

HEARING FOR LIFE

THE VALUE OF HEARING SERVICES FOR VULNERABLE AUSTRALIANS

MARCH 2020



Hearing Care Industry Association 2020, *Hearing for Life – The value of hearing services for vulnerable Australians*, Report prepared with assistance from Deloitte Access Economics, Canberra.

**Hearing for Life – The value of
hearing services for vulnerable
Australians**

Hearing Care Industry Association

March 2020

Foreword

“I am in a Catch-22 situation – I find it hard to work with my level of hearing loss, but without working I cannot afford to fund the purchase of hearing aids.”¹

Hearing loss is widely considered to be a hidden disability. Despite the benefits of rehabilitation, increasingly sophisticated hearing technologies and an Australian Government program regarded as world-class, a group of Australians remain vulnerable to social and economic disadvantage owing to their hearing loss.

The Hearing Care Industry Association (HCIA) has long advocated for better access to subsidised hearing services for Australians of working age on low incomes.

Our commitment is based on reports into the social and economic costs of hearing loss in Australia (2006, 2017) which present a compelling case for engaging people with hearing loss in the community and the workforce.

Two Parliamentary inquiries into hearing health in Australia (2010 and 2017) lent support to widening access to Government funded hearing services. The Hearing Health Roadmap commissioned by Minister Ken Wyatt AM in 2018 identified, as one of eight top priorities, the unmet hearing needs of people on low incomes who are ineligible for the Hearing Services Program or the National Disability Insurance Scheme.

To underscore the current and future importance of this initiative, HCIA commissioned Deloitte Access Economics to estimate the costs and benefits of widening the eligibility criteria for the Hearing Services Program to encompass those of working age on low incomes.

Drawing on the latest data available from the Australian Bureau of Statistics and the Australian Institute of Health and Welfare, this report from Deloitte Access Economics also updates our widely cited 2017 publication on the social and economic costs of hearing loss in Australia.

Hearing for Life. Don't let hearing loss limit you is the theme of World Hearing Day in 2020 and we trust this report will inform the future of government funded hearing services.



Ashley Wilson AM
Chairman

Hearing Care Industry Association

¹ “Still waiting to be heard; report on the inquiry into hearing health and wellbeing in Australia”, House of Representatives Standing Committee on Health, Aged Care and Sport, 2017

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Glossary

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
ASSD	Additional Support for Students with Disabilities
AWE	Average weekly earnings
CSO	Community Service Obligation
DALY	Disability adjusted life year
DSP	Disability Support Pension
GBD	Global Burden of Disease
GP	General practitioner
HA	Hearing aid
HCIA	Hearing Care Industry Association
HPQ	Health Performance Questionnaire
HR	Hazard ratio
HSP	Hearing Services Program
LISTO	Low Income Superannuation Tax Offset
NCCD	Nationally Consistent Collection of Data on School Students with Disability
NDIA	National Disability Insurance Agency
NDIS	National Disability Insurance Scheme
NRS	National Relay Service
PAF	Population attributable fraction
PHDB	Private Hospital Data Bureau
QALY	Quality-adjusted life year
SDAC	Survey of Disability, Ageing and Carers
UK	United Kingdom
VAS	Visual Analog Scale
VSLY	Value of a statistical life year
YLD	Years of healthy life lost due to disability
YLL	Years of life lost due to premature death

Acknowledgments

The Hearing Care Industry Association would like to thank Deloitte Access Economics for their assistance in preparing this report.

As a leading economics advisory practice in Australia, Deloitte Access Economics has helped shape hearing health policy for more than a decade, beginning with their report, *Listen Hear! The economic impact and cost of hearing loss in Australia*. Most recently, they were engaged by the Hearing Care Industry Association in 2017 to produce the report, *The social and economic cost of hearing loss in Australia*.

We greatly appreciate Deloitte Access Economics' continued work to provide a robust evidence base to support informed policy development in relation to hearing health in Australia.

Executive summary

About this report

The Hearing Care Industry Association engaged Deloitte Access Economics to consider the social and economic impact of expanding eligibility for hearing services to vulnerable Australians – classified as hearing impaired Australians aged 26 to 65 years on low incomes or who are unemployed. This follows previous work by Deloitte Access Economics in 2017 to estimate the social and economic cost of hearing loss in Australia.² Together with this report, there is an emerging evidence base to support informed policy development in relation to hearing health in Australia.

Hearing is the ability to detect vibrations through the ear and to perceive and understand sound. It is a primary sense, which enables communication, together with vision and touch. Hearing loss can limit one's ability to communicate orally and, through this, limit a person's ability to interact with their community in the absence of appropriate supports.

The Australian Government supports hearing services for eligible persons through the Hearing Services Program (HSP). The HSP is designed to reduce the impact of hearing loss by providing access to hearing services, including assessments, hearing aids, fittings, maintenance and rehabilitation services.

A key focus of the program is to improve accessibility of hearing services for the most vulnerable people in society. However, not every person who has experienced hearing loss is eligible for support through the HSP.

A recent Parliamentary inquiry into the Hearing Health and Wellbeing of Australia, *Still waiting to be heard...* (2017) recommended that hearing services should be extended to vulnerable hearing impaired Australians, particularly those hearing impaired Australians aged 26 to 65 years on low incomes or who are unemployed and qualify for lower income support.³

There are two main components included within this report:

1. This report quantifies the costs of hearing loss in 2019-20 (as these costs may be avoided by improving access to hearing services), providing an update to Deloitte Access Economics' 2017 report on the social and economic cost of hearing loss.
2. This report then uses the costs of hearing loss as an input, along with the costs of providing government-funded hearing services, to estimate the value of expanding access to the HSP.

Noting this, there is a linear progression in this report such that: (1) the total prevalence and costs of hearing loss are summarised in chapters 2 and 3; (2) chapter 4 then presents the results of the modelling to estimate the annual costs and benefits of expanding access to the HSP.

Prevalence and costs of hearing loss in 2019-20

Hearing loss is a relatively common condition that affects approximately one in six people in Australia. The prevalence of hearing loss, in the better ear, was estimated to be 3.95 million people in 2019-20 or 15.3% of the population, a 9.7% increase from 3.6 million people in 2017. There were an estimated 2.6 million cases of mild hearing loss, 1.2 million cases of moderate hearing loss and more than 112,500 cases of severe hearing loss, in the better ear. The prevalence of hearing loss is expected to rise to 7.78 million people by 2066.

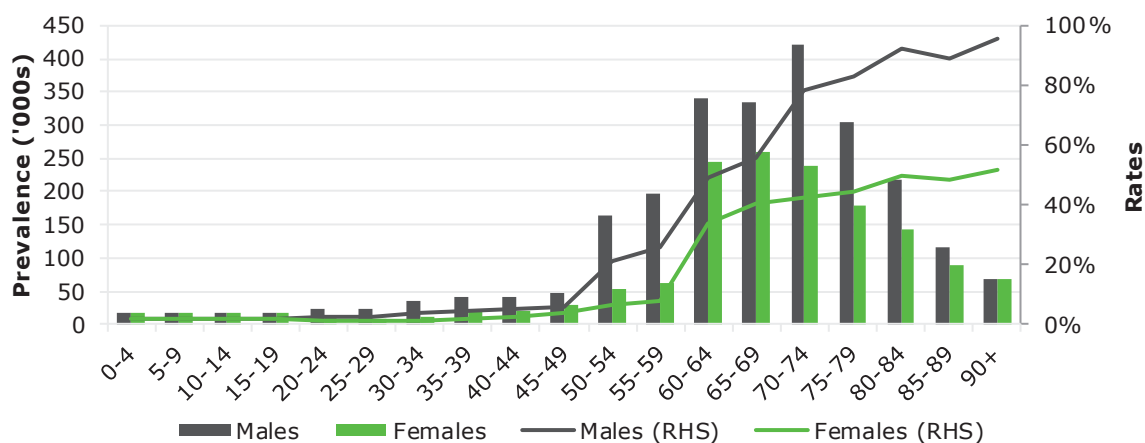
² Deloitte Access Economics. *The social and economic cost of hearing loss in Australia*. (2017). Report for the Hearing Care Industry Association. Canberra.

