0%**	**21,015,015**	**5.6%**

Source: OHS unpublished data

Further analysis of this data mapped to ABS statistical sub-divisions and comparing client data to ABS estimated resident populations from June 2007 has identified a number of areas with a high percentage of clients per capita:

NSW – Tweed Heads & Tweed Coast SSD	11.9%
NSW – Port Macquarie SSD	11.5%
QLD – Redcliffe City SSD	10.6%
QLD – Hervey Bay City Part A SSD	10.9%
SA – Yorke SSD	9.7%
SA – Western Adelaide SSD	9.4%
TAS – Central North SSD	9.2%

Similarly it is also possible to identify the areas with a low percentage of clients per capita, possibly indicating areas where it is difficult to provide hearing services. It should be noted that these locations are very isolated areas.

WA – De Grey SSD	0.3%
WA – Fortescue SSD	0.6%
WA – Ord SSD	0.7%
WA – Fitzroy SSD	0.8%
NT – Bathurst-Melville SSD	0.9%
NT – Daly SSD	0.4%
NT – East Arnhem	0.1%

Further detail in included in Appendix J showing a detailed Voucher Client distribution by ABS statistical sub-division.

PART 6 HEARING HEALTH AND RESEARCH PROGRAMS

6.1 Prevention Programs

6.1.1 Hearing Loss Prevention Program

The Hearing Loss Prevention Program (the HLPP) was announced in May 2007 as a Budget measure. This is an ongoing program that provides funding for research and prevention activities to help reduce the burden and incidence of avoidable hearing loss in young people, Indigenous Australians and those in the workplace. As this is a designated 'ongoing program', there will be opportunities to respond to identified gaps and emerging needs after the initial establishment phase of the Program.

In 2007-08, the Department commenced the implementation of the first round of research projects under the Program. Six research projects were commissioned through this funding round with $3.5 million allocated to the projects. The projects will be finalised by 2011-12.

In June 2009, $1.3 million was allocated for the implementation of the first round of prevention projects under the Program. Four prevention projects were commissioned through this funding round under the prevention component of the Program.

The research and prevention projects funded to date address identified issues for all three groups targeted in the Program. A second funding round for prevention projects is scheduled for 2009 and the Program will be evaluated in 2011-12.

6.1.1.1 Young people

To prevent avoidable hearing loss in young people who are exposed to excessive leisure noise, including the use of personal music players, the NAL has been funded to undertake a research project to establish the prevalence of hearing loss and its relationship to leisure sound exposure in adolescents. A complementary study, also undertaken by NAL, will provide a comprehensive and accurate picture of noise exposure for young people, together with an assessment of the relative 'hazard' contribution that different activities and environments pose for young people across a lifetime.

In a related prevention project, NAL will develop an educational program for school children in Years 4-5 to raise their awareness of risks to hearing health. The educational program will be adapted for use with Indigenous children.

Edith Cowan University (ECU) is conducting research targeting young people who use personal music players at high volume. The research will determine the effectiveness of a health-based fear appeal augmented by simulations of hearing loss and tinnitus. A related prevention project will incorporate a science museum demonstration of simulated hearing loss and tinnitus, and a hearing health promotion strategy targeting adolescents.

The Ear Science Institute Australia Inc (ESIA) will undertake a prevention project to develop downloadable applications for iPod type devices to provide warnings to young people when safe exposure levels are exceeded. ESIA will also establish a website for all matters related to high noise exposure, and a hearing health education course for school aged children.

6.1.1.2 Indigenous Australians

The following projects address issues related to untreated otitis media and consequent conductive hearing loss in Indigenous communities. Flinders University has received funding to conduct a longitudinal study with high statistical power to significantly extend previous research into the effects of the use of swimming pools by Indigenous children in remote communities. This will be achieved by incorporating measures of hearing (audiometry) and middle ear function (tympanometry) as the critical outcomes measures which are more directly linked to educational outcomes in these children.

Additionally, the Menzies School of Health Research has been funded for research to evaluate a comprehensive case management support program for the prevention of hearing loss associated with otitis media with perforation of the eardrums in Indigenous children 0-5 years of age.

Under the prevention component of the Program, Phoenix Consulting Inc in collaboration with the Batchelor Institute of Indigenous Tertiary Education**,** will train early childhood workers to instigate early treatment for Indigenous children with ear disease. The project will also develop a noise exposure profile for Indigenous lifestyles in urban, regional and remote areas, and design hearing health promotion resources for use with Indigenous communities.

6.1.1.3 Workplace Hearing Loss

Existing research conducted by the ASCC indicates that there are barriers to occupational noise management that contribute to the failure of efforts to reduce personal noise exposure. A key research challenge is to understand the barriers and enablers to compliance, and how these influence opportunity, ability, willingness and intent to prevent hearing loss.

The Work Safe Australia, formally part of the Department of Education, Employment and Workplace Relations, has been funded to undertake a research project to determine the key barriers and enablers to the effective control of hazardous occupational noise exposure amongst key stakeholders within selected high risk populations.

6.1.2 Pneumococcal Immunisation

Routine immunisation against pneumococcal disease is recommended for children, older Australians and Indigenous Australians. The aim of immunisation is to protect against disease caused by the organism, *Streptococcus pneumoniae*, also known as the pneumococcus. There are over 90 different types of pneumococcus, some of which are associated with middle ear infections.

It is difficult to evaluate the impact of the pneumococcal immunisation program on rates of otitis media and associated hearing loss. However, a study undertaken by the National Centre for Immunisation Research and Surveillance has found some evidence of a reduction in the rates of myringotomy and ventilation tube insertion procedures in the <1, 1 and 2 years after the introduction of routine childhood pneumococcal vaccination.

The National Immunisation Program has provided free pneumococcal vaccine since January 2005. This vaccine is routinely administered to children at 2, 4 and 6 months of age, with Indigenous children living in high risk areas in Queensland, the Northern Territory, Western Australia and South Australia receiving a booster dose between 18 and 24 months of age.

Older Indigenous Australians receive vaccination at 50 years of age and a booster 5 years later. Vaccine is also provided for Indigenous Australians in the 15 – 50 year age group who are at high risk from pneumococcal infection.

New pneumococcal vaccines have been developed with the potential to further reduce the burden of otitis media. One of them, a 10-valent pneumococcal conjugate vaccine, which incorporates protection against another organism commonly associated with otitis media, non-typeable *Haemophilus influenzae,* is currently being evaluated for possible inclusion in the National Immunisation Program. A 13 valent pneumococcal conjugate vaccine is currently being evaluated by the Therapeutic Goods Administration for marketing in Australia.

6.1.3 Hearing Awareness Week

Hearing Awareness Week is an annual event coordinated by the Deafness Forum of Australia to raise community awareness of hearing impairment and ways to protect an individuals hearing. This event is also an opportunity for adults with a hearing impairment to share their experience and knowledge and to promote a greater understanding of their needs and aspirations.[50]

6.2 Research Programs

6.2.1 NAL Research Projects

The Office funds AH to deliver hearing services related research and community education services under CSO arrangements. The research division of AH, NAL, undertakes scientific investigations into hearing, hearing rehabilitation, and the effects of noise on people, including the prevention of hearing loss.

Table 6.1 details the current research projects funded through the CSO arrangements with NAL.

Table 6.1: NAL Research Projects funded under the CSO arrangements - Prevention of Hearing Loss

Project	Start Date	Finish Date
Minimising acoustic shock in speech communication systems	July 2002	Ongoing
Factors affecting the attenuation of hearing protectors	Aug 2005	Ongoing
Barriers to noise exposure reduction	June 2007	Dec 2012
Prevalence of hearing loss in adolescents	June 2007	Dec 2012
Active noise control core technology	Sep 2007	Mar 2009
Sources of noise exposure	July 2008	Dec 2012

6.2.1.1 Longitudinal Outcomes of Children with Hearing Impairment (LOCHI)

NAL is currently undertaking a longitudinal study to examine the development of speech, language functional and psychosocial skills and the educational attainment of children with a hearing impairment. The study measures the:

- importance of early detection of hearing loss, intervention and special education;
- effects on outcomes of a range of factors including age the time of intervention, cause of hearing loss, type of hearing aid prescription and type of intervention;
- rate of development and the relative impact of different factors at different ages.

[50] Deafness Forum, 2009

When all data is available, the study will assist in the determination of:

- whether normal development at an early age will continue through school years; and
- the impact of many factors on long-term speech, language, functional, psychosocial and educational attainment.

LOCHI is the most comprehensive study of its type in the world.[51]

6.2.2 National Health and Medical Research Council

The NHMRC funds a number of research projects into hearing related issues in Australia. Table 6.2 provides a summary of hearing related research areas and allocated funding by calendar year and Table 6.3 provides a summary of funding for hearing related research by financial year from 2000-01 to 2008-09.[52]

6.2.3 HEARING CRC

The HEARing Cooperative Research Centre (CRC) is a consortium of research, clinical and industry organisations that aims to prevent and remediate lost productivity resulting from hearing loss in children and adults. The objectives of the CRC are:

- to enhance Australia's industrial, commercial and economic growth through a program of sustained, user-driven cooperative research into hearing loss prevention and mitigation; and
- through education and commercialisation of research findings, to reduce the incidence of hearing loss and increase the effectiveness of with which hearing loss and hearing disorders are treated through improved technology, processes or clinical services.[53]

The CRC has four research programs:

- biomolecular, genetic, physiological solutions;
- intelligent sound processing;
- integrated bioengineering; and
- clinical tools and techniques.

In 2007, the CRC received $32.55 million over seven years through the Cooperative Research Centres Program administered by the Department of Innovation, Industry, Science and Research. The Cooperative Research Centres Program aims to deliver significant economic, environmental and social benefits to Australia by supporting end-user driven research partnerships between publicly funded researchers and end-users to address clearly articulated, major challenges that require medium to long term collaborative efforts.[54]

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[51] National Acoustics Laboratories, 2009
[52] National Health and Medical Research Council (NHMRC), 2008
[53] The Hearing Cooperative Research Centre (Hearing CRC), http://www.hearingcrc.org/, retrieved 1 October 2009.
[54] Department of Innovation, Industry, Science and Research, https://www.crc.gov.au/Information/ShowInformation.aspx?Doc=about_programme&key=bulletin-board-programme&Heading=The%20Program>, retrieved 1 October 2009.

Table 6.2: Hearing Related Research Funded by NHMRC by Calendar Year

Type	2000	2001	2002	2003	2004	2005	2006	2007	2008
Deafness	$241,316	$655,097	$852,621	$767,688	$806,765	$731,968	$541,662	$497,882	$888,192
Ear Physiology	$735,258	$569,210	$402,466	$352,828	$445,584	$428,937	$381,822	$306,591	$652,269
Hearing Related Issues NEC	$1,032,530	$1,335,933	$1,704,742	$1,629,558	$1,735,089	$1,628,694	$1,491,949	$1,947,221	$2,282,905
Hearing Aids	$146,464	$281,023	$603,068	$688,807	$569,403	$472,811	$394,868	$424,957	$591,179
Otitis Media	$486,345	$1,171,160	$983,135	$1,771,826	$1,134,236	$985,831	$1,386,977	$1,494,939	$2,066,103
Tinnitus	$18,571	$219,412	$416,430	$267,433	$130,220	$114,556	$109,125	$109,125	$92,710
All Hearing and Sound Related Issues - CY	**$2,002,864**	**$2,999,725**	**$3,425,071**	**$4,430,057**	**$3,967,342**	**$3,471,476**	**$3,384,027**	**$3,678,592**	**$5,306,396**

Note: *Some grants may also involve more than one hearing issue. Aggregating the data will therefore not equal the All Hearing and Sound totals*

Table 6.3: Hearing Related Research Funded by NHMRC by Financial Year

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
All Hearing and Sound Related Issues - FY	**$2,418,418**	**$3,482,740**	**$3,798,729**	**$4,253,858**	**$3,737,995**	**$3,630,999**	**$3,271,329**	**$4,802,526**	**$4,647,431**

PART 7 HEARING HEALTH IN INDIGENOUS COMMUNITIES

7.1 Hearing Health in Indigenous Communities

The National Aboriginal and Torres Strait Islander Health Survey conducted by the Australian Bureau of Statistics found that in 2004-05, a higher proportion of Indigenous than non-Indigenous Australians reported ear and hearing problems across all age groups, except for those aged 55 years and over, among whom prevalence rates were similar. Furthermore, around 10% of Indigenous Australian children aged 0–14 years were reported as having ear or hearing problems compared with 3% of other Australian children. Around 5% of Indigenous children were reported to have complete or partial deafness or hearing loss, and 4% were reported to have otitis media.[55]

The onset of Otitis media (middle ear infection) among Indigenous children, especially those living in remote communities, generally occurs in the first few weeks to months of their life. Such infection occurs earlier and is more severe and persistent compared with non-Indigenous children and can eventually cause fluctuating hearing loss, preventing active participation in education and subsequently limiting employment opportunities.[56]

By adulthood, some form of hearing loss can affect up to 70% of Aboriginal people. State and territory surveys indicate that the prevalence of otitis media in Indigenous communities can range from 10% to 54%. The World Health Organization defines rates of chronic suppurative otitis media (CSOM) greater than 4 % as an unacceptable public health problem.[57] These rates are consistently exceeded in Indigenous populations, particularly in rural and remote populations.