³ Parliament of Australia, *Still waiting to be heard...Report on the Inquiry into the Hearing Health and Wellbeing of Australia* (2018)
<https://parlinfo.aph.gov.au/parlInfo/download/committees/reportrep/024048/toc_pdf/Stillwaitingtobeheard...pdf;fileType=application%2Fpdf>.

The financial costs of hearing loss in 2019-20 were estimated as \$20.0 billion, comprising:

- health system costs of \$1.0 billion, or \$259 per person with hearing loss. The largest component of health system costs was the cost of the HSP that is provided by the Australian Government (\$590.0 million);
- productivity losses of \$16.2 billion, or \$4,109 per person with hearing loss, most of which was due to reduced employment of people with hearing loss (\$12.6 billion);
- informal care costs of \$174.7 million, or \$44 per person with hearing loss;
- deadweight losses of \$1.9 billion, or \$482 per person with hearing loss; and
- other financial costs of \$683.4 million, or \$173 per person with hearing loss.

Chart i: Number of cases of hearing loss and prevalence rates (better ear), by age and gender, 2019-20



Source: Deloitte Access Economics.

In addition to financial costs, hearing loss imposes a significant reduction of wellbeing, estimated for 2019-20 as 98,001 disability adjusted life years. **The value of the lost wellbeing was estimated to be \$21.2 billion in 2019-20**, which represents 52% of total costs attributed to hearing loss. The loss of wellbeing is a non-financial cost (i.e. it is not measured within traditional measures of economic activity, such as gross domestic product).

The value of expanding access to government-funded hearing services

Government-funded hearing aids are not provided to the working age population in Australia, except under a small number of circumstances (e.g. people who have a pensioner concession card, people who are younger than 26 years old, veterans and their dependants, or people who are eligible for the NDIS). Consequently, a substantial number of working age people with hearing loss are required to self-fund their hearing aids, where these are required.

Deloitte Access Economics' approach to estimating the number of people who are unable to access government-funded hearing services under the current eligibility criteria considered two cohorts:

- **Cohort 1: People with known hearing loss.** This cohort was estimated using the prevalence results presented in Section 2.1.
- **Cohort 2: People considered at risk of hearing loss.** The estimation of this cohort was guided by the academic literature on rates of undiagnosed hearing loss. This cohort contains two sub-groups, the first being those who have undiagnosed hearing loss and the second being those who in fact do not have hearing loss.

Receiving appropriate treatment early is important, particularly for adults, as they not only have more years of benefit from their hearing aid but will also experience a greater benefit later in life relative to those who seek help late. This is likely because older adults often experience difficulty adjusting to their hearing aids and may struggle to learn how to use the technology.

It was estimated that extending the HSP to vulnerable Australians would cost around \$25.3 million, providing free access to hearing services for a further 13,523 people. Based on employment differentials in people with and without hearing aids, as many as 8,091 people may obtain employment. The potential benefits of this greater employment were conservatively estimated to be \$311.7 million in 2019-20, outweighing the cost of providing hearing services.

The increase in employment rates would lead to a change in transfer costs, with the budget position improving by approximately \$33,135 per Australian who gains employment. Overall, the fiscal benefit of improving access to hearing services were estimated to be \$268.1 million in 2019-20.

Table i: Benefits of expanded HSP, by payer (\$ millions)

Cost component	Individual	Government	Society
Employment	278.8	32.9	311.7
Transfers	-235.2	235.2	0.0
Wellbeing	146.5		146.5
Cost of additional hearing services		-25.3	-25.3
Total	190.1	242.8	432.8

Source: Deloitte Access Economics estimates.

Considering the estimated \$25.3 million cost of providing hearing aids to 13,523 vulnerable Australians free of charge and the \$311.7 million in productivity gains, the overall benefit to cost ratio was estimated to be 12.3 to 1 (10.6 to 1 from the perspective of government based on the \$268.1 million in fiscal benefits). Therefore, on average, for each dollar invested in expanding the HSP, there is a \$12.30 return in benefits.

The use of hearing aids has also been shown to improve social, emotional and communication functions in people who have experienced hearing loss. As such, there are also substantial (non-financial) wellbeing gains, valued at an additional \$146.5 million.

Overall, expanding access to government-funded hearing services in Australia is likely to offer substantial benefits to a number of vulnerable, hearing impaired Australians, and to Australian society as a whole.

1 Background

1.1 Introduction

The Hearing Care Industry Association (HCIA) engaged Deloitte Access Economics to consider the social and economic impact of expanding eligibility for hearing services to vulnerable Australians – classified as hearing impaired Australians aged 26 to 65 years on low incomes or who are unemployed. This follows previous work by Deloitte Access Economics in 2017 to estimate the social and economic cost of hearing loss in Australia.⁴ Together with this report, there is an emerging evidence base to support informed policy development in relation to hearing health in Australia.

Hearing is the ability to detect vibrations through the ear and to perceive and understand sound. It is a primary sense, which enables communication, together with vision and touch. Hearing loss can limit one's ability to communicate orally and, through this, limit a person's ability to interact with their community in the absence of appropriate supports.

One of the recommendations of the recent Inquiry into the Hearing Health and Wellbeing of Australia, *Still waiting to be heard...* was that hearing services should be extended to vulnerable hearing impaired Australians.⁵

Specifically, the report recommended that services be extended to hearing impaired Australians aged 26 to 65 years on low incomes or who are unemployed and qualify for lower income support or the Low Income Superannuation Tax Offset (referred to as "vulnerable Australians" in this report).

The current eligibility requirements mean there are numerous vulnerable Australians who may not be able to receive the hearing care they need. One in seven Australians suffer from some degree of hearing loss, and nearly half of them are of working age (16 to 64 years). By 2050, this figure is expected to increase to one in four.

This report is structured in the following way:

- **Chapter 1** provides an introduction to this report, summarises the methodology used, describes the causes and severity of hearing loss, and discusses the range of treatment pathways available to individuals who have suffered a loss of hearing.
- **Chapter 2** presents the prevalence estimates of hearing loss in Australia. Understanding prevalence is important to estimate the number of people who may be eligible under expanded arrangements to receive government-funded hearing services in the working age population.
- **Chapter 3** summarises the costs of hearing loss in 2019-20, which includes estimates of the financial costs to the health system, productivity losses, other financial costs such as other government services and efficiency losses, and the loss of wellbeing due to hearing loss.
- **Chapter 4** estimates the social and economic impact of expanding the eligibility for the HSP.
- The **appendices** include supplementary data and methodology to estimate the costs of hearing loss in 2019-20.

1.1.1 Overview of methodology

At a high level, estimating the value of expanding eligibility for hearing services to vulnerable Australians requires an understanding of the target population and the costs they incur due to their hearing loss.

⁴ Deloitte Access Economics, *The social and economic cost of hearing loss in Australia*. (2017). Report for the Hearing Care Industry Association, Canberra.

⁵ The Department of Health, *Still waiting to be heard...Report on the Inquiry into the Hearing Health and Wellbeing of Australia* (2018) <<https://www.health.gov.au/sites/default/files/response-still-waiting-to-be-heard.pdf>>.

The costs of hearing loss were estimated for the financial year 2019-20 using a prevalence approach to cost estimation. A prevalence approach measures the number of people with a condition (hearing loss) at a point in time, and estimates the costs incurred due to hearing loss for a period (e.g. a given year).

This approach was used to update the costs of hearing loss that Deloitte Access Economics estimated in 2017, which included financial costs to the Australian health system, productivity losses (e.g. reduced employment and/or reduced output due to hearing loss), other financial costs of hearing loss (e.g. deadweight losses and other government programs), and the loss of wellbeing due to hearing loss.

By presenting the updated costs of hearing loss in 2019-20, it was then possible to estimate what portion of those costs might be avoided through expanded access to government-funded hearing services, which is the focus of chapter 4 and this report as a whole.

There are also several benefits from expanded access to government-funded services that are difficult to capture quantitatively. These include social-emotional, psychosocial and social participation benefits. Receiving appropriate hearing services has the potential to reduce these cost impacts.

To capture these benefits, Deloitte Access Economics conducted eleven semi-structured interviews over the phone with people who have a hearing loss. The findings from these interviews have been included throughout the report. Each interviewee had received government-funded hearing services, self-funded these services or received free hearing services through a philanthropic program such as HCIA's Hearing Aid Bank.

The interviews explored the impact that access to care had on removing barriers to independence and participation in the community, and the emotional wellbeing on the patient. The interviewees were specifically asked about:

- The impact of their hearing loss on their everyday activities, in the absence of treatment.
- Their experience receiving hearing services, for example, how their treatment was funded, and the impact that it has had on them (e.g. whether they are able to undertake more social activities than they otherwise would be able to, or if they are able to work more and/or differently as a result of treatment).
- Whether their treatment had an impact on their general health and/or wellbeing.

Quotes from interviewees have been included throughout the report to summarise these findings, and three case studies of the impact of hearing loss have been included in chapter 4. Permission was sought to ascribe these quotes and case studies to the interviewees by name, with pseudonyms applied in cases where permission was not granted to protect their privacy.

The rest of this chapter provides a brief overview of the causes and severity of hearing loss, and existing treatment and support pathways in Australia, with the latter focusing on government-funded hearing services.

1.2 Causes and severity of hearing loss

Hearing loss is a common problem with a myriad of causes, including exposure to noises, ageing, diseases and disorders, physical trauma and hereditary factors, and it can affect one or both ears. It is also possible that hearing loss is a congenital condition (present at birth) or acquired; progressive or sudden; and temporary or permanent. For these reasons, the severity of hearing loss can vary widely - from mild with little impact on a person's quality of life, to severe with a profound disruption to an individual's ability to communicate and interact with their community.

Hearing loss is classified in the following ways:

- **conductive hearing loss**, in which lesions in the external auditory canal, tympanic membrane, or middle ear, prevent sound from being conducted to the inner ear
- **sensorineural hearing loss**, in which hearing loss is caused by lesions of either the inner ear or the auditory nerve

- **mixed loss**, which may be caused by severe head injury, chronic infection, genetic disorders, or when a transient conductive hearing loss occurs in conjunction with a sensorineural hearing loss.⁶

Each of these types of hearing loss can vary significantly in their aetiology and the extent to which they affect an individual's day-to-day life.

The aetiology of hearing loss is broad and dependent on the affected individual. Hearing loss may be the result of hereditary or non-hereditary genetic factors which can lead to the onset of hearing loss either at or soon after birth. These congenital causes can include infections during pregnancy, low birth weight, inappropriate drug use during pregnancy, birth asphyxia or severe jaundice.

Alongside congenitally acquired hearing loss, many individuals' conditions are acquired later in life. These causes can arise at any age and include infectious diseases (such as meningitis and measles); chronic ear infections; fluid build-up, wax or foreign bodies in the ear canal; impact injuries to the head or ear; noise exposure (either single instances of extreme noise or prolonged exposure to noise); and age-related degeneration of the cochlea and/or auditory nerve.

A range of thresholds is used to define the severity of an individual's hearing loss, from mild hearing loss (typically between 20dB-34dB of hearing loss) to complete hearing loss (95dB+).⁷ This study uses the same severity definitions in Stevens et al (2011), although groups have been aggregated for reporting purposes where:

- **mild hearing loss** is between 25-34dB
- **moderate hearing loss** is between 35-64dB
- **severe hearing loss** is 65dB or worse.

1.3 Treatment and support pathways

Based on the cause of the hearing loss, some specific treatments exist that can be administered to an individual with hearing loss if their impairment is curable. For example, ear canal obstructions may often be addressed through the removal of the foreign object(s) and fluid build-up in the middle ear may be drained through surgical incision. Hearing loss resulting from autoimmune disorders or conditions such as otitis media may be treated through the use of appropriate medications, such as corticosteroids or antibiotics. Structural deformities in the middle ear or the outer ear may be rectified surgically.⁸

Where the cause of the hearing loss is not curable, aids and modifications are available to compensate for the loss of hearing. For example:

- **hearing aids** can help individuals with hearing loss by amplifying sound and facilitating improved communication. Hearing aids have become more sophisticated and smaller in recent years, such that they are customised to a person's particular pattern of hearing loss to ensure the amplification of sound is as natural and responsive as possible.
- **cochlear implants** are medical devices which are surgically implanted into the cochlear and worn with an external sound processor. These devices are best suited to people with severe hearing loss, as, unlike hearing aids, cochlear implants operate by simulating the auditory nerve in the inner ear directly.
- **bone conduction and middle ear implants** are surgically implanted to overcome a conductive hearing loss or a single sided deafness. Similar to the cochlear implant, an external sound processor converts sound energy into mechanical energy, and directly stimulates the middle ear, overcoming a conductive hearing loss.

⁶ Lustig L, 'hearing loss' (2019) <<http://www.merckmanuals.com/professional/ear,-nose,-and-throat-disorders/hearing-loss/evaluation-of-hearing-loss>>.

⁷ Stevens G, Flaxman S, Brunskill E, Mascarenhas M, Mathers C and Finucane M, 'Global and regional hearing impairment prevalence: an analysis of 42 studies in 29 countries', *European Journal of Public Health*, 23(1) 146.

⁸ Lustig L, 'hearing loss' (2019) <<http://www.merckmanuals.com/professional/ear,-nose,-and-throat-disorders/hearing-loss/evaluation-of-hearing-loss>>.

- **brain stem implants** are suitable for individuals who have had both acoustic nerves damaged by tumours, disease or trauma. This approach uses sound-detecting and sound-processing devices to convert sound to electrical signals that are delivered to auditory centres in the brainstem via implanted electrodes.
- **assistive approaches**, such as special sound systems, can help transmit infrared or FM to radio signals to help people hear where there may be excess of conflicting noise, while visual signals or supports, such as lights or subtitles, can assist in place of solely auditory ones. People with hearing loss can also use lip-reading or speechreading to help discriminate between sounds and might also use sign language (e.g. Auslan) to communicate.

While these supports can play an important role in improving a person's ability to engage meaningfully in their day-to-day life, accessibility to appropriate treatment can be an issue, often due to financing issues as well as timely diagnosis.

The Australian Government supports hearing services for eligible persons through programs such as the HSP.⁹ The HSP is designed to reduce the impact of hearing loss by providing access to hearing services, including assessments, hearing aids, fittings, maintenance and rehabilitation services. Eligible individuals may receive support through a voucher scheme and a Community Service Obligation (CSO) component.

A key focus of the program is to improve accessibility of hearing services for the most vulnerable people in society. However, not every person who has experienced hearing loss is eligible for support through the HSP. Access to the HSP is dependent on a client being fitted with a hearing aid to meet a minimum 3 Frequency Average Hearing Loss threshold of greater than 23dB, measured at 0.5, 1 and 2 kHz, with each ear evaluated independently. Applicants are also subject to income/means testing and must be within certain age ranges. The impact of the current access arrangements is explored further in Chapter 4.

⁹ Services are also provided through the NDIS and other programs, although those services make up a relatively small share of overall hearing health services in Australia.

2 Epidemiology of hearing loss

This chapter outlines the prevalence and mortality of hearing loss in Australia in 2019-20.

Key findings

- The prevalence of hearing loss in Australia (better ear) in 2019-20 was estimated to be 3.95 million people, comprising 2.45 million males and 1.51 million females. This represents 15.3% of the total Australian population.
- There are an additional 350,000 people with hearing loss compared to 2017, a 9.7% increase. This is largely due to population growth and the ageing population.
- By 2066, it is estimated that the prevalence of hearing loss (better ear) will reach up to 7.78 million people – 18.2% of the total population.