Two sets of guidelines have been developed to assist practitioners in the management of Otitis Media and hearing in Indigenous Australians:

- Recommendations for Clinical Care Guidelines on the Management of Otitis Media in Aboriginal and Torres Strait Islander Populations, March 2001;
- General Guidelines for Audiological Practice with Indigenous Australians, June 2001[58]

The 2008 edition of *Aboriginal Primary Health Care – an Evidence-based Approach* includes a chapter on Ear Health which notes:[59]

- surgical and rehabilitative needs are not being met for Indigenous Australians, particularly in remote areas;
- untreated complications from CSOM include death from brain abscesses and meningitis amongst other complications;
- hospitalisation for Indigenous Australian children for repair of perforated ear drums is around 14 times greater than for non-Indigenous children;
- ear health problems viewed as an individual's problem rather than a larger complex systemic problem;
- the link between hearing loss and disability caused by developmental delays;

[55] Department of Health and Ageing, 2008, *Aboriginal and Torres Strait Islander Health Performance Framework 2008 Report*
[56] *Ibid*.
[57] Morris, P, Ballinger, D, Leach A, et al, 2001
[58] Both sets of guidelines are about to be updated.
[59] Couzos, S, and Murray, M, 2008

- the link between ear health, hearing impairment and overcrowding, remoteness, low birth weight, nutrition, bottle feeding, swimming and passive smoking;
- the importance of the modification of risk factors listed above;
- the importance of strategies for prevention, early intervention and rehabilitation; and
- the importance of the responsiveness of health systems

A paper prepared in 2009 by the Menzies School of Health Research *Management of Otitis Media in Populations with Limited Health Care* concludes that:[60]

- children living is some disadvantaged populations continue to suffer unacceptably high rates of severe otitis media;
- interventions available to families may be limited by their cost or the presence of other competing priorities; and
- many health staff in remote communities are overwhelmed by the workload associated with trying to treat a condition which affects are large number of the population.

Improvements in the quality of primary health care provided in the first 2 years of life are likely to have substantial impact – health education is particularly important

7.2 Measures to Address Hearing Health in Indigenous Communities

7.2.1 Background

The *National Aboriginal Health Strategy 1989*, (the Strategy) was the first comprehensive attempt to take into account historical and environmental factors influencing the health and life expectancy of Indigenous Australians.[61]

The Strategy listed possible aetiological factors contributing to chronic ear disease such as undetected and therefore untreated otitis media, chronic upper respiratory infections, under nutrition, overcrowding, Chlamydia infections, Eustachian tube differences and low immunity.[62]

An evaluation of the Strategy conducted in 1994 found minimal gains had been achieved and recommended:[63]

- national commitment to the principles underlying the Strategy;
- partnership between the different levels of government;
- inter-sectoral collaboration;
- recognition of the importance of local Aboriginal control and participation;
- acceptance of Aboriginal people's holistic view of health;
- a human rights based approach to funding;
- performance indicators including a statement of national goals for housing and essential services development and redevelopment; and
- the Commonwealth to take a leadership position.

The National Hearing Strategy, which commenced in 1996, was the first systemic national response to addressing the high incidence of ear disease in Aboriginal populations.

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[60] Leach, M, and Morris, P, 2008
[61] Department of Health and Ageing, 1989, *National Aboriginal Health Strategy*
[62] *Ibid*.
[63] *Ibid*.

The strategy focussed on the ear health and hearing of infants and children aged 0-5 years by improving access to primary, secondary and tertiary services and improving standards of care. Funding was allocated over four years and included initiatives in four complementary areas: training and equipment, the establishment of Child Hearing Health Sites, capital infrastructure and strategic research.[64]

The Child Hearing Health Sites were developed to support an Aboriginal Health Worker to deliver an ear and hearing health program that targeted Indigenous children up to five years old through screening and intervention.

Funding that was specifically provided for the 30 child hearing health sites has now been rolled into individual services' base funding. Services have discretion to direct this funding into other primary health care priorities determined by local requirements.

In 2000, in order to inform future policy direction, the Department commissioned a program review of Australian Government funded ear health and hearing services in Indigenous populations. From this, the *Report on Commonwealth Funded Hearing Services to Aboriginal and Torres Strait Islander Peoples Strategies for Future Action* was released in October 2002. This report lead to a collaboration between OATSIH and the Office for Hearing Services (OHS) and the development of the *Work Plan for Future Actions in Ear and Hearing Health (the Work Plan)* in 2003.

The Work Plan outlined policy principles and key activities to address ear and hearing health needs of Indigenous communities. The Work Plan was intended to lead to improvements in service delivery, workforce and primary, secondary and tertiary ear health and hearing services.[65]

The key strategies of the Work Plan were to:[66]

- position ear health in a comprehensive, population-based approach to family, maternal and child health;
- promote skills development in the primary health care workforce in the clinical management of otitis media;
- facilitate earlier and increased access to medical specialists and audiologists;
- increase the capacity of the Commonwealth Hearing Services Program to respond to the tertiary hearing needs of Aboriginal and Torres Strait Islander peoples;
- enhance and harness the role Aboriginal Health Workers play in ear health services and health promotion in Aboriginal Community Controlled Health ; and
- inter-sectoral collaborative approaches to improve the use of technological systems and training in school ear health and hearing policies and programs.

Responsibility for carrying out specific strategies in the Work Plan were accorded to either OATSIH or OHS, with AH and other Australian Government and state agencies playing an important role. Activity relating to the Work Plan was completed in 2008. Activities under the Work Plan are reported in the Department's Annual Reports and National Strategic Framework for Aboriginal and Torres Strait Islander Health Implementation Reports.[67]

[64] Department of Health and Ageing, 1989, *National Aboriginal Health Strategy*
[65] Department of Health and Ageing, 2003, *Workplan for future actions in ear and hearing health*
[66] *Ibid*.
[67] *Ibid*.

The *National Aboriginal and Torres Strait Islander Health Performance Framework - 2008 Report and Report Summary* confirmed the associations between the presence of ear or hearing problems and social conditions. The survey found that nationally there had been little change since 2001.[68]

7.2.2 Current Measures

There are currently a number of state, territory and Australian Government funded programs that address Indigenous hearing health. Australian Government initiatives include:

7.2.2.1 Hearing Provision in Aboriginal Medical Services

OATSIH provides funding for Indigenous primary health care services. Funds previously provided to individual services under the ear and hearing program have been progressively absorbed into the general budgets of primary health care services. In 2007-08, 71% of OATSIH funded Indigenous primary health care services surveyed provided and/or facilitated hearing screening programs[69] (Note: 2008-09 Service Activity Reporting data is not yet available).

OATSIH has historically provided funding to AH to provide hearing training for Aboriginal and Torres Strait Islander Health Workers in each state and territory except the Northern Territory (see details on the Australian Government Intervention in the Northern Territory). AH has also provided upgrade and maintenance of hearing equipment within OATSIH funded Aboriginal Medical Services (AMS).

7.2.2.2 Closing the Gap in the Northern Territory

Australian Government funding was provided for hearing and Ear Nose and Throat (ENT) services in 2007-08 and 2008-09 to children under the age of 16 years as follow-up to the Northern Territory Emergency Response (NTER) Child Health Checks. In 2007-08, additional primary health care follow-up services were provided by Hearing Health Workers through the NTER Follow-up measure. ENT services (including surgery) will continue to be provided in 2009-10.

As at 30 June 2009, according to the Australian Institute of Health and Welfare (AIHW) audiology database, a total of 4,497 audiology checks have been performed since July 2007. The total number of children who received one or more audiology checks during this period was 3,166. The Northern Territory Department of Health and Families reported providing 2,285 ENT consultations and 342 ENT surgical procedures to 30 June 2009.

Under the *Closing the Gap Northern Territory – Indigenous health and related services* measure the Australian Government has committed funding of $4.5 million for one year (2009-10) to complete ENT specialist services (including surgery) arising from valid ENT referrals from child health checks. Under the Expanding Health Service Delivery Initiative resources will continue to be available for audiology services in 2009/10.

[68] Department of Health and Ageing, 2008, *Aboriginal and Torres Strait Islander Health Performance Framework 2008 Report*

[69] Department of Health and Ageing, 2008, 2007-08 Service Activity Report (SAR)

7.2.2.3 Medicare Items for health assessment: Child Health Checks

Health assessment items for Indigenous people of all ages currently exist in the Medicare Benefits Schedule (MBS). The intention of these items is to provide a systematic approach to health checks for Indigenous people, with the overall aims including the prevention, early detection of disease and intervention to improve health outcomes. The Indigenous child health check (MBS item 708) is available annually for Indigenous children from birth to 14 years of age.

The essential components of an Indigenous Child Health Check are:

- taking a comprehensive medical history;
- examination of the patient;
- organising required investigations;
- making an overall assessment of the patient; and
- arranging any necessary interventions and referrals.

With respect to ear health this specifically includes an assessment of hearing through the history, the achievement of developmental milestones, and otoscopic examination of the ears.

7.2.2.4 Improving Indigenous Eye and Ear Health for Better Education and Employment Outcomes measure

On 26 February 2009, the Prime Minister announced $58.3 million over four years for the *Improving Eye and Ear Health Services for Indigenous Australians for Better Education and Employment Outcomes* measure. The measure is being administered through the Department and the hearing health components of the new measure include:

- Increased training of health workers for hearing screening, to make sure they can pick up any hearing problems of Indigenous people as early as possible.
- Maintenance and purchase of medical equipment for hearing screening including audiometers, tympanometers and otoscopes.
- Hearing health promotion to increase awareness of ear disease and the importance of providing and following treatment to reduce hearing loss in Indigenous communities.
- Additional ear surgery in areas of need, particularly remote communities.

The first phase of the initiative involved the organisation of a Clinical Roundtable in Hearing Health, to determine best practice approaches for the delivery of hearing services to Indigenous Australians. One of the issues raised at the Roundtable was the significant amount of work currently occurring at a state and territory level in hearing health, and the need for Australian Government initiatives to align with this work.

Additionally, the Department is seeking to establish an Indigenous Ear Health Working Group comprising Australian Government, state and territory health department representatives. This working group will discuss the implementation of Australian Government funded hearing initiatives and how they will align with current state and territory activity.

The Department will shortly conduct several tender processes to:

- undertake a scoping study of current state and territory funded Indigenous health activity in relation to the management of otitis media and associated hearing issues;
- undertake a planning and needs analysis for the strategic location of hearing equipment in AMS funded by OATSIH and other primary health care services;
- supply specified hearing equipment and a plain English instruction manual for the use, care and storage of the hearing equipment; and
- provide accredited training in ear and hearing health assessment to Aboriginal Health Workers.

Indigenous children and young people under 21 years of age are the target group for the hearing component of the *Improving Eye and Ear Health Services for Indigenous Australians for Better Education and Employment Outcomes* measure, however all Indigenous Australians will benefit from the measure.

7.3 Access to Hearing Services and Technologies for Indigenous Australians

7.3.1 Australian Hearing Specialist Program for Indigenous Australians

AH does not reach every single hearing impaired Indigenous young adult client due to the number of communities that they can service, cultural issues around acceptance of hearing loss as a disability, difficulty or unwillingness to attend appointments as well as a lack of primary screening & secondary diagnosis to detect and refer hearing loss in some areas.

To address some of these issues the CSO Program includes Indigenous specific measures and funding for the Australian Hearing Specialist Program for Indigenous Australians (AHSPIA) outreach service. In addition the HLPP also targets Indigenous people.

In recognising that many Indigenous people are reluctant to attend mainstream services, AH has developed AHSPIA as a culturally sensitive outreach program to deliver hearing services to eligible Indigenous Australians. Outreach services are provided to individuals and communities in urban, rural and remote localities. Services delivered include individual hearing assessment and rehabilitation programs as well as community education and information sessions on the causes and effects of hearing loss.

As at 31 August 2009, 7,908 clients have been seen under this initiative since it commenced on 1 December 2005. AH visited 221 sites which exceeded the target of 139 sites, which compares with 217 sites visited in 2007-08.

AH continues to create opportunities to raise awareness of hearing loss and the services available from AH under the CSO Program to increase the take up rate of services including using a “hearing bus” to provide a mobile hearing service for Indigenous communities in rural areas of NSW, Victoria and Tasmania where the take up rate has been lower than expected based on population.

7.3.2 AHSPIA performance audit

The Office of Evaluation and Audit (OEA) within the Department of Finance and Deregulation conducted an audit of AHSPIA as part of its 2007-10 Evaluation and Audit Work Program. The objective of the audit was to assess the efficiency and effectiveness of AH's management and delivery of AHSPIA to improve access to hearing services for Indigenous Australians. The audit included coverage of AH's planning, service delivery arrangements, monitoring and review activities associated with the delivery of AHSPIA services.

The three agencies (ie the Office, the Department of Human Services and AH) were extensively consulted by OEA throughout the audit process and were provided with opportunities to comment on draft audit reports. OEA incorporated a majority of comments provided by these three agencies in the final report.

The performance audit was completed in October 2008. The Secretary of the Department, Ms Jane Halton PSM, wrote to OEA and advised that the Department overall supports the findings of the performance audit of AHSPIA and welcomes a number of recommendations made in the report towards improving the effectiveness of AHSPIA. The Department's response to each of the recommendations was also provided to OEA. The OEA report was published on 15 July 2009.

There are five OEA recommendations specifically for the Office to address (recommendations 1, 5, 6, 7, 8).

Revised reporting requirements in the new Memorandum of Understanding (MOU) are in place to met recommendation 1. The Office and AH are working on associated documents to set targets for some of the CSO categories.

Recommendation 5 sought consistency of the definition of Indigenous eligibility for people aged over 50. This was actioned.

In Recommendation 6 recommends that Office and AH improve transparency in reporting of the expenditure of AHSPIA funding by:

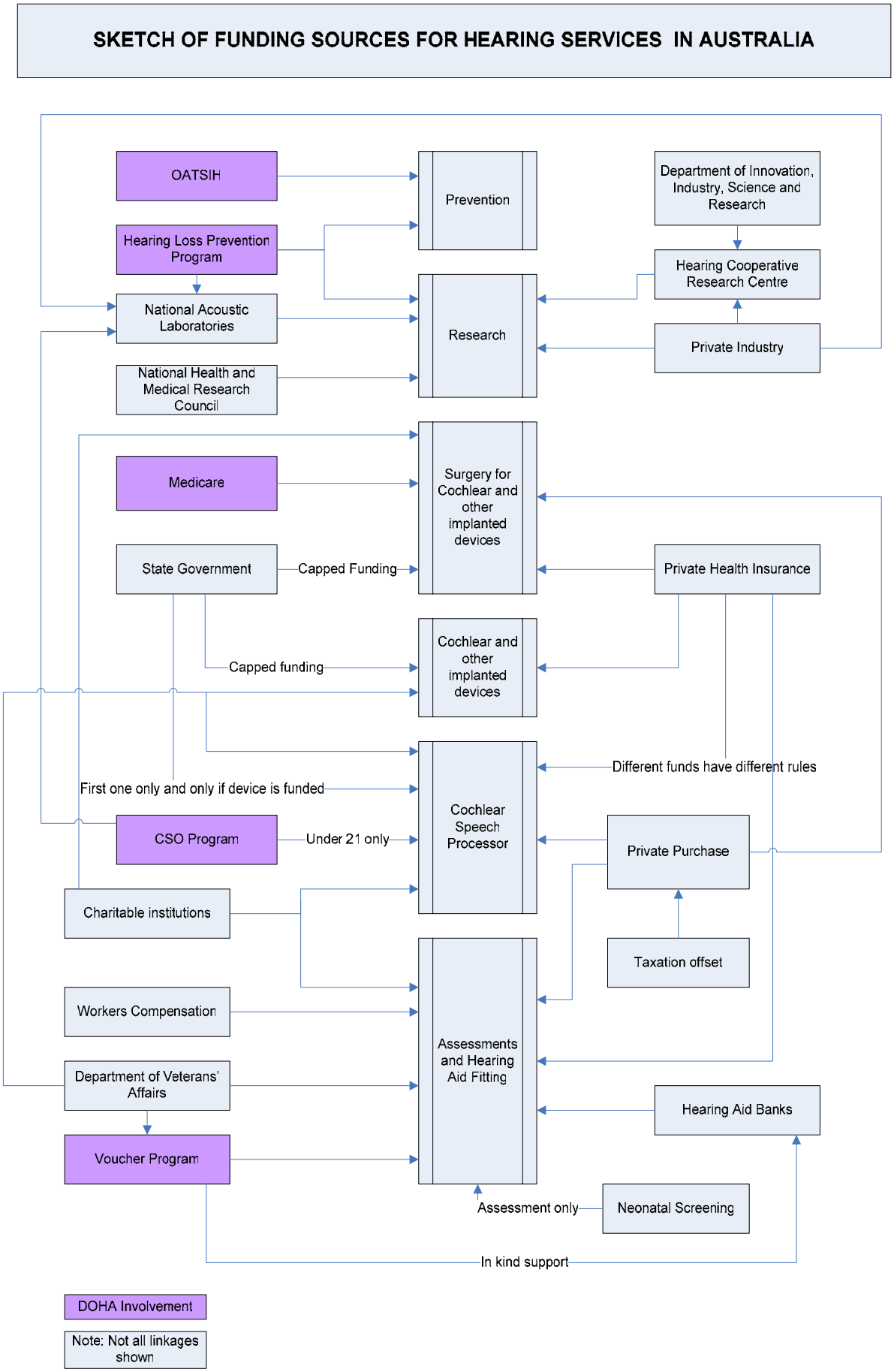
- ensure the new reporting template provides for disclosure of the number of AHSPIA clients from each CSO category
- clarifying the definition of an "Outreach Site"
- providing information on the number of operational AHSPIA sites, including the annual number of site visits

The only part of the recommendation not met is reporting the number of annual visits. AH is building a new report to provide information on the number of AHSPIA visits.

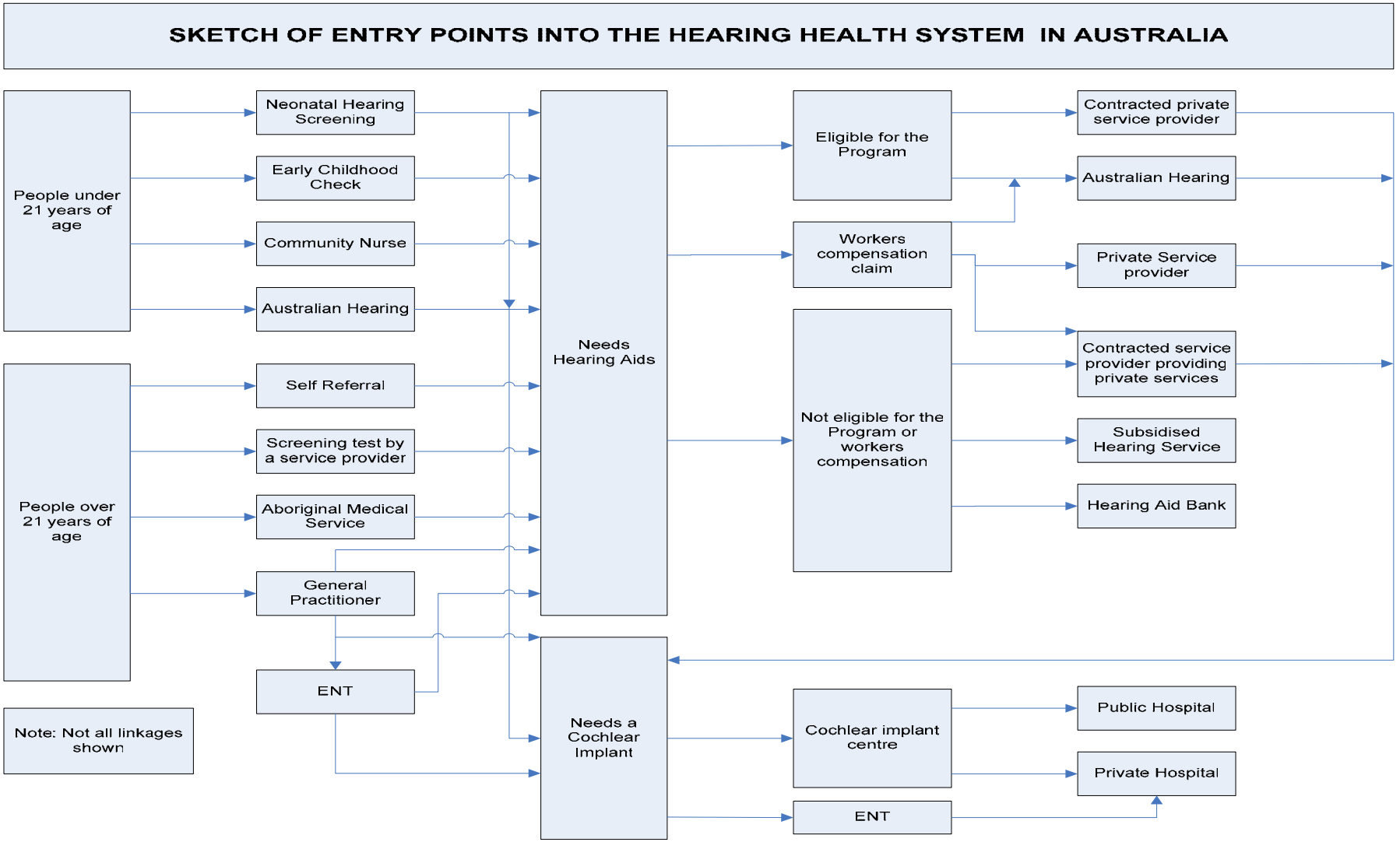
Recommendation 7 relates to the setting of targets for the relevant level of service hours for Indigenous clients. This recommendation is under discussion with Australian Hearing.
An evaluation strategy is being drafted to address recommendation 8.

APPENDICES

APPENDIX A


SKETCH OF FUNDING SOURCES FOR HEARING SERVICES IN AUSTRALIA
OATSIH
Hearing Loss Prevention Program
National Acoustic Laboratories
National Health and Medical Research Council
Prevention
Research
Department of Innovation, Industry, Science and Research
Hearing Cooperative Research Centre
Private Industry
Medicare
State Government
Capped Funding
Surgery for Cochlear and other implanted devices
Private Health Insurance
Capped funding
Cochlear and other implanted devices
Different funds have different rules
First one only and only if device is funded
CSO Program
Under 21 only
Cochlear Speech Processor
Private Purchase
Charitable institutions
Taxation offset
Workers Compensation
Department of Veterans' Affairs
Voucher Program
Assessments and Hearing Aid Fitting
Hearing Aid Banks
Assessment only
Neonatal Screening
In kind support
DOHA Involvement
Note: Not all linkages shown

APPENDIX B


SKETCH OF ENTRY POINTS INTO THE HEARING HEALTH SYSTEM IN AUSTRALIA
People under 21 years of age
People over 21 years of age
Note: Not all linkages shown
Neonatal Hearing Screening
Early Childhood Check
Community Nurse
Australian Hearing
Self Referral
Screening test by a service provider
Aboriginal Medical Service
General Practitioner
ENT
Needs Hearing Aids
Needs a Cochlear Implant
Eligible for the Program
Workers compensation claim
Not eligible for the Program or workers compensation
Cochlear implant centre
ENT
Contracted private service provider
Australian Hearing
Private Service provider
Contracted service provider providing private services
Subsidised Hearing Service
Hearing Aid Bank
Public Hospital
Private Hospital

APPENDIX C

Description of the Legislative Framework for the Australian Government Hearing Services Program

The Australian Government Hearing Services Program is established by the *Hearing Services Administration Act 1997*. This Act sets out:

- the eligibility criteria,
- the accreditation scheme for the Program,
- action to be taken for fraud or dishonesty,
- payment arrangements,
- requirement for complaints procedures,
- review and reconsideration procedures, and
- injunctions and liability procedures.