2.1 Prevalence of hearing loss

Hearing loss is a common condition around the world. Despite this, there is a limited number of reliable audiological sources for the prevalence of hearing loss specifically in Australia, which is the situation for most other developed countries.

While there are studies that provide prevalence of hearing loss based on self-reported measures, it has been shown that self-reported hearing loss is subjective and can poorly estimate total prevalence of hearing loss. For example, Wilson et al (1999) showed that the false positive rate in self-reported studies of hearing loss was 46% and the false negative rate was 17%.

The current generation is listening to so many devices (phones, music, etc.) that I expect hearing loss to be a growing problem – David

Consequently, it is necessary to rely on robust, audiological studies of the prevalence of hearing loss. The sources used in this report to inform prevalence are discussed in the following section.

2.1.1 Overview

In 2017, Deloitte Access Economics estimated the social and economic cost of hearing loss and hearing health conditions in Australia. This report identified Wilson et al (1999) as the most appropriate source for estimating prevalence of hearing loss in Australia.¹⁰

A recent review of Australian and international literature on adult prevalence of hearing loss confirmed that Wilson et al (1999) is the most recent source for overall adult prevalence estimates in Australia.¹¹ This study included 9,027 Australians and was representative of the broader Australian population. The sampling strategy consisted of a multi-staged, clustered, self-weighting, systematic area sample of people aged 15 years or older. This study has been used as the main basis of prevalence estimates throughout this report for adults.

Wang et al (2019) is one of the most suitable sources for overall hearing loss prevalence rates in children as it is a recent systemic review and meta-analysis of a range of audiological studies in

¹⁰ Wilson D, Walsh, P, Sanchez, L, Davis, A, Taylor, A, Tucker, G and Meagher, I, 'The epidemiology of hearing impairment in an Australian adult population' (1999) 28(2) *International Journal of Epidemiology* 247.

¹¹ Rosenhall, U, 'Epidemiology of age related hearing loss' (2015) 13(2) *Hearing, Balance and Communication* 46.

children conducted around the world.¹² Further, Wang et al (2019) also provide prevalence estimates across a range of different hearing loss thresholds and tests. As such, it was used for this purpose in this study.

The prevalence of hearing loss was disaggregated into mild, moderate and severe hearing loss using data from Stevens et al (2011), which combines information from a number of robust international, audiological surveys.¹³

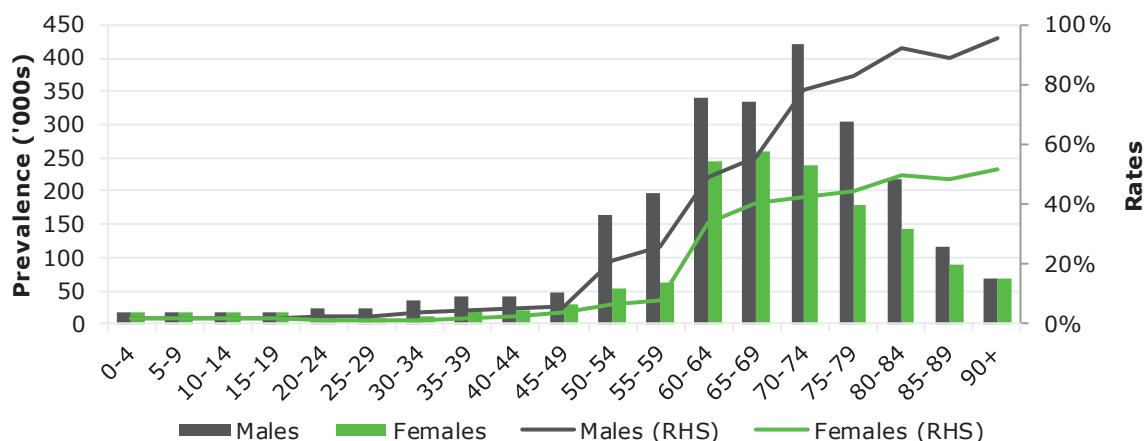
The Survey of Disability, Ageing and Carers (SDAC) and the Australian National Health Survey contain questions on hearing loss.^{14, 15} In both of these surveys, the method to assess hearing loss is self-report, rather than through audiometric testing. Since self-reporting provides much less accurate prevalence estimates than audiometric testing, these surveys were not used as the primary prevalence source in this report.

2.1.2 Prevalence by age, gender and jurisdiction (better ear)

Hearing loss can differ from one ear to the other (asymmetrical hearing loss). Having better hearing in one ear than the other impacts on the ability to communicate and may lessen the overall effect of the impairment in the worse ear. Given this outcome, disability in epidemiological hearing studies has often been defined on measures of the better ear, including in Wilson et al (1999). This approach is also adopted in this study. Information regarding hearing loss in the worse ear can be found in Deloitte Access Economics (2017).

There were an estimated 3.95 million people with hearing loss in the better ear in Australia in 2019-20 (Chart 2.1 and Table 2.1). This is equivalent to 15.3% of the total population.

Chart 2.1: Number of cases of hearing loss and prevalence rates (better ear), by age and gender, 2019-20



Source: Deloitte Access Economics estimates.

¹² Wang, J, Sung, V, Carew, P, Burt, RA, Liu, M, Wang, Y, Afandi, A and Wake, M, 'Prevalence of childhood hearing loss and secular trends: A systematic review and meta-analysis' (2019) *Academic paediatrics*.

¹³ Stevens G, Flaxman S, Brunskill E, Mascarenhas M, Mathers C and Finucane M, 'Global and regional hearing impairment prevalence: an analysis of 42 studies in 29 countries', *European Journal of Public Health*, 23(1) 146.

¹⁴ Australian Bureau of Statistics, *Disability, Ageing and Carers, Australia: Summary of Findings, 2018*, Cat. No. 4430.0 (2019).

¹⁵ Australian Bureau of Statistics, *National Health Survey: First Results, 2017-18*, Cat. No. 4364.0 (2018).

Table 2.1: Prevalence of hearing loss in Australia in 2019-20, better ear, '000s of people, by jurisdiction

Age/gender	NSW	VIC	QLD	WA	SA	TAS	ACT	NT	Total
Male									
0-9	12	10	8	4	2	1	1	0	37
10-19	11	9	8	4	2	1	1	0	35
20-29	15	13	9	5	3	1	1	1	48
30-39	24	21	14	8	5	1	1	1	75
40-49	29	23	18	10	6	2	2	1	90
50-59	114	91	73	38	26	8	6	4	360
60-69	217	168	136	68	52	18	9	5	675
70-79	236	179	149	70	57	20	10	4	723
80+	134	104	75	37	34	10	5	1	401
<i>Male total</i>	<i>792</i>	<i>618</i>	<i>490</i>	<i>244</i>	<i>187</i>	<i>61</i>	<i>35</i>	<i>17</i>	<i>2,445</i>
Female									
0-9	11	9	7	4	2	1	1	0	35
10-19	10	8	7	4	2	1	1	0	33
20-29	7	6	4	2	1	0	0	0	22
30-39	11	9	6	3	2	1	1	0	33
40-49	16	13	10	5	3	1	1	1	50
50-59	36	29	23	12	8	3	2	1	114
60-69	163	127	101	50	39	13	7	3	503
70-79	135	105	83	40	34	11	6	2	416
80+	101	78	55	28	26	7	4	1	300
<i>Female total</i>	<i>490</i>	<i>385</i>	<i>297</i>	<i>147</i>	<i>118</i>	<i>38</i>	<i>22</i>	<i>9</i>	<i>1,507</i>
Total	1,282	1,003	787	391	305	99	57	26	3,952

Source: Deloitte Access Economics estimates. Note: Components may not sum to totals due to rounding. Jurisdictions may not sum to total as Australia-wide estimates included Other Territories, which are not included in the jurisdiction breakdown.

2.1.3 Prevalence by age, gender and level of severity (better ear)

Table 2.2 presents the number of cases of hearing loss in Australia in 2019-20 by age, gender and level of severity. There were an estimated 2.6 million cases of mild hearing loss, 1.2 million cases of moderate hearing loss and more than 112,500 cases of severe hearing loss in the better ear in Australia in 2019-20. Prevalence has increased by 9.7% or around 350,000 people since 2017.