The Act also allows for the establishment of various legislative instruments which expand on various aspects of the Program. These are:

- *Hearing Service Providers Accreditation Scheme 1997.* This sets out:
  - the issues to be taken into account when the Minister decides if they are going to accredit an entity, and
  - the action to be taken when the Minister thinks that there has been a contravention of a condition of an entity's accreditation.
- *Hearing Services Voucher Rules 1997*. This sets out:
  - the process for applying for a Voucher,
  - the process for issuing a Voucher, and
  - the process for revalidating a Voucher.
- *Hearing Services Rules of Conduct 2005*. This sets out:
  - who can provide hearing services - including qualifications,
  - what hearing devices can be supplied under the Program,
  - the provision of information and the obtaining of consent – including advertising,
  - record keeping,
  - fees and charges payable by Voucher clients, and
  - professional standards.
- *Hearing Services (Participants in the Voucher System) Determination 1997*. This sets out:
  - what services a client can receive under the Program,
  - the ability to fit Top-Up devices, and
  - maintenance arrangements and charges.
- *Hearing Services (Eligible Persons) Determination 1997*. This sets out:
  - transition arrangements when the program was established; and
  - eligibility criteria for dependants.

Australian Hearing, which manages the Community Services Obligations component of the Program, is established by the *Australian Hearing Services Act 1991.*

- The Act also allows for the establishment of various legislative instruments which expand on various aspects of Australian Hearing's operation.
- *Declared Hearing Services Determination 1997*. This sets out:
  - who Australian Hearing can provide services to, and
  - what services they can provide to these people.
- *Australian Hearing Services Regulations 1992.* This sets out:
  - How much Australian Hearing can charge for providing specified services.

APPENDIX D

International Hearing Programs

1 United Kingdom

The United Kingdom (UK) National Health Service (NHS) provides access to a range of subsidised hearing services to individuals across the UK.[70]

Eligibility to access NHS services applies to all UK citizens but also extends to permanent residents, visa holders for a minimum of 1 year (who are resident for at least six months) and refugees.[71] These eligibility requirements apply to all NHS services.

Clients experiencing hearing difficulties, after first visiting their local GP, can be referred on to a specialist for further consultation if this is deemed necessary. The specialist will then determine the severity of hearing loss and recommend an appropriate course of action.[72]

The subsidised specialist services can be provided from the following:

- An Ear, Nose and Throat (ENT) specialist;
- A hearing specialists (i.e. Audiologist); or
- A clinic run by Audiological professionals at GP surgeries or health centres.[73]

Following an initial consultation, if a person is identified as requiring further hearing services these are also subsidised services. These include a fitting appointment (to fit the hearing devices) and a follow up appointment (to resolve any difficulties and check progress).[74]

Under the NHS system, a range of hearings aids are bought in bulk at low prices and provided to patients via the hearing specialists. The aids are loaned to patients on a long-term basis,[75] to be returned if they are not being used, no longer required or if the patient is leaving the country for an extended period.[76]

A range of devices are provided under the NHS system.[77] For example:

- Behind-the-Ear (BTE)
- Body-worn hearing aids
- Bone conduction hearing aids
- Bone anchored hearing aids

[70] National Health Service, *About the NHS*
[71] English, P, 2007
[72] National Health Service, 2009, *How do I get a Hearing Aid Through the NHS*
[73] *ibid.*
[74] Royal National Institute for Deaf People, *NHS Hearing Aid Service*
[75] *ibid.*
[76] *ibid.*
[77] National Health Service, 2009, *How do I get a Hearing Aid Through the NHS*

BTE devices are the most commonly provided aids under the NHS system, however digital hearing aids are also becoming more widely available.[78] Other types of devices, including In-The-Ear (ITE) and Completely-In-The-Canal (CIC) aids, are not available through the subsidised Government system but can be purchased privately.[79]

Under the NHS system, access to hearing services and the provision of hearing devices, new earmoulds, tubing, batteries and repairs are all free to the patient. However, costs may be incurred if the hearing device is damaged or lost.[80] Individuals can also opt to seek services privately, outside of the NHS, and pay for the associated costs themselves.[81] This would avoid the sometimes lengthy waiting times for NHS services.

As with many public health systems, lengthy delays can often be experienced accessing services. The NHS has a blanket policy that says the maximum waiting time for consultation is 18 weeks. This starts after a person has been referred by their GP for further services.[82] Although this could mean a delay of up to 4 and a half months to access services, both the NHS and the Royal National Institute for Deaf People (RNID) are collaborating on several initiatives to shorten waiting times.[83] One such initiative is *Hearing Direct* which is a phone based helpline where hearing aid users can talk directly to NHS advisors about specific problems or appointments.[84]

Whether hearing services are publicly funded through the NHS or privately paid for, all hearing aid dispensers are qualified and regulated by the Hearing Aid Council.[85] To sell hearing aids in the UK, individuals must be registered with this Government body and meet the standards for education and training.[86]

2 United States of America

United States of America Veterans Affairs Hearing Aid Program

While there is no national hearing service program within the United State, the closest comparison to the Australian Government Hearing Services Program is the Department of Veterans Affairs Hearing Aid Program.

Eligibility for hearing aids is not given to all Veterans under the VA hearing aid program. Veterans are placed in one of seven eligibility categories based on service related disabilities, income level and other factors[87]. Provided Veterans meet the criteria to receive health care they are automatically given access to diagnostic audiological services even if they do not meet the criteria for hearing aids.

Hearing aids are available to eligible Veterans with a documented service connected hearing loss (including tinnitus), veterans receiving a disability rating of 10% for a

[78] National Health Service, 2009, *How do I get a Hearing Aid Through the NHS*
[79] *Ibid.*
[80] *Ibid.*
[81] Royal National Institute for Deaf People (RNID), *Buying a Hearing Aid Privately*
[82] National Health Service, *Guide to Waiting Times*
[83] RNID, *Waiting Times for NHS Hearing Aids*
[84] RNID, *Support for Hearing Aid Users*
[85] Royal National Institute for Deaf People (RNID), *Buying a Hearing Aid Privately*
[86] The Hearing Aid Council, 2009
[87] United States Department of Veterans Affairs, 2008

condition other than hearing loss, and some veterans with very special needs[88]. Alternatively, veterans currently enrolled in and receiving health care from a VA Medical Centre or VA Outpatient Clinic are also eligible. However, dependants of military retirees are ineligible to participate in the program but can take advantage of the Retiree Assistive Listening Device (RALD) Program which gives them access to assistive listening devices at a discounted price[89].

In order to redeem free audiological services, Veterans are required to contact one of 1561 VA health facilities across the US. The VA issues over 160,000 hearing aids each year at a cost of over $50 million[28]. The aids are purchased by the VA from the commercial market according to negotiated contracts with hearing aid manufacturers and are sold to US military retirees at cost. The VA provides a large range of devices that include ITE and BTE non-programmable and programmable analogue hearing aids, special purpose hearing aids (CROS, BICROS), bone conduction, body, and eyeglass hearing aids are all currently on contract. However, hearing aids not listed on the VA contract can still be obtained in special circumstances. In addition, Veterans have access to spare hearing aids, a wide variety of assistive listening devices, battery and repair services. The provision of hearing aids and associated services are provided free to veterans.

Hearing aids can be obtained at significant cost savings under the program and Veterans can purchase a set of aids for less than $2000.

3 New Zealand

Under the New Zealand (NZ) Ministry for Health, a hearing aid subsidy exists for eligible individuals.

For eligible clients over the age of 65 years, an additional subsidy of $302 per hearing aid has been introduced as of 1 October 2008. This brings the financial assistance available to $500 for a monaural fitting and $1000 for a binaural fitting. The eligibility of a client to access this financial assistance is based on holding a Government SuperGold Card.[90]

For eligible clients under the age of 65 years, a Universal Hearing Aid Subsidy of $198 per hearing aid exists. The eligibility of a client to access this financial assistance is based on not receiving other benefits through the following:

- Accident Compensation Corporation (ACC);
- Environment Support Services; or
- War Pensions.[91]

Both of these subsidies are available once every five years, commencing on the date the first hearing aid is provided. If there has been a change in the hearing impairment, necessitating a new prescription, a second application can be submitted within the five-year period.[92]

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[88] Audiology Online, 2002
[89] Danielson, R, 1998

[90] Enable New Zealand – Disability Funding, *Hearing Aid Subsidy Manual*
[91] *Ibid.*
[92] *Ibid.*

APPENDIX D

When an individual experiences hearing difficulties, they must be assessed by a qualified Audiologist, who is a member of the New Zealand Audiological Society. If a recommendation is made for the fitting of hearing device(s), the Audiologist will submit an application for the subsidy. Current processing times for applications for the subsidy are at least eight weeks.[93] The subsidy provided by the Government scheme is applicable to the fitting of hearing devices on an approved list, compiled by the University of Auckland.[94]

Other programs that provide funding for hearing devices to eligible clients are:

- **Children's Special Aid Fund**
  Under this scheme, children under the age of 18 (or under 21 if enrolled in fulltime study) can be fitted with hearing aids, completely subsidised. As well as covering the cost of the device, this funding also covers repairs, batteries and replacement aids. Under this scheme, children are provided with services without delay.[95]
- **Accident Compensation Corporation (ACC) Scheme**
  For individuals whose hearing loss is the result of prolonged occupational noise exposure or sudden trauma. Eligible clients are assessed by an Audiologist, who lodges a claim with the ACC. The client is then referred on to an ENT to make a diagnosis relating to the noise-induced hearing loss. If the claim is approved, the ACC will cover in full the cost of the appropriate devices.[96]
- **Environmental Support Services**
  Through these services, Accessable NZ and Enable NZ provide partial funding of devices for people who are in full-time study, full-time employment or are unemployed, but seeking work. Eligibility for this scheme is determined by a registered assessor and the processing of applications often encounters lengthy delays.[97]
- **War Pensions Scheme**
  Funding under this scheme is for eligible clients who have been exposed to noise rifle or artillery fire and have served in the armed services. Other criteria, such as receiving the war pension and associated disability, are also assessed. If their eligibility is approved, clients are referred to MNZAS assessment and fitting of hearing aids.[98]
- **Work and Income New Zealand**
  For individuals who are receiving benefits through Work and Income NZ, a loan of up to $1000 can be applied for to help with purchasing hearing devices. Repayments for the loan are gradually deducted from benefit payments.[99]

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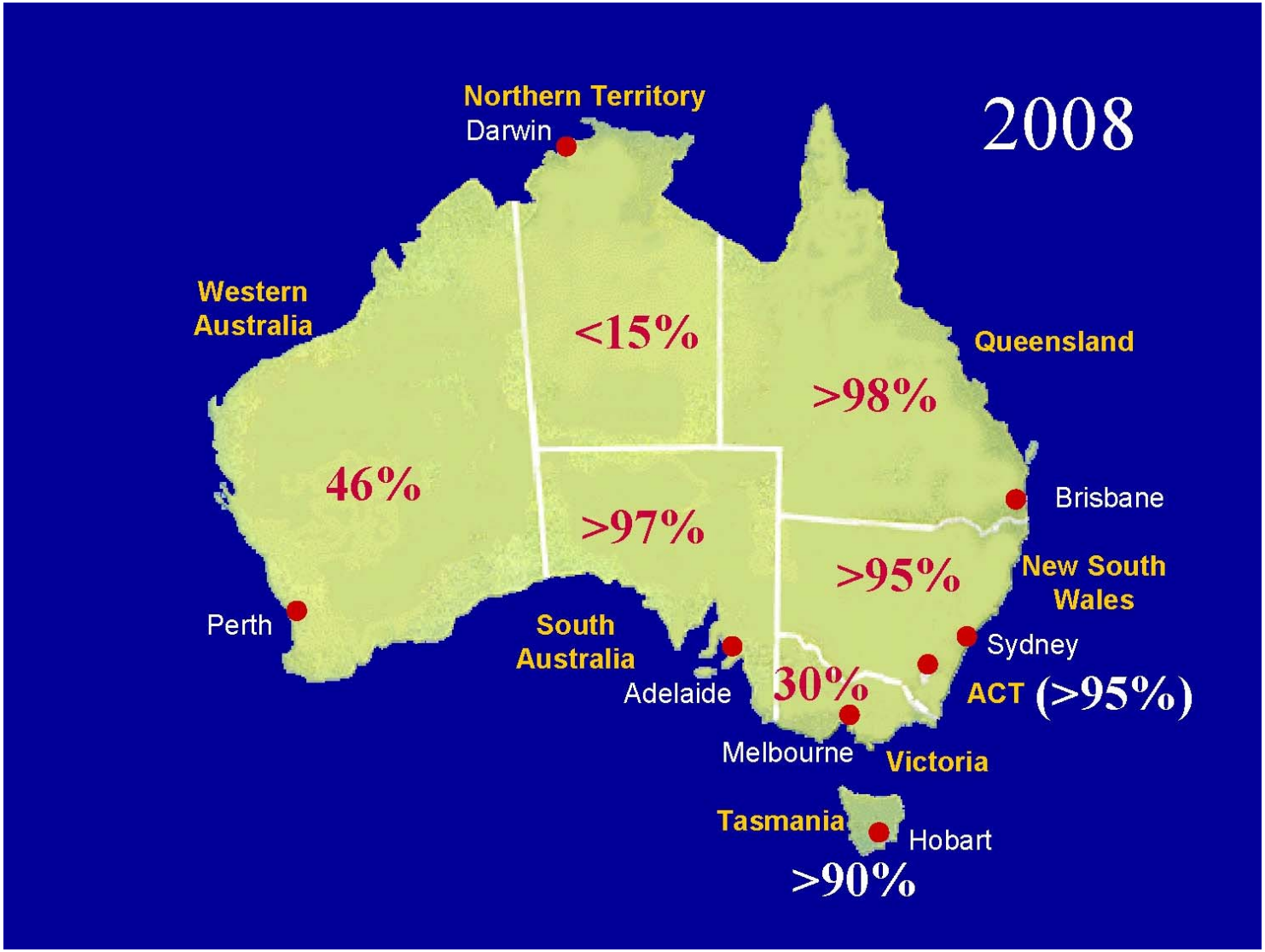
[93] Enable New Zealand – Disability Funding, *Hearing Aid Subsidy Processing Times*
[94] Enable New Zealand – Disability Funding, *Hearing Aid Subsidy Manual*
[95] New Zealand Audiological Society Audiologists, *Funding for Hearing Aids*
[96] *Ibid*.
[97] *Ibid*.
[98] *Ibid*.
[99] New Zealand Audiological Society Audiologists, *Funding for Hearing Aids*

APPENDIX E

Map of Neonatal Screening Coverage in Australia



APPENDIX F

Overview of State and Territory Neonatal Hearing Screening

NEWBORN HEARING SCREENING IN AUSTRALIA							
Jurisdiction	***Funding approved***	***Population Coverage – age range and % of babies offered screening***	***Capture Rate - % uptake among offered***	***Date Program Commenced and Location of Services***	***Information Systems***	***Staffing***	***Comments / Protocol***
NT	Whole of NT	Aim to cover entire NT newborn population Screen 34 w gestation and up to 6 months age		March 2008 at Royal Darwin Hospital		1x Project Officer	Recently commenced. AABR/AABR
QLD	Allocated full statewide screening $6.29 m per year	52,000 annual births 99.8% coverage of population Screen 34 w gestation and medically stable (?cut off age of baby)	98%	Phased implementation commenced 2004. Universal screening for all Qld babies in both public and private sectors since 2005/06	Trial version eSP installed	1 statewide coordinator 2 project officers 3 zonal officers ?local coordinators 6 family support coordinators	Highest statewide capture rate in Australia AABR/AABR Prevalence?
VIC	2006 for statewide screening	Currently covers 30% babies born in Vic Screen 34 w gestation and up to 6 months age	97.8%	Commenced 2005 to be expanded to cover all birth during current term of govt.	eSP	Senior PO And one other PO	Will roll out to all Vic 2008 AABR/AABR Prevalence 1.2 per 1000

APPENDIX F

Overview of State and Territory Neonatal Hearing Screening

NEWBORN HEARING SCREENING IN AUSTRALIA							
Jurisdiction	***Funding approved***	***Population Coverage – age range and % of babies offered screening***	***Capture Rate - % uptake among offered***	***Date Program Commenced and Location of Services***	***Information Systems***	***Staffing***	***Comments / Protocol***
TAS	July 2006 for staged implementation	1600 babies Gestation 34 w Not sure re age range of baby	93%	Commenced 2007 all 4 major Tas hospitals.	NK	Audiologist	Program not yet fully rolled out AABR/AABR Prevalence 2.25 per 1000
SA	Funding 2006 for staged implementation 16m over 4 years	Statewide – covers 90% Not suere gestation and age range	?		NK	Midwives perform screen CYH nurse follow up	Utilises dual technology TEOAE/AABR
NSW	$4m annually for Statewide Infant Screening for Hearing *SWISH* $24 million from commencement of the program.	Statewide Covers 98% approx 94,000 annual births (this has increased from 86,000 births since commencement of the program) Screen 34 w gestation and up to 6 months age	98%	Commenced 2002 Screening is undertaken at each birthing location in the state. This includes, Birthing Hospitals, Maternity Hospitals and Paediatric Hospitals. Screening is also undertaken within the community setting and in the home.		Each area has a SWISH coordinator 3 full time audiologists at 3 tertiary hospitals Each tertiary hospital has a part time paediatrician, and a part-time dedicated social worker	SWISH Program incorporates Audiology, medical, parent support, travel assistance Prevalence 0.9 per 1000 (significant bilateral hearing loss) Protocol AABR/AABR

APPENDIX F

Overview of State and Territory Neonatal Hearing Screening

NEWBORN HEARING SCREENING IN AUSTRALIA							
Jurisdiction	***Funding approved***	***Population Coverage – age range and % of babies offered screening***	***Capture Rate - % uptake among offered***	***Date Program Commenced and Location of Services***	***Information Systems***	***Staffing***	***Comments/Protocol***
WA	Public - $350k per annum $$ NGO User pays system - costs parents $70 per screen	Only 45% of WA newborns offered screening 34 week gestation and up to 12 weeks age range	98% of covered population in public sector 60% in Private sector	2 separate Programs **Public sector** coordinated by PMH NMAHS commenced **Private sector** provided by Telethon Speech and Hearing Commenced Feb 2000 Location Perth and Bunbury	Filemaker Pro Database for public sector Have developed own software		Limited to no access to non metro Funding does not extend to parent support, audiology, PATS does not cover audiology Dual technology TEOAE and AABR **Private** – single AABR protocol – reduces time from detection to diagnosis
ACT		Whole of Territory Screen 34 w gest age and up to 6 months					AABR/AABR

APPENDIX G

FREE-TO-CLIENT DEVICE SPECIFICATIONS

DEVICE TYPE	SPECIFICATIONS
BTE (C1) (OSPL90 >= 128 dBSPL) IEC RTF 1600 Hz	Minimum specifications and • Feedback cancellation
BTE (C2) (OSPL90 < 128 dBSPL) IEC RTF 1600 Hz	Minimum specifications and • Switchable or adaptive directional microphone • At least one form of adaptive noise reduction • Feedback cancellation • In addition to the above, at least one of the following: -Transient noise reduction -Autophone -Automatic or adaptive directional microphone -Automatic multi-memory -Automatic environmental adaptation -Wireless connectivity
OTE (C2 open ear BTE)	Minimum specifications and • Capillary tube (or RITC) and dome option • At least one form of adaptive noise reduction • Feedback cancellation • Capacity for 0dB gain below 800Hz • Capacity for OSPL90 =<103dBSPL at or below 800Hz • In addition to the above, at least one of the following: -Transient noise reduction -Autophone -Automatic or adaptive directional microphone -Automatic multi-memory -Automatic environmental adaptation -Wireless connectivity
Custom (ITE, ITC, CIC) (C3)	Minimum specifications and • At least one form of adaptive noise reduction • Feedback cancellation

APPENDIX H

TOP-UP DEVICE SPECIFICATIONS

DEVICE TYPE	SPECIFICATIONS
BTE (C1) (OSPL90 >= 128 dBSPL) IEC RTF 1600 Hz	Minimum specifications • Feedback cancellation and at least one of the following: -Transient noise reduction -Autophone -Automatic or adaptive directional microphone -Automatic multi-memory -Automatic environmental adaptation -Wireless connectivity - Multi-channel adaptive directional microphone - Super directional microphone - Frequency transposition/compression - Trainability/environmental learning - Bilateral processing/synchronisation
BTE (C2) (OSPL90 < 128 dBSPL) IEC RTF 1600 Hz	Minimum specifications and • Switchable or adaptive directional microphone • At least one form of adaptive noise reduction • Feedback cancellation • In addition to the above, at least two of the following: -Transient noise reduction -Autophone - Automatically switched directional microphone -Automatic multi-memory -Automatic environmental adaptation -Wireless connectivity - Multi-channel adaptive directional microphone - Super directional microphone - Frequency transposition/compression - Trainability/environmental learning - Bilateral processing/synchronisation
OTE (C2 open ear BTE)	Minimum specifications and • Capillary tube (or RITC) and dome option • At least one form of adaptive noise reduction • Feedback cancellation • Capacity for 0dB gain below 800Hz • Capacity for OSPL90 =<103dBSPL at or below 800Hz • In addition to the above, at least two of the following: -Transient noise reduction -Autophone -Automatically switched directional microphone -Automatic multi-memory -Automatic environmental adaptation -Wireless connectivity - Multi-channel adaptive directional microphone - Super directional microphone - Frequency transposition/compression - Trainability/environmental learning - Bilateral processing/synchronisation

APPENDIX H

Custom (ITE, ITC, CIC*) (C3)	Minimum specifications and • At least one form of adaptive noise reduction • Feedback cancellation And at least one of the following: -Transient noise reduction -Autophone -Switchable, automatic or adaptive directional microphone -Automatic multi-memory -Automatic environmental adaptation -Wireless connectivity - Multi-channel adaptive directional microphone - Super directional microphone - Frequency transposition/compression - Trainability/environmental learning - Bilateral processing/synchronisation

*CIC (Completely in the canal) devices only need to meet minimum specifications for custom devices.

APPENDIX H

Feature Definitions

FEATURE	DEFINITION
Adaptive noise reduction	A method of automatically changing the gain-frequency response, either quickly or slowly, in a manner dependent on the variation of SNR across frequency, and that causes the overall SNR to increase.
Feedback cancellation	A method of reducing feedback oscillation using the addition of a signal with identical gain and opposing phase response to cancel that feedback pathway
Transient noise reduction	A method of automatically changing gain, or gain-frequency response with extremely fast attack and recovery times designed to provide reduction of intense transient sounds in all SNR environments
Autophone	A feature whose functionality switches automatically to the telephone program as soon as a telephone is brought to the ear
Switchable directional microphone	A microphone that can change from directional to omni-directional either by fitter or user adjustment
Automatically switched directional microphone	A microphone that can change from directional to omni-directional automatically
Single-channel adaptive directional microphone	A directional microphone whose directivity pattern automatically varies so as to minimize sensitivity in the arrival direction of the dominant rearward sound source.
Multi-channel adaptive directional microphone	A directional microphone whose directivity pattern automatically varies so as to minimize sensitivity, independently in two or more frequency ranges, in the arrival direction of the dominant rearward sound within each frequency range.
Automatic multi-memory	Devices that automatically vary the processing strategy, including the gain/frequency response and available features, depending on the acoustic environment
Automatic environmental adaptation	A device whose output continually adapts to the environment by varying amplification parameters other than those associated with wide-dynamic range compression.
Wireless connectivity	The capacity of a device to facilitate wireless connectivity to external compatible devices
Super directional microphone	A directional microphone whose directivity index (the ratio of sensitivity for frontal sounds relative to all other directions) is greater than 6.0 dB
Frequency transposition/compression	The downward compressing and/or shifting of output frequencies into frequency regions more likely to be audible for clients with sloping hearing losses
Trainability/environmental learning	Devices that automatically adjust signal processing parameters to user preferences in different listening environments by applying user data over time
Bilateral processing/synchronisation	A wireless communication between two devices that enables the exchange of environmental information to synchronise automatic and user-controlled signal processing variables that affect the device output.