Table 2.2: Prevalence ('000s of people) of hearing loss in Australia in 2019-20, better ear, by level of severity

Age/gender	Mild	Moderate	Severe	Total
Male				
0-9	30.9	5.8	0.3	37.0
10-19	29.4	5.5	0.3	35.2
20-29	40.0	7.8	0.5	48.3
30-39	62.1	12.5	0.8	75.4
40-49	73.0	15.9	1.0	89.9
50-59	280.8	74.7	4.8	360.3
60-69	476.7	184.7	13.2	674.6
70-79	407.1	287.2	29.1	723.4
80+	174.8	201.3	25.0	401.1
<i>Male total</i>	<i>1,575.0</i>	<i>795.4</i>	<i>75.0</i>	<i>2,445.4</i>
Female				
0-9	29.3	5.4	0.3	35.1
10-19	27.9	5.2	0.3	33.4
20-29	18.2	3.5	0.2	21.8
30-39	27.2	5.3	0.3	32.8
40-49	41.5	8.5	0.5	50.5
50-59	91.1	21.3	1.3	113.6
60-69	377.5	117.6	7.8	502.9
70-79	261.4	142.2	12.7	416.3
80+	153.3	132.9	14.0	300.2
<i>Female total</i>	<i>1,027.3</i>	<i>441.8</i>	<i>37.5</i>	<i>1,506.6</i>
Total	2,602.3	1,237.2	112.5	3,952.0

Source: Deloitte Access Economics estimates.

2.1.4 Projected prevalence of hearing loss (better ear)

Prevalence projections for the total population of Australia were conducted for the years 2025, 2030, 2040, 2050, 2060 and 2066. The prevalence projections were made on the basis of demographic ageing only. They do not account for possible changes in the age-gender prevalence rates of hearing loss in the future that may arise due to prevention or interventions that may reduce rates, or other changes that may impact rates.

Table 2.3 presents the projected prevalence of mild, moderate and severe hearing loss for all ages and both genders. As can be seen, there will be an estimated 4.4 million cases of hearing loss by 2025 (over a 10% increase) and 7.8 million cases of hearing loss by 2066 (nearly double the current number); 2066 is the end of the current Australian Bureau of Statistics (ABS) single year population projection horizon.

Table 2.3: Projected prevalence ('000s of people) of hearing loss, by level of severity

Severity	2025	2030	2040	2050	2060	2066
Mild	2,877.9	3,128.7	3,573.9	4,052.7	4,586.0	4,891.8
Moderate	1,421.5	1,596.6	1,894.2	2,140.5	2,423.6	2,630.4
Severe	131.8	150.2	181.7	205.2	231.4	253.0
Total	4,431.2	4,875.5	5,649.8	6,398.3	7,241.1	7,775.2

Source: Deloitte Access Economics estimates.

In Deloitte Access Economics (2017)¹⁶, it was estimated that the pooled risk of mortality occurring was 10% greater than in people without hearing loss. Broadly, the increased risk of mortality occurs in elderly people with (often) severe hearing loss. While these costs have been included in this report too, a detailed review of the literature has not been duplicated again here.

Following the methodology in Deloitte Access Economics (2017), it was also estimated that there were 137 deaths that are attributed to hearing loss in 2019-20. These deaths are only estimated to occur in the elderly population aged 70 years or older. Appendix C includes more detail about the likely mechanisms through which these deaths may occur, and the approach taken to estimate the number of deaths due to hearing loss.

¹⁶ Deloitte Access Economics, *The social and economic cost of hearing loss in Australia*. (2017). Report for the Hearing Care Industry Association, Canberra.

3 Cost of hearing loss

The total costs of hearing were estimated to provide insight to the potential benefits of expanded access to the HSP. Providing access to hearing aids for people currently ineligible under the HSP and who cannot afford them may have significant benefits. With hearing aids, people may be more productive, incur fewer costs within the health system and experience improvements to their wellbeing. This chapter quantifies the costs to the individual and upon society assuming there is no expansion to the HSP.

The approach is consistent with Deloitte Access Economics 2017 report, with some exceptions due to data availability. The broad types of costs associated with hearing loss included in this report are:

- Financial costs to the Australian health system, which include the cost of running hospitals, hearing services in Australia, general practitioner (GP) and specialist services reimbursed through Medicare and private funds, other allied health services (including privately funded audiometrist/audiologist visits), research and some other expenditure such as health administration.
- Productivity costs, which included reduced workforce participation (absenteeism and a change in employment rates), reduced productivity at work, and the value of informal care (lost income of carers who are unable to work as often as they would like due to providing care to someone with hearing loss).
- Costs of government and other services, including in the education system, and services to provide captioning among other costs.
- Transfer costs, which comprise the deadweight losses, or reduced economic efficiency, associated with the need to raise additional taxation to fund the provision of government services.
- Wellbeing costs, which are the costs associated with reduced quality of life and impaired functioning, and premature death that may result from severe hearing loss. Wellbeing costs are measured in terms of the years of life, or healthy life, lost using the burden of disease methodology.

The specific methodologies for each of the costs associated with hearing loss are outlined further in the appendices attached to this report.

Key findings

- The total health system costs due to hearing loss were estimated to be \$1.0 billion in 2019-20, or \$259 per person with hearing loss.
 - The total other financial costs due to hearing loss were estimated to be \$19.0 billion in 2019-20, or \$4,808 per person with hearing loss.
- The total cost associated with the loss of wellbeing from hearing loss was estimated to be \$21.2 billion in 2019-20.

3.1 Health system expenditure

Health system expenditure for hearing loss primarily includes the cost of running hospitals, public and private expenditure on hearing aids and the services associated with providing these aids. There is also some expenditure on other health services such as visits to GPs, outpatient services and imaging among other costs.

It was estimated that there were 4,081 inpatient admissions in 2019-20 for hearing loss (excluding separations for cochlear implants), with a further 1,566 admissions involving procedures associated with the insertion of cochlear implants. Average case weights were applied to the number of admissions to estimate **admitted patient hospital expenditure of \$70.1 million.**

Publicly funded hearing aids are administered through the HSP. The program provides vouchers to eligible participants, which allows them to purchase hearing aids funded by the government. The services provided for include the costs of assessment, fitting, maintenance and rehabilitation of hearing aids. The total **funding for the HSP was \$590.0 million** in 2019-20.

Jennifer’s hearing services cost about \$6,000. Jennifer relied on her sister to pay up front and does not have the money to get her hearing aids replaced.

In addition, **privately funded hearing aids and services were estimated to be \$252.8 million** in 2019-20, comprising the costs of aids and the associated testing and fitting services.

Additional health system costs derive from GP, specialist and outpatient visits as well as imaging, pathology, pharmaceuticals, research and capital costs. It was estimated that **other health system expenditure allocated to hearing loss totalled \$90.0 million in 2019-20, while unallocated (overhead capital costs) were a further \$21.9 million.**