APPENDIX I

Current Hearing Loss by Financial Year and Severity in the Voucher Program

	Financial Year											
Normal HL	**98/99**	**99/00**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	***Total***
21-24								2	13	22	32	***69***
25-29				6	4	23	28	57	51	72	84	***325***
30-34	18	25	20	16	22	28	53	56	77	104	119	***538***
35-39	24	35	29	36	51	68	80	98	114	147	200	***882***
40-44	45	41	40	46	66	72	119	139	184	244	284	***1,280***
45-49	60	63	55	69	66	156	232	225	258	443	522	***2,149***
50-54	57	90	66	102	129	216	334	288	372	626	803	***3,083***
55-59	99	123	134	157	214	369	544	617	739	1,069	1,427	***5,492***
60-64	156	175	226	316	462	826	1,158	1,279	1,614	2,477	3,115	***11,804***
65-69	146	197	298	429	742	1,480	2,203	2,299	2,906	4,629	6,077	***21,406***
70-74	295	422	591	881	1,367	2,467	3,245	3,135	3,647	5,130	5,857	***27,037***
75-79	405	536	739	917	1,311	2,024	2,556	2,393	2,613	3,712	3,932	***21,138***
80-84	401	539	569	744	1,004	1,340	1,611	1,506	1,513	1,998	1,883	***13,108***
85-89	333	402	408	465	481	632	696	591	564	675	579	***5,826***
90-94	107	123	122	117	130	136	135	85	92	75	90	***1,212***
95+	34	24	18	23	26	25	59	32	14	11	16	***282***
Normal Total	**2,180**	**2,795**	**3,315**	**4,324**	**6,075**	**9,862**	**13,053**	**12,802**	**14,771**	**21,434**	**25,020**	***115,631***
Mild HL	**98/99**	**99/00**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	***Total***
21-24								7	7	29	45	***88***
25-29				1	7	15	29	36	52	78	84	***302***
30-34	9	13	14	10	19	32	37	49	65	96	107	***451***
35-39	20	20	21	23	32	45	73	75	106	154	164	***733***
40-44	27	27	33	40	48	56	104	134	156	238	292	***1,155***
45-49	31	32	45	57	52	95	181	214	289	476	545	***2,017***
50-54	48	48	63	77	115	171	273	381	519	820	1,051	***3,566***
55-59	74	87	117	160	207	368	551	802	1,082	1,670	2,165	***7,283***
60-64	170	215	256	327	602	936	1,386	2,083	2,875	4,494	5,812	***19,156***
65-69	179	252	389	602	1,049	1,829	2,891	4,331	5,916	10,135	12,395	***39,968***
70-74	369	572	839	1,306	2,084	3,425	5,245	7,007	8,917	14,113	16,546	***60,423***
75-79	663	975	1,192	1,779	2,599	3,842	5,586	7,826	9,964	15,602	17,156	***67,184***
80-84	1,010	1,426	1,561	2,155	2,968	4,196	5,853	7,830	9,356	13,960	14,114	***64,429***
85-89	1,681	1,942	2,078	2,405	2,952	3,539	4,493	5,484	5,977	8,238	7,495	***46,284***
90-94	1,047	1,116	1,063	1,213	1,249	1,505	1,758	1,857	1,905	2,093	1,774	***16,580***
95+	443	463	404	402	393	435	509	503	399	350	286	***4,587***
Mild Total	**5,771**	**7,188**	**8,075**	**10,557**	**14,376**	**20,489**	**28,969**	**38,619**	**47,585**	**72,546**	**80,031**	***334,206***
Moderate HL	**98/99**	**99/00**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	***Total***
21-24								7	12	38	46	***103***
25-29				2	7	7	11	33	57	77	77	***271***
30-34	4	3	6	8	8	17	27	34	57	78	99	***341***
35-39	8	17	14	15	18	33	35	58	103	162	135	***598***
40-44	20	15	21	20	33	42	61	80	156	203	228	***879***
45-49	26	29	26	34	41	60	93	139	192	347	380	***1,367***
50-54	26	37	22	43	65	98	138	220	293	509	551	***2,002***
55-59	34	68	59	59	96	162	244	388	540	975	1,066	***3,691***
60-64	55	104	128	159	217	355	506	822	1,379	2,180	2,834	***8,739***
65-69	91	131	156	280	374	627	1,068	1,816	2,718	5,104	6,330	***18,695***
70-74	157	267	315	504	783	1,219	1,940	3,179	4,415	8,407	9,758	***30,944***
75-79	317	391	513	705	995	1,551	2,579	4,404	6,357	11,821	13,728	***43,361***
80-84	551	758	883	1,222	1,642	2,380	3,806	6,211	8,641	15,361	16,856	***58,311***

APPENDIX I

Current Hearing Loss by Financial Year and Severity in the Voucher Program

85-89	1,273	1,543	1,670	2,072	2,536	3,307	4,677	6,879	8,945	13,964	14,372	***61,238***
90-94	1,199	1,426	1,398	1,676	1,959	2,399	3,098	4,286	4,818	6,415	6,084	***34,758***
95+	1,003	1,110	1,020	1,113	1,132	1,338	1,592	1,974	1,834	1,943	1,601	***15,660***
Moderate Total	**4,764**	**5,899**	**6,231**	**7,912**	**9,906**	**13,595**	**19,875**	**30,530**	**40,517**	**67,584**	**74,145**	***280,958***

Serious HL	**98/99**	**99/00**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	***Total***
21-24								4	16	37	38	***95***
25-29			1	2	2	7	20	20	42	61	52	***207***
30-34		4	8	6	14	10	14	30	46	73	73	***278***
35-39	6	9	12	7	13	18	28	45	81	109	134	***462***
40-44	21	17	15	15	22	24	43	64	103	158	151	***633***
45-49	14	13	14	15	19	44	62	91	152	263	273	***960***
50-54	18	28	25	27	35	53	79	138	208	354	369	***1,334***
55-59	15	27	34	46	64	74	134	171	359	547	634	***2,105***
60-64	36	49	57	71	108	163	242	432	678	1,148	1,388	***4,372***
65-69	53	61	74	129	178	282	484	745	1,294	2,439	2,681	***8,420***
70-74	85	138	149	210	317	437	736	1,246	1,861	3,357	3,840	***12,376***
75-79	123	161	220	266	366	597	958	1,586	2,466	4,612	5,087	***16,442***
80-84	243	326	342	461	615	884	1,313	2,179	3,354	6,048	6,404	***22,169***
85-89	530	657	685	746	863	1,224	1,710	2,536	3,625	5,910	6,242	***24,728***
90-94	509	568	551	668	749	942	1,264	1,823	2,264	3,107	3,199	***15,644***
95+	565	548	484	526	559	662	828	1,099	1,273	1,432	1,179	***9,155***
Serious Total	**2,218**	**2,606**	**2,671**	**3,195**	**3,924**	**5,421**	**7,915**	**12,209**	**17,822**	**29,655**	**31,744**	***119,380***
Profound HL	**98/99**	**99/00**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	**Total**
21-24								3	19	56	58	***136***
25-29				3	5	17	28	33	88	80	77	***331***
30-34	2	6	12	13	10	19	10	27	80	95	71	***345***
35-39	20	15	14	15	22	13	22	29	87	126	82	***445***
40-44	12	24	35	17	21	23	31	37	127	166	126	***619***
45-49	20	27	29	21	21	31	41	47	150	188	154	***729***
50-54	15	15	18	19	34	27	43	75	161	179	187	***773***
55-59	21	24	30	26	38	46	77	88	234	274	269	***1,127***
60-64	29	30	31	35	58	79	103	147	334	500	511	***1,857***
65-69	35	37	59	46	95	122	219	329	657	993	983	***3,575***
70-74	56	65	69	93	140	192	269	450	814	1,262	1,353	***4,763***
75-79	78	103	93	113	149	196	364	544	978	1,583	1,594	***5,795***
80-84	127	125	149	165	222	302	454	744	1,369	2,074	1,988	***7,719***
85-89	236	249	231	278	304	397	518	796	1,438	1,889	1,775	***8,111***
90-94	183	243	198	196	215	269	351	463	811	962	829	***4,720***
95+	170	180	154	150	145	173	215	301	393	374	287	***2,542***
Profound Total	**1,004**	**1,143**	**1,122**	**1,190**	**1,479**	**1,906**	**2,745**	**4,113**	**7,740**	**10,801**	**10,344**	***43,587***
Grand Total	**98/99**	**99/00**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	***Grand Total***
21-24	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**23**	**67**	**182**	**219**	***491***
25-29	**-**	**-**	**1**	**14**	**25**	**69**	**116**	**179**	**290**	**368**	**374**	***1,436***
30-34	**33**	**51**	**60**	**53**	**73**	**106**	**141**	**196**	**325**	**446**	**469**	***1,953***
35-39	**78**	**96**	**90**	**96**	**136**	**177**	**238**	**305**	**491**	**698**	**715**	***3,120***
40-44	**125**	**124**	**144**	**138**	**190**	**217**	**358**	**454**	**726**	**1,009**	**1,081**	***4,566***
45-49	**151**	**164**	**169**	**196**	**199**	**386**	**609**	**716**	**1,041**	**1,717**	**1,874**	***7,222***
50-54	**164**	**218**	**194**	**268**	**378**	**565**	**867**	**1,102**	**1,553**	**2,488**	**2,961**	***10,758***
55-59	**243**	**329**	**374**	**448**	**619**	**1,019**	**1,550**	**2,066**	**2,954**	**4,535**	**5,561**	***19,698***

APPENDIX I

Current Hearing Loss by Financial Year and Severity in the Voucher Program

60-64	**446**	**573**	**698**	**908**	**1,447**	**2,359**	**3,395**	**4,763**	**6,880**	**10,799**	**13,660**	***45,928***
65-69	**504**	**678**	**976**	**1,486**	**2,438**	**4,340**	**6,865**	**9,520**	**13,491**	**23,300**	**28,466**	***92,064***
70-74	**962**	**1,464**	**1,963**	**2,994**	**4,691**	**7,740**	**11,435**	**15,017**	**19,654**	**32,269**	**37,354**	***135,543***
75-79	**1,586**	**2,166**	**2,757**	**3,780**	**5,420**	**8,210**	**12,043**	**16,753**	**22,378**	**37,330**	**41,497**	***153,920***
80-84	**2,332**	**3,174**	**3,504**	**4,747**	**6,451**	**9,102**	**13,037**	**18,470**	**24,233**	**39,441**	**41,245**	***165,736***
85-89	**4,053**	**4,793**	**5,072**	**5,966**	**7,136**	**9,099**	**12,094**	**16,286**	**20,549**	**30,676**	**30,463**	***146,187***
90-94	**3,045**	**3,476**	**3,332**	**3,870**	**4,302**	**5,251**	**6,606**	**8,514**	**9,890**	**12,652**	**11,976**	***72,914***
95+	**2,215**	**2,325**	**2,080**	**2,214**	**2,255**	**2,633**	**3,203**	**3,909**	**3,913**	**4,110**	**3,369**	***32,226***
Total	**15,937**	**19,631**	**21,414**	**27,178**	**35,760**	**51,273**	**72,557**	**98,273**	**128,435**	**202,020**	**221,284**	***893,762***

APPENDIX J

Geographical Distribution of Voucher Clients by ABS Statistical Subdivision

State	Statistical Subdivision Code	Statistical Subdivision Name[1]	Number of OHS Clients[2]	ABS Population (June 2007)[3]	Clients as % of Population
NSW	10505	Inner Sydney	9,560	336,258	2.8%
NSW	10510	Eastern Suburbs	9,019	246,906	3.7%
NSW	10515	St George-Sutherland	26,822	444,283	6.0%
NSW	10520	Canterbury-Bankstown	20,882	317,027	6.6%
NSW	10525	Fairfield-Liverpool	17,878	361,462	4.9%
NSW	10530	Outer South Western Sydney	8,043	241,608	3.3%
NSW	10535	Inner Western Sydney	8,263	179,695	4.6%
NSW	10540	Central Western Sydney	18,486	324,032	5.7%
NSW	10545	Outer Western Sydney	13,909	316,543	4.4%
NSW	10553	Blacktown	12,651	285,564	4.4%
NSW	10555	Lower Northern Sydney	13,098	306,113	4.3%
NSW	10560	Central Northern Sydney	16,231	430,808	3.8%
NSW	10565	Northern Beaches	10,402	237,338	4.4%
NSW	10570	Gosford-Wyong	21,213	306,383	6.9%
NSW	11005	Newcastle	34,414	523,680	6.6%
NSW	11010	Hunter SD Bal	7,656	100,719	7.6%
NSW	11505	Wollongong	15,906	280,173	5.7%
NSW	11507	Nowra-Bomaderry	2,549	32,678	7.8%
NSW	11510	Illawarra SD Bal	8,146	105,211	7.7%
NSW	12005	Tweed Heads & Tweed Coast	7,562	63,304	11.9%
NSW	12007	Lismore	2,086	31,788	6.6%
NSW	12010	Richmond-Tweed SD Bal	9,288	137,981	6.7%
NSW	12501	Coffs Harbour	4,269	50,595	8.4%
NSW	12503	Port Macquarie	4,834	41,944	11.5%
NSW	12505	Clarence (excl. Coffs Harbour)	8,440	100,645	8.4%
NSW	12510	Hastings (excl. Port Macquarie)	9,232	106,664	8.7%
NSW	13005	Tamworth	2,658	45,016	5.9%
NSW	13010	Northern Slopes (excl. Tamworth)	2,520	41,638	6.1%
NSW	13015	Northern Tablelands	3,535	65,887	5.4%
NSW	13020	North Central Plain	1,032	27,956	3.7%
NSW	13501	Dubbo	2,049	36,251	5.7%
NSW	13505	Central Macquarie (excl. Dubbo)	3,066	52,142	5.9%
NSW	13510	Macquarie-Barwon	820	17,291	4.7%
NSW	13515	Upper Darling	285	10,288	2.8%
NSW	14003	Bathurst	1,810	32,396	5.6%
NSW	14007	Central Tablelands (excl. Bathurst & Orange)	3,105	54,648	5.7%
NSW	14015	Lachlan	3,365	54,493	6.2%
NSW	14020	Orange	2,444	37,433	6.5%
NSW	14505	Queanbeyan	1,406	48,705	2.9%
NSW	14510	Southern Tablelands (excl. Queanbeyan)	3,909	70,800	5.5%
NSW	14515	Lower South Coast	5,944	69,464	8.6%
NSW	14520	Snowy	888	20,522	4.3%
NSW	15005	Wagga Wagga	2,795	55,889	5.0%
NSW	15010	Central Murrumbidgee (excl. Wagga Wagga)	3,401	53,014	6.4%
NSW	15015	Lower Murrumbidgee	1,891	45,653	4.1%
NSW	15505	Albury	3,535	52,817	6.7%
NSW	15510	Upper Murray (excl. Albury)	1,878	22,958	8.2%
NSW	15515	Central Murray	1,976	30,872	6.4%
NSW	15520	Murray-Darling	482	9,644	5.0%
NSW	16010	Far West	1,793	22,835	7.9%
		NEW SOUTH WALES TOTAL	***377,426***	***6,888,014***	***5.5%***

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VIC	20505	Inner Melbourne	9,282	296,111	3.1%
VIC	20510	Western Melbourne	25,829	443,652	5.8%
VIC	20520	Melton-Wyndham	7,036	209,704	3.4%
VIC	20525	Moreland City	11,627	144,033	8.1%
VIC	20530	Northern Middle Melbourne	18,364	255,320	7.2%
VIC	20535	Hume City	7,046	157,834	4.5%
VIC	20540	Northern Outer Melbourne	7,050	195,921	3.6%
VIC	20545	Boroondara City	6,565	162,866	4.0%
VIC	20550	Eastern Middle Melbourne	29,109	437,937	6.6%
VIC	20555	Eastern Outer Melbourne	15,349	255,617	6.0%
VIC	20560	Yarra Ranges Shire Part A	8,002	144,880	5.5%
VIC	20565	Southern Melbourne	26,955	412,910	6.5%
VIC	20575	Greater Dandenong City	9,761	132,917	7.3%
VIC	20580	South Eastern Outer Melbourne	11,179	290,347	3.9%
VIC	20585	Frankston City	7,616	123,127	6.2%
VIC	20590	Mornington Peninsula Shire	11,306	142,579	7.9%
VIC	21005	Greater Geelong City Part A	10,735	169,502	6.3%
VIC	21010	East Barwon	4,318	62,297	6.9%
VIC	21015	West Barwon	3,313	41,590	8.0%
VIC	21501	Warrnambool City	2,126	32,152	6.6%
VIC	21505	Hopkins	2,007	33,327	6.0%
VIC	21510	Glenelg	2,411	37,977	6.3%
VIC	22005	Ballarat City	6,587	89,703	7.3%
VIC	22010	East Central Highlands	2,360	41,134	5.7%
VIC	22015	West Central Highlands	1,492	18,460	8.1%
VIC	22505	South Wimmera	2,408	36,309	6.6%
VIC	22510	North Wimmera	1,154	13,888	8.3%
VIC	23005	Mildura Rural City Part A	3,005	48,488	6.2%
VIC	23010	West Mallee	725	10,927	6.6%
VIC	23015	East Mallee	2,133	33,188	6.4%
VIC	23505	Greater Bendigo City Part A	6,686	86,330	7.7%
VIC	23510	North Loddon	4,080	50,441	8.1%
VIC	23520	South Loddon	1,648	40,307	4.1%
VIC	24005	Greater Shepparton City Part A	2,521	46,884	5.4%
VIC	24010	North Goulburn	5,446	79,191	6.9%
VIC	24015	South Goulburn	2,224	31,595	7.0%
VIC	24020	South West Goulburn	2,202	46,976	4.7%
VIC	24505	Wodonga	2,845	48,699	5.8%
VIC	24510	West Ovens-Murray	2,113	31,417	6.7%
VIC	24515	East Ovens-Murray	1,138	16,681	6.8%
VIC	25005	East Gippsland Shire	3,375	41,993	8.0%
VIC	25015	Wellington Shire	2,599	41,946	6.2%
VIC	25505	La Trobe Valley	5,227	77,244	6.8%
VIC	25510	West Gippsland	2,056	35,432	5.8%
VIC	25520	South Gippsland	4,414	54,993	8.0%
		VICTORIA TOTAL	***305,424***	***5,204,826***	***5.9%***
QLD	30501	Inner Brisbane	3,069	90,989	3.4%
QLD	30503	Northwest Inner Brisbane	8,305	184,652	4.5%
QLD	30507	Northwest Outer Brisbane	19,115	330,486	5.8%
QLD	30509	Southeast Inner Brisbane	8,461	158,319	5.3%
QLD	30511	Southeast Outer Brisbane	13,099	242,530	5.4%
QLD	30515	Beaudesert Shire Part A	1,108	43,248	2.6%
QLD	30520	Caboolture Shire	9,267	139,803	6.6%
QLD	30525	Ipswich City	7,664	148,806	5.2%
QLD	30530	Logan City	9,087	180,650	5.0%
QLD	30540	Pine Rivers Shire	5,448	150,348	3.6%

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QLD	30545	Redcliffe City	5,654	53,533	10.6%
QLD	30550	Redland Shire	8,081	133,602	6.0%
QLD	30705	Gold Coast North	3,275	57,694	5.7%
QLD	30710	Gold Coast East	13,996	190,463	7.3%
QLD	30715	Gold Coast West	11,120	272,222	4.1%
QLD	30720	Gold Coast SD Bal	640	15,240	4.2%
QLD	30905	Sunshine Coast	17,056	230,366	7.4%
QLD	30910	Sunshine Coast SD Bal	4,568	72,650	6.3%
QLD	31205	Upper West Moreton	1,572	20,015	7.9%
QLD	31210	Lower West Moreton	2,904	54,280	5.4%
QLD	31505	Bundaberg	5,707	64,798	8.8%
QLD	31507	Hervey Bay City Part A	5,836	53,365	10.9%
QLD	31510	Wide Bay-Burnett SD Bal	11,533	157,781	7.3%
QLD	32001	Toowoomba	7,119	123,376	5.8%
QLD	32005	Darling Downs SD Bal	5,857	105,948	5.5%
QLD	32505	South West	1,140	26,119	4.4%
QLD	33005	Rockhampton	4,137	74,441	5.6%
QLD	33010	Gladstone	1,226	47,097	2.6%
QLD	33015	Fitzroy SD Bal	3,532	82,776	4.3%
QLD	33505	Central West	349	11,394	3.1%
QLD	34005	Mackay City Part A	2,826	79,153	3.6%
QLD	34010	Mackay SD Bal	2,623	83,907	3.1%
QLD	34505	Townsville City Part A	4,241	99,924	4.2%
QLD	34510	Thuringowa City Part A	1,632	57,554	2.8%
QLD	34515	Northern SD Bal	2,693	57,140	4.7%
QLD	35005	Cairns City Part A	4,062	135,930	3.0%
QLD	35010	Far North SD Bal	4,911	117,496	4.2%
QLD	35505	North West	573	33,336	1.7%
		QUEENSLAND TOTAL	***223,486***	***4,181,431***	***5.3%***
SA	40505	Northern Adelaide	24,166	370,920	6.5%
SA	40510	Western Adelaide	20,217	214,106	9.4%
SA	40515	Eastern Adelaide	15,035	235,015	6.4%
SA	40520	Southern Adelaide	25,764	337,920	7.6%
SA	41005	Barossa	3,197	43,249	7.4%
SA	41010	Kangaroo Island	217	4,479	4.8%
SA	41015	Mt Lofty Ranges	1,855	44,362	4.2%
SA	41020	Fleurieu	2,399	39,221	6.1%
SA	41505	Yorke	2,559	26,391	9.7%
SA	41510	Lower North	1,171	19,491	6.0%
SA	42005	Riverland	2,697	41,837	6.4%
SA	42010	Murray Mallee	2,185	27,930	7.8%
SA	42505	Upper South East	933	19,401	4.8%
SA	42510	Lower South East	2,466	45,431	5.4%
SA	43005	Lincoln	1,847	28,581	6.5%
SA	43010	West Coast	267	6,379	4.2%
SA	43505	Whyalla	1,070	22,777	4.7%
SA	43515	Pirie	878	25,961	3.4%
SA	43520	Flinders Ranges	1,116	20,303	5.5%
SA	43525	Far North	106	10,443	1.0%
		SOUTH AUSTRALIA TOTAL	***110,145***	***1,584,197***	***7.0%***
WA	50505	Central Metropolitan	5,517	135,626	4.1%
WA	50510	East Metropolitan	12,761	263,339	4.8%
WA	50515	North Metropolitan	21,386	472,701	4.5%
WA	50520	South West Metropolitan	17,277	330,501	5.2%
WA	50525	South East Metropolitan	16,897	351,958	4.8%
WA	51001	Mandurah	5,117	74,419	6.9%

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Geographical Distribution of Voucher Clients by ABS Statistical Subdivision

WA	51003	Bunbury	2,500	60,509	4.1%
WA	51010	Preston	2,049	35,183	5.8%
WA	51015	Vasse	1,790	39,373	4.5%
WA	51020	Blackwood	706	16,956	4.2%
WA	51505	Pallinup	344	11,476	3.0%
WA	51510	King	891	44,795	2.0%
WA	52005	Hotham	506	14,152	3.6%
WA	52010	Lakes	89	4,634	1.9%
WA	52505	Moore	557	15,120	3.7%
WA	52510	Avon	1,222	28,317	4.3%
WA	52515	Campion	356	10,288	3.5%
WA	53001	Kalgoorlie/Boulder City Part A	396	30,646	1.3%
WA	53005	Lefroy	325	8,372	3.9%
WA	53010	Johnston	628	17,571	3.6%
WA	53503	Geraldton	1,485	34,293	4.3%
WA	53505	Gascoyne	171	9,492	1.8%
WA	53510	Carnegie	47	3,471	1.4%
WA	53515	Greenough River	568	14,743	3.9%
WA	54005	De Grey	51	20,278	0.3%
WA	54010	Fortescue	140	24,748	0.6%
WA	54505	Ord	73	10,851	0.7%
WA	54510	Fitzroy	187	22,307	0.8%
		WESTERN AUSTRALIA TOTAL	***94,036***	***2,106,119***	***4.5%***
TAS	60505	Greater Hobart	12,558	207,399	6.1%
TAS	61005	Southern	2,136	36,421	5.9%
TAS	61505	Greater Launceston	6,624	104,110	6.4%
TAS	61510	Central North	1,938	20,998	9.2%
TAS	61515	North Eastern	1,110	14,358	7.7%
TAS	62005	Burnie-Devonport	5,903	80,254	7.4%
TAS	62010	North Western Rural	973	24,647	3.9%
TAS	62015	Lyell	240	5,184	4.6%
		TASMANIA TOTAL	***31,482***	***493,371***	***6.4%***
NT	70505	Darwin City	1,513	72,859	2.1%
NT	70510	Palmerston-East Arm	556	27,145	2.0%
NT	70520	Litchfield Shire	292	17,395	1.7%
NT	71005	Finniss	41	2,214	1.9%
NT	71010	Bathurst-Melville	23	2,501	0.9%
NT	71015	Alligator	147	6,913	2.1%
NT	71020	Daly	16	4,353	0.4%
NT	71025	East Arnhem	20	16,077	0.1%
NT	71030	Lower Top End NT	213	18,894	1.1%
NT	71035	Barkly	95	6,279	1.5%
NT	71040	Central NT	766	40,299	1.9%
		NORTHERN TERRITORY TOTAL	***3,682***	***214,929***	***1.7%***
ACT	80505	North Canberra	1,993	45,053	4.4%
ACT	80510	Belconnen	2,885	88,420	3.3%
ACT	80515	Woden Valley	1,440	33,187	4.3%
ACT	80520	Weston Creek-Stromlo	952	22,909	4.2%
ACT	80525	Tuggeranong	2,005	89,730	2.2%
ACT	80535	South Canberra	1,238	25,205	4.9%
ACT	80540	Gungahlin-Hall	725	34,970	2.1%
ACT	81005	Australian Capital Territory - Bal + Other Territories[4]	462	2,654	17.4%
		AUSTRALIAN CAPITAL TERRITORY TOTAL	***11,700***	***342,128***	***3.4%***
Unallocated[5]			17,179		

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Geographical Distribution of Voucher Clients by ABS Statistical Subdivision

TOTAL		**AUSTRALIA**	**1,174,560**	**21,015,015**	**5.6%**

Notes:

1. Statistical Subdivisions (SSDs) are from the 2006 version of the Australian Standard Geographic Classification (ASGC 2006).
2. Clients are allocated to SSDs using the latitude/longitude of the client's address. These coordinates are understood to be associated with the location of suburbs and/or postcodes.
3. Populations are ABS Estimated Resident Populations for June 2007.
4. Clients in the Other Territories SSD have been combined with ACT Balance due to their small size.
5. Clients in the unallocated category had an address which could not be matched to Statistical Sub-Division.