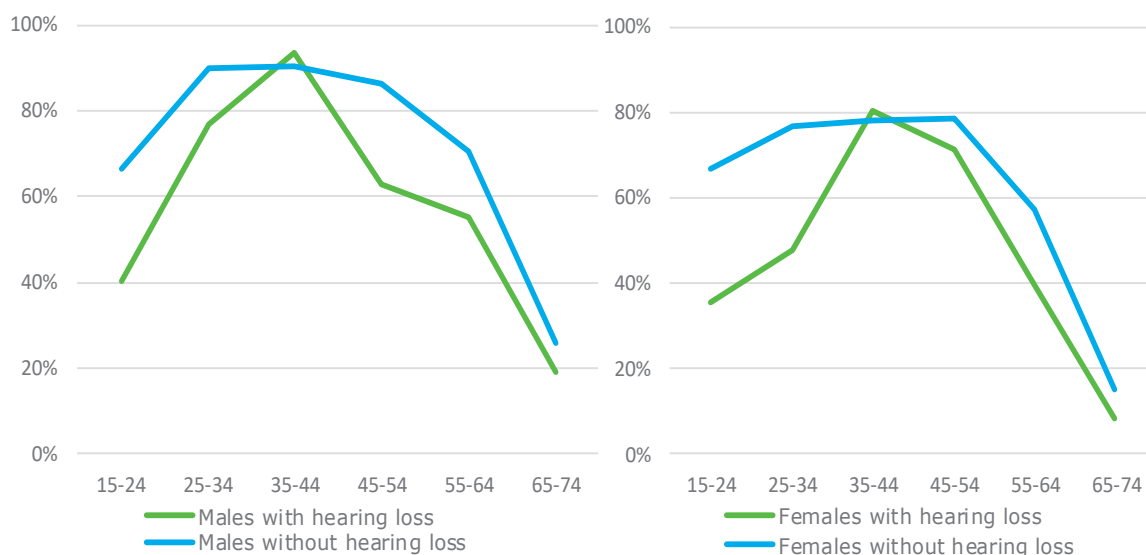
3.2 Productivity costs

Productivity costs include any reduction in the likelihood of employment due to hearing loss either through disadvantages in job-seeking or self-selection out of the labour force. Additional costs include days absent from work due to hearing loss (absenteeism) and reduced performance at work due to hearing loss (presenteeism).

As my hearing began to deteriorate, so did my ability to perform my job. My co-workers began questioning if I could perform my job and I knew that if I was let go, I would struggle to find another job - David

Both males and females with hearing loss had, on average, a lower likelihood of being employed compared to their hearing colleagues (Chart 3.1). Multiplying the gap in employment due to hearing loss by the AWE (adjusted for age and gender) resulted in a **total cost from reduced workforce participation of \$12.6 billion** in 2019-20.

Chart 3.1 Employment rates for people with and without hearing loss, Australia, 2018



Source: Source: ABS, 2018. Note: employment is a percent of population not of labour force.

It was estimated that people with hearing loss spend 3.5 more days absent from work compared to the hearing population. While at work, people with hearing loss are assumed to be 2.8% less productive than their hearing colleagues. **These productivity losses from absenteeism and presenteeism are estimated to cost an additional \$3.7 billion in 2019-20.**

David's wife provided her support during our phone interview with David to ensure that he could hear our questions. His wife also helps David with conversations when he goes to the shops

3.3 Informal care productivity losses

Informal care refers to assistance provided free of charge by family members or friends to the affected person with hearing loss. It was estimated that in 2019-20 there were 45,194 people with hearing loss each requiring an average of 7.8 hours of additional care.¹⁷ The value of each hour of informal care was assumed to be equivalent to the hourly wage the carer would earn if they were working. It was estimated the total **cost of informal care provided to people with hearing loss was \$174.7 million in 2019-20.**

3.4 Other services

A number of supports are provided to people with hearing loss, including education services, interpreter services, captioning, telecommunications and formal care. The detailed breakdown of these costs is provided in Appendix B. It was estimated that **these education and support services were provided at a total cost of \$683.4 million in 2019-20.**

3.5 Deadweight losses

Funding transfers from one economic entity to another through taxation creates distortions and inefficiencies in the economy. Taxes change the price and quantity of goods sold compared to what they would be if the market were not distorted, and thus lowers the value of trade between buyers and sellers. These distortions present real net costs to the economy known as deadweight losses. It was estimated that **deadweight losses due to hearing loss were \$1.9 billion in 2019-20.**

3.6 Loss of wellbeing

People with hearing loss may experience a reduction in their wellbeing. The Global Burden of Disease Study estimates wellbeing losses by attributing a disability weight to the level of hearing impairment.¹⁸ Higher disability weights represent a greater burden on the individual with the loss of wellbeing quantified using disability adjusted life years (DALYs). It was estimated that there were a total of 98,001 DALYs (or 98,001 years of healthy life lost), which, when converted to a financial cost, represented a total loss of wellbeing of \$21.2 billion in 2019-20.¹⁹

When I take my hearing aids off it is a big shock how quiet things are – Kelly

3.7 Summary of the total cost of hearing loss

The financial costs of hearing loss in 2019-20 were estimated as \$20.0 billion, comprising:

- health system costs of \$1.0 billion, or \$259 per person with hearing loss. The largest component of health system costs was the cost of the Hearing Services Program (HSP) that is provided by the Australian Government (\$590.0 million);
- productivity losses of \$16.2 billion, or \$4,109 per person with hearing loss, most of which was due to reduced employment of people with hearing loss (\$12.6 billion);
- informal care of \$174.7 million, or \$44 per person with hearing loss;
- deadweight losses of \$1.9 billion, or \$480 per person with hearing loss; and

¹⁷ 7.8 hours refers to the additional hours a person with hearing loss receives compared to the average hours of care a person with no hearing loss and no other disability received.

¹⁸ Global Burden of Disease Collaborative Network. *Global Burden of Disease Study 2017 (GBD 2017) Disability Weights*. Seattle, United States: Institute for Health Metrics and Evaluation (IHME) (2018).

¹⁹ The Department of Prime Minister and Cabinet estimated the value of a statistical life year (VSLY) to be \$213,000 in 2019 dollars. Department of Prime Minister and Cabinet, *Best Practice Regulation Guidance Note: Value of Statistical Life*, Australian Government, Canberra (2019) <https://www.pmc.gov.au/sites/default/files/publications/value-of-statistical-life-guidance-note_0_0.pdf>.

- other financial costs of \$683.4 million, or \$173 per person with hearing loss.

In addition to financial costs, hearing loss imposes a significant reduction of wellbeing, estimated for 2019-20 as 98,001 DALYs. **The value of the lost wellbeing was estimated to be \$21.2 billion in 2019-20**, which represents 51% of total costs attributed to hearing loss. While the loss of wellbeing is a non-financial cost and is not measured within traditional measures of economic activity, it is clear that hearing loss imposes a large burden on individuals and Australian society more broadly.

As this report follows a similar methodology to the Deloitte Access Economics (2017) report,²⁰ it allows for the costs across both reports to be compared. **The total cost of hearing loss estimated in 2019-20 was 23.7% higher than the cost estimated in 2017. This suggests that hearing loss is a growing problem in Australian society.**²¹

There was a significant increase in productivity costs, reflecting a larger gap in employment between people with hearing loss and their hearing colleagues. In terms of wellbeing, there were an additional 7,778 DALYs in 2019-20 compared to 2017, driven by the growth in prevalence of hearing loss (there were approximately 350,000 more people with hearing loss in 2019-20 compared to 2017).

Table 3.1: Comparison of the cost of hearing loss, 2017 to 2019-20.

Cost component	2017 cost (\$ million)	2019-20 cost (\$ million)	Cost per person (\$ 2017)	Cost per person (\$ 2019-20)	Change in cost per person (%)
Health system	881.5	1,024.8	245.4	259.3	5.7%
Productivity	12,807.2	16,238.7	3,565.6	4,109.0	15.2%
Other financial	2,200.9	2,761.3	612.8	689.7	12.5%
Wellbeing	17,441.3	21,193.4	4,855.8	5,362.8	10.4%
Total	33,330.9	41,218.3	9,279.6	10,429.8	12.4%

Deloitte Access Economics (2017). Note: components may not sum to totals due to rounding.

²⁰ Deloitte Access Economics, *The social and economic cost of hearing loss in Australia*. (2017). Report for the Hearing Care Industry Association, Canberra.

²¹ Though the costs to the health system and other financial costs have increased, there are multiple factors driving this change. There have been changes in the methodology due to data availability (the detailed methodology is outlined in appendix B) which, most notably, affect the estimates of captioning and primary education services. Another example is the increased funding for the HSP. The additional funding suggests that support for hearing loss is increasing, and not necessarily that hearing loss is a growing problem.