Source: OHS unpublished data, ABS ASGC 2006 (cat. No. 1216.0), ABS June 2007 ERP.

REFERENCES

Access Economics, 2006, *Listen Hear! The Economic Impact and Cost of Hearing Loss in Australia*.

Anand, A, Boswell, J, Burton, C, Hayhurst, B, Harkus, S, Leidwinger, L, McCulloch, R, Meiklejohn, K, Page, S, Scott, J, Weeks, S, Yonovitz, L and Yonovitz, A, 2001, *General Guidelines for Audiological Practice with Indigenous Australians*, Audiological Society of Australia, Victoria.

Audiology Online, 2002, *VA Hearing Aid Benefits*, retrieved 2 October 2009, <http://www.audiologyonline.com/askexpert/display_question.asp?question_id=87>.

Australian Academy of Science, 2009, *Cochlear Implants – Wiring for Sound*, retrieved 8 September 2009, <http://www.science.org.au/nova/029/029box01.htm>.

Australian Bureau of Statistics, Consumer Price Index, retrieved 6 October 2009, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/6401.0Main%20Features1Jun%202009?opendocument&tabname=Summary&prodno=6401.0&issue=Jun%202009&num=&view=>

Australian Bureau of Statistics, Population Projections, retrieved 6 October 2009, <http://www.abs.gov.au/Ausstats/abs@.nsf/mf/3222.0>

Australian Hearing, 2003, *Causes of Hearing Loss Information Sheet*.

Australian Hearing (Unknown) *Noise Destroys Your Hearing: How much noise can cause permanent damage*, retrieved 30 September 2009, < http://www.hearing.com.au/digitalAssets/9493_1254446207788_NFR-1983-Noise-Destroys-your-hearing.pdf>.

Australian Institute of Health and Welfare, 2008, *Australia's Health*.

Australian Institute of Health and Welfare, 2009, *Health Expenditure Australia 2007-08*, retrieved 6 October 2009, < http://www.aihw.gov.au/publications/index.cfm/title/10954>.

Australian Safety and Compensation Council, 2006, *Report on Indicators for Occupational Disease*.

Australian Safety and Compensation Council, 2006, *Work-related Noise Induced Hearing Loss in Australia*.

Australian Safety and Compensation Council, 2008, *Occupational Disease Indicators*.

Cochlear Ltd, 2009, Unpublished Data.

Couzos, S, and Murray, M, 2008, *Aboriginal Primary Health Care - An Evidence Based Approach Third Edition*, Oxford University Press, USA.

Dahl, H, Wake, M, Sarant, J, Poulakis, Z, Siemering, K & Blamey, P, 2003, 'Language and Speech Perception Outcomes in Hearing-Impaired Children With and Without Connexin 26 Mutations', *Audiology & Neuro-Otology*, vol. 8, no. 5, pp. 263-8.

Danielson, R, 1998, *VA Hearing Aid Initiative*, Military Audiology Association, retrieved 2 October 2009, <http://militaryaudiology.org/site/1998/07/va-hearing-aid-initiative/>.

Deaf Services Queensland, 2007, *Understanding Deafness*, retrieved 1 October 2009, <http://www.deafservicesqld.org.au/understanding/deafculture.html>.

Deafness and Mental Health Service, 2008, *Deafness & Mental Health: Guidelines for Working with People Who Are Deaf or Hard of Hearing*, Princess Alexandra Hospital, Division of Mental Health, Brisbane.

Deafness Forum, 2009, *Hearing Awareness Week 2009*, retrieved 29 September 2009, <http://www.hearingawarenessweek.org.au>.

Department of Health and Ageing, 2008, *2007-08 Service Activity Report (SAR),* Commonwealth of Australia, Canberra.

Department of Health and Ageing, 2008, *Aboriginal and Torres Strait Islander Health Performance Framework 2008 Report,* Commonwealth of Australia, Canberra.

Department of Health and Ageing, 2008, *Information for Providers: Clients with Complex Needs*, Commonwealth of Australia, Canberra. (see footnote 33 and 34)

Department of Health and Ageing, Medicare Benefits Online <http://www.mbsonline.gov.au/>/

Department of Health and Ageing, 1989, *National Aboriginal Health Strategy*, Commonwealth of Australia, Canberra

Department of Health and Ageing, 2009, *Portfolio Budget Statement*, Commonwealth of Australia, Canberra.

Department of Health and Ageing, 2009, *Part A Prostheses List: August 2009*, retrieved 6 October 2009, <http://www.health.gov.au/internet/main/publishing.nsf/Content/BD94DFD828DDFA6BCA2575EF000F806A/$File/ProsthesisList.pdf>.

Department of Health and Ageing, 2002, *Report on Commonwealth Funded Hearing Services to Aboriginal and Torres Strait Islander Peoples - Strategies for Future Action*, Commonwealth of Australia, Canberra.

Department of Health and Ageing, 2003, *Workplan for future actions in ear and hearing health*, Commonwealth of Australia, Canberra.

Department of Innovation, Industry, Science and Research, 2009, *Cooperative Research Centres,* <https://www.crc.gov.au/Information/ShowInformation.aspx?Doc=about_programme&key=bulletin-board-programme&Heading=The%20Program> , retrieved 1 October 2009.

Dewberry, M, 2009, Personal Communication.

Dillon, H, 2001, *Hearing Aids*, Boomerang Press, Sydney.

Enable New Zealand – Disability Funding, *Hearing Aid Subsidy Manual,* New Zealand Ministry of Health, retrieved 2 October 2009, <http://www.disabilityfunding.co.nz/hearing-aids/hearing-aid-subsidy/hearing-aid-subsidy-manual>.

Enable New Zealand – Disability Funding, *Hearing Aid Subsidy Processing Times,* New Zealand Ministry of Health, retrieved 2 October 2009, <http://www.disabilityfunding.co.nz/hearing-aids/hearing-aid-subsidy-prcessinng-times>.

English, P, 2007, *Eligibility for NHS Treatment for Overseas Visitors, and Citizens of Other Countries*, Health Protection Agency, retrieved 2 October 2009, <http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1194947353623>.

Goulios, H, and Patuzzi, RB, 2007, *Australian Audiology Workforce 2006*, School of Biomedical, Bimolecular and Chemical Sciences, University of Western Australia.

HEARing CRC, 2009, *Objectives* and *Research*, < http://www.hearingcrc.org/>, retrieved 1 October 2009.

Kennedy, CR, McCann, DC, Campbell, MJ, Law, CM, Mullee, M, Petrou, S, Watkin, P, Worsfold, S, Ming Yuen, H & Stevenson, J, 2006, 'Language ability after early detection of permanent childhood hearing impairment', *New England Journal of Medicine*, vol. 354, no. 20, pp. 2131–41.

Leach, M, and Morris, P, 2008, *Management of Otitis Media in Populations with Limited Health Care*, Menzies School of Health Research, Darwin (unpublished)

Morris, P, Ballinger, D, Leach A, et al, 2001, *Recommendations for clinical care guidelines on the management of otitis media in Aboriginal and Torres Strait Islander populations,* Commonwealth Department of Health and Ageing, Canberra.

Mulrow CD, Tuley, MR & Aguilar, C, 1992, 'Sustained benefits of Hearing Aids', *Journal of Speech and Hearing Research*, vol. 35, no 6, pp. 1401-1405.

National Acoustics Laboratories, 2009, *Research News from the National Acoustics Laboratories July 2009*, accessed 29 September 2009, <http://www.nal.gov.au/Publications/NewsLetter/Research%20News%20July%202009.pdf>.

National Health and Medical Research Council (NHMRC), 2008, *The Hearing Related Issues Dataset*, retrieved 1 October 2009, <http://www.nhmrc.gov.au/grants/dataset/issues/hearing.php>.

National Health Service, *About the NHS*, retrieved 2 October 2009, <http://www.nhs.uk/NHSEngland/aboutnhs/Pages/About.aspx>.

National Health Service, *Guide to Waiting Times*, retrieved 2 October 2009,

<http://www.nhs.uk/choiceintheNHS/Rightsandpledges/Waitingtimes/Pages/Guide%20to%20waiting%20times.aspx>.

National Health Service, 2009, *How do I get a Hearing Aid Through the NHS*, retrieved 2 October 2009,
< http://www.nhs.uk/chq/Pages/894.aspx>.

New Zealand Audiological Society Audiologists, *Funding for Hearing Aids*, retrieved 2 October 2009,
<http://www.audiology.org.nz/Public/HearingAidFunding.aspx>.

Office of Hearing Services, 2009, *Unpublished Program Data*, Department of Health and Ageing, Canberra.

Office of Hearing Services, 2009, *Unpublished Program Figures*, Department of Health and Ageing, Canberra

Powerhouse Museum, *The Cochlear Implant*, NSW Department of Arts, Sport and Recreation, retrieved 10 September 2009,
<http://www.powerhousemuseum.com/hsc/cochlear/the_cochlear.htm>.

Private Health Insurance Administration Council, 2008, *Annual Report*, Commonwealth of Australia, Canberra.

Royal National Institute for Deaf People, *Buying a Hearing Aid Privately*, retrieved 2 October 2009,
<http://www.rnid.org.uk/information_resources/hearing_aids/buying_a_hearing_aid_privately/

Royal National Institute for Deaf People, *NHS Hearing Aid Service*, retrieved 2 October 2009,
<http://www.rnid.org.uk/information_resources/factsheets/hearing_aids/factsheets_leaflets/the_nhs_hearing_aid_service.htm>.

Royal National Institute for Deaf People, *Waiting Times for NHS Hearing Aids*, retrieved 2 October 2009,
<http://www.rnid.org.uk/information_resources/hearing_aids/getting_nhs_hearing_aids/waiting_times/>.

Royal National Institute for Deaf People, *Support for Hearing Aid Users*, retrieved 2 October 2009,
<http://www.rnid.org.uk/information_resources/hearing_aids/getting_nhs_hearing_aids/support_for_hearing_aid_users/>.

The Cochlear Implant Clinic, 2009, *Is a Cochlear Implant for You?* University of Melbourne - Department of Otolaryngology, retrieved 9 September 2009,
<http://www.medoto.unimelb.edu.au/clinical_services/cochlear_implant_clinic/is_a_cochlear_implant_for_you>.
The Hearing Aid Council, 2009, *About the Council*, retrieved 2 October 2009,
< http://thehearingaidcouncil.org.uk/>.

The Hearing Cooperative Research Centre (Hearing CRC), *Mission: Creating Sound Value*, retrieved 2 October 2009, <http://www.hearingcrc.org/#MISSION>.

United States Department of Veterans Affairs, 2008, *VA Health Care Eligibility and Enrolment: Eyeglasses and Hearing Aids*, retrieved 2 October 2009, < http://www.va.gov/healtheligibility/coveredservices/SpecialBenefits.asp#EyeEar>.

Wilson, DH, Walsh, PG, Sanchez, L & Read, P, 1998, *Hearing Impairment in an Australian Population*, Centre for Population Studies in Epidemiology, South Australian Department of Human Services.

Yoshinaga-Itano, C, 2003, 'Early intervention after universal neonatal hearing screening: impact on outcomes', *Mental Retardation and Developmental Disabilities Research Review*, vol. 9, pp. 252–66