4 Expanding access to the Hearing Services Program

As discussed in Chapter 1, a number of working age Australians with hearing loss have limited or no access to the HSP. The HSP currently provides free hearing aids and services to people of working age younger than 26 years old, pension concession card holders,²² veterans, certain Aboriginal and Torres Strait Islander peoples and those with complex hearing and health issues, including NDIS participants with hearing needs who are referred by a planner from the National Disability Insurance Agency (NDIA).

As such, there is currently a large accessibility gap for hearing impaired Australians of working age. These Australians are often unable to save for and purchase hearing aids, as evidenced by the anecdotal information reported during the interviews and are vulnerable to the kinds of financial, social and health disadvantage described in other chapters of this report.

"If you are a low-income earner and are faced with a cost of even \$2,000 for hearing aids you just won't be able to buy them. Finding that kind of money is just too hard." – Jodie

"My assessor did not provide the option of hearing aids to me because of the financial cost. My treatment was delayed until I was able to find a program that would subsidise my treatment." – Sarah

"Why should we not be eligible? Why wait until I'm a pensioner? I want to be an active member of society and work." – Jennifer

4.1 Hearing aid access in Australia

Government-funded hearing aids are not provided to the working age population in Australia,²³ meaning that nearly everyone in the labour market (and the many not in the labour market) with hearing loss has to self-fund their hearing aids.

The recent Inquiry into the Hearing Health and Wellbeing of Australia recommended hearing services be extended to hearing impaired Australians aged 26 to 65 years on low incomes or who are unemployed and qualify for lower income support or the Low Income Superannuation Tax Offset ("vulnerable Australians").²⁴

Our approach to estimating the number of people who are unable to access government-funded hearing services under the current eligibility criteria considered two cohorts:

- **Cohort 1: People with known hearing loss.** This cohort was estimated using the prevalence results presented in Section 2.1.
- **Cohort 2: People considered at risk of hearing loss.** The estimation of this cohort was guided by the academic literature on rates of undiagnosed hearing loss. This cohort contains two sub-groups, the first being those who have undiagnosed hearing loss and the second being those who in fact do not have hearing loss.

²² Considered to be 65 years of age for the purposes of this report.

²³ NDIS participants may access hearing supports through their NDIS plan, however hearing impairments must be permanent and bilateral at 90 decibels (dB) or greater in the better ear, meaning that very few people are eligible.

²⁴ The Parliament of the Commonwealth of Australia, *Still waiting to be heard... Report on the Inquiry into the Hearing Health and Wellbeing of Australia* (2017) <https://parlinfo.aph.gov.au/parlInfo/download/committees/reportrep/024048/toc_pdf/Stillwaitingtobeheard...pdf;fileType=application%2Fpdf>.

Case study 1: Margot aged 57

Margot is a happily married mum with two teenage children. Margot found out about her hearing loss when she was six, though she was told by her parents that there was no treatment available. Margot spent her childhood years thinking that hearing loss was something to hide or be ashamed of. Consequently, Margot only received treatment for her hearing loss at the age of 25, which she paid for out of her own pocket.

Margot's hearing loss has significantly affected her employment prospects. She now works as a cleaner as this role does not rely on her hearing. Earlier in her life, Margot had been passionate about becoming a nurse, though she indicated that this was not a feasible goal given her hearing loss.

The hidden nature of hearing loss makes Margot feel misunderstood. In particular, she struggles to participate in groups, and feels that there is a misconception held by others that when she misses part of a conversation that it is because she is 'slow'.

Margot was fortunate that a repayment plan was available to her for her first set of hearing aids. However, when these hearing aids needed replacement after 5 years, she was unable to afford a new pair. Consequently, she kept the old hearing aids for an additional two years, during which she needed to constantly tweak the aids so that they continued working.

Since receiving the correct aids for her condition at no cost through a HCIA member's philanthropy program, Margot has successfully completed a course in professional writing at TAFE and is now enrolled to undertake a Bachelor of Creative Writing. While her accessibility to these courses is aided by an Access Plan, Margot noted that support for people who have suffered a loss of hearing is generally still limited to 'sitting at the front of the class'.

Margot is worried that her two children will develop hearing loss. She does not want to pass on the daily struggle that hearing loss causes onto her children. When her children were younger, Margot could not hear them crying, something which added significant stress to the challenges of parenting.

Case study 2: Renée aged 55

Renée is married with two children and is the sole provider for the family. She works part time in a local school library. Renée first noticed her hearing loss 6 years ago when she realised that she was struggling to understand phone conversations. At that stage, Renée only had a small amount of hearing loss in one ear, however, over the following 5 years her hearing deteriorated rapidly. Rather than receive treatment, Renée denied that her condition was worsening. Renée avoided talking over the phone where possible and grew anxious about any phone conversations she had.

Renée could no longer deny her hearing loss when she was unable to understand the children at her school. She recalled having to ask one child what they were saying more than 5 times before she finally understood. Renée was ineligible to access funding through the HSP, something that she was surprised by given her relatively low-income status. Because of her ineligibility, Renée took longer to access hearing aids than she otherwise would have.

Now that Renée has hearing aids, she feels more secure in her employment. Renée is more connected with society, something she feared she would lose. Her fear stems from her father's experience with hearing loss, whereby he received his hearing aids after many years without treatment. Renée described that, by this time, her father had become accustomed to the silence and preferred not to use the hearing aids often. Renée's fear of withdrawing from society in similar circumstances to her father provided significant motivation to seek treatment which was provided free of charge through HCIA's Hearing Aid Bank.

Receiving appropriate treatment early is important, particularly for adults as they not only have more years to benefit from their hearing aid but will also experience a greater benefit later in life relative to those who seek help late.²⁵ This is likely because older adults often experience difficulty adjusting to their hearing aids and may struggle to learn how to use the technology.²⁶

4.1.1 People with known hearing loss

The number of people with known (or diagnosed) hearing loss was estimated to be equal to the prevalence estimates presented in Section 2.1 for those aged 26 to 49. No adjustments were required to these figures given the accepted definitions of mild, moderate and severe hearing loss in this analysis exceed the Minimum Hearing Loss Threshold required to be eligible for the HSP.

For those aged 50 and above, it is likely that many live with a loss of hearing but have not yet been formally assessed or diagnosed. Many individuals in this cohort may also be at risk of hearing loss due to an ongoing age-related deterioration of their hearing sense. Assessments and diagnoses, particularly in this cohort, are often delayed due to denial, stigma or awareness of bad experiences of friends and/or family. Others may be unable to afford the treatment they need so persist with their condition and adjust their lifestyle, such as Alfred.

Alfred spent close to 20 years without hearing aids despite his condition "impacting incredibly on his daily routine". Unable to afford the hearing aids he needed; Alfred said his hearing loss was "like a sore back; I just put up with it."

In the SDAC, the method of assessing disability status such as hearing loss is self-report. Given the denial and stigma associated with hearing loss, it is considered unlikely that respondents would disclose a loss of hearing that had not yet been diagnosed. As such, despite self-report being considered less accurate than audiometric testing, the number of people reporting hearing loss in the SDAC is considered to indicate the total known hearing loss in each age-gender cohort.

Table 4.1 shows that there are around 246,800 people aged 26 to 64 with a diagnosed loss of hearing. This is comprised of an estimated 148,400 males and 98,400 females.

4.1.2 People with undiagnosed hearing loss

In addition to the number of people living with known hearing loss in Australia in 2019-20, this analysis also considered those who have experienced a loss of hearing but not been formally assessed or diagnosed.

Evidence suggests there is a significant delay between people starting to experience hearing loss and receiving hearing services. For example, it was estimated that there were four million people in the United Kingdom (UK) living with unaddressed hearing loss and that, on average, there is a 10- to 15-year delay between people identifying that they may have hearing loss and seeking help.^{27,28} This means that, at any point in time, there are likely to be many individuals who have suffered a loss of hearing but not been formally diagnosed.

I found out about my hearing loss when I was 6. I grew up thinking that hearing loss was something to hide or be ashamed of. I treated my hearing loss for the first time when I was 25. - Margot

²⁵ Davis, A, Smith, P, Ferguson, M, Stephens, D, and Gianopoulos, I, 'Acceptability, benefit and costs of early screening for hearing disability: a study of potential screening tests and models' (2007) 11(42) *Health Technology Assessment* 1.

²⁶ Humes, LE, 'The contributions of audibility and cognitive factors to the benefit provided by amplified speech to older adults' (2007) 18(7) *Journal of the American Academy of Audiology* 590.

²⁷ Royal National Institute for Deaf People (RNID), 'Caring for older people with hearing loss' (2013), Action on Hearing Loss, London, United Kingdom.

²⁸ Davis, A, Smith, P, Ferguson, M, Stephens, D, and Gianopoulos, I, 'Acceptability, benefit and costs of early screening for hearing disability: a study of potential screening tests and models' (2007) 11(42) *Health Technology Assessment* 1.

Hearing screening programs that provide hearing assessments for people aged 50 years and over have the potential to benefit people in achieving timelier hearing services for hearing loss. Improved identification of these undiagnosed cases is important as adults who receive their hearing aids earlier have more years of improved life ahead of them.²⁹

People aged over 50 were considered eligible to be included in the undiagnosed hearing loss cohort, based on the academic literature investigating the cost effectiveness of hearing loss screening programs.³⁰ This age is considered to be the most cost effective point to begin conducting hearing screening, as the prevalence rate in this age cohort suggests the risk of developing hearing loss is high enough to justify screening, yet individuals are young enough for benefits to adequately accrue from early intervention.

The number of people aged 50 to 64 with undiagnosed hearing loss was estimated to be equal to the difference between the prevalence estimates and the self-reported hearing loss from SDAC for each age-gender cohort. This effectively removes those who have self-reported their hearing loss (considered to be diagnosed hearing loss) from the overall prevalence estimated from the Wilson (1998) study.

I spent most of my life adapting to my changing hearing without seeking help - David

Table 4.1 presents the estimated number of people aged 26 to 64 living with hearing loss (either known or undiagnosed) in Australia in 2019-20. In total, it was estimated that there are around 1.13 million people in this cohort, comprised of around 246,800 people with known hearing loss and a further 879,700 whose conditions are not yet diagnosed.

Table 4.1: Known and undiagnosed hearing loss in Australia, people 26-64 (000s), 2019-20

Age/ gender	Known hearing loss	Undiagnosed hearing loss	Total
Males			
26-49	35.5	-	35.5
50-64	112.9	588.2	701.1
<i>Male total</i>	<i>148.4</i>	<i>588.2</i>	<i>736.6</i>
Females			
26-49	31.8	-	31.8
50-64	66.6	291.5	358.1
<i>Female total</i>	<i>98.4</i>	<i>291.5</i>	<i>389.9</i>
Person total	246.8	879.7	1,126.5

Source: Deloitte Access Economics estimates.

4.2 Target population for expanded HSP

While government hearing services are provided through both the HSP and the NDIS, our analysis only considered the costs and benefits of expanding eligibility to the HSP. This owes to the fact that the HSP currently subsidises, or partially subsidises, approximately 80 per cent of hearing aids sold in Australia.³¹ Furthermore, the Parliamentary inquiry into the Hearing Health and Wellbeing of Australia, *Still waiting to be heard...* (2017) specifically considered the possibilities for expanding assistance through the HSP.

²⁹ Linszen, AM, Anteunis, JC, and Joore, MA, 'The cost-effectiveness of different hearing screening strategies for 50- to 70-year-old adults: A Markov model' (2015) 18(5) *Value in Health* 560.

³⁰ Ibid.

³¹ Parliament of Australia, *Still waiting to be heard...Report on the Inquiry into the Hearing Health and Wellbeing of Australia* (2018) <https://parlinfo.aph.gov.au/parlInfo/download/committees/reportrep/024048/toc_pdf/Stillwaitingtobeheard...pdf;fileType=application%2Fpdf>.

To estimate the number of vulnerable Australians who would be eligible for an expanded HSP, it was necessary to exclude those among the 1.13 million Australians aged 26-64 with hearing loss who have already received hearing aids and/or whose income is above \$37,000 annually (see below).

While a significant gap in eligibility for the HSP currently exists, there are a number of people aged 26 to 64 who already wear hearing aids. The pathways through which these individuals obtain hearing aids include the HSP itself, self-funding, non-government programs and the NDIS.

Data obtained from the Department of Health showed that there were 65,469 people aged 26 to 64 who had received hearing aids through the HSP in 2018-19. This was inflated to 2019-20 by applying the three-year average growth rate HSP recipients, giving a total of 66,603 in 2019-20. As noted above, it is estimated that government-funded hearing aids constitute approximately 80 per cent of the market in Australia.³² As such, the remaining 20 per cent were assumed to be comprised of those who self-fund, receive support through non-government programs and those who are NDIS participants. Adding these 16,651 people to the 66,603 government-funded provides an estimate of 83,254 hearing aid recipients in 2019-20.

Among the cohort of 26 to 64-year-olds, NDIS participants may be eligible for hearing supports if they are living with permanent bilateral hearing loss >90 dB in the better ear.³³ This analysis conservatively assumed that all people living with hearing loss above the 95 dB threshold would have received hearing aids through the NDIS. In total, it is estimated that 4,262 people aged 26 to 64 received hearing aids through this pathway in 2019-20,³⁴ while the remainder of the 20 per cent (12,389 = 16,651-4,262) received their aids either by self-funding or through non-government programs. Appendix D provides a breakdown of these recipients by age and gender.

The analysis for this report also considered an income threshold below which self-funded care is considered difficult and above which people may reasonably be able to self-fund their hearing aids. A conservative approach was taken, whereby only those whose annual incomes are below \$37,000 or who are unemployed would be eligible of the expanded HSP. This aligns with the current threshold for the Low Income Superannuation Tax Offset (LISTO).

To establish this proportion of the sub-target population, SDAC data regarding respondent income deciles were analysed. This showed that approximately 20.1% of people with hearing loss are within the first and second decile for total weekly income, which roughly aligns with the proportion in the broader population who earn below \$37,000 annually.

These additional criteria allowed the total number of Australians who would be eligible for an expanded HSP to be established. Table 4.2 shows the breakdown of males and females in the 26-49 and 50-64 age groups with hearing loss (1.13 million), and subtracts those who already have hearing aids (83,254) to show the sub-target population of 1.04 million, as well as those 209,851 people below the income threshold. Appendix D presents more detail on the numbers of vulnerable Australians by age and gender in 2019-20.

³² Parliament of Australia, *Still waiting to be heard...Report on the Inquiry into the Hearing Health and Wellbeing of Australia* (2018) <https://parlinfo.aph.gov.au/parlInfo/download/committees/reportrep/024048/toc_pdf/Stillwaitingtobeheard...pdf;fileType=application%2Fpdf>.

³³ National Disability Insurance Scheme, *List A - Conditions which are likely to meet the disability requirements in section 24 of the NDIS Act* (2019) <<https://www.ndis.gov.au/about-us/operational-guidelines/access-ndis-operational-guideline/list-conditions-which-are-likely-meet-disability-requirements-section-24-ndis-act>>

³⁴ The NDIA submission (Submission 45) to the Inquiry into the Hearing Health and Wellbeing of Australia reported that there were there were approximately 700 NDIS participants with hearing loss as their primary condition, 200 of whom were aged below six, as at 30 June 2016. It was suggested that this would climb to between 16,000 and 20,000 over the coming years, the majority of whom would be children and young people or HSP-eligible adults with substantially reduced functional impairment.

Table 4.2: Target population for expansion of the HSP in Australia, people 26-64 (000s), 2019-20

Age/ gender	Total hearing loss	Existing hearing aid recipients	Sub-target population	Below income threshold
Male				
26-49	35.5	7.9	27.6	5.5
50-64	701.1	31.0	670.1	134.8
<i>Male total</i>	736.6	39.0	697.6	140.3
Female				
26-49	31.8	11.2	20.6	4.1
50-64	358.1	33.0	325.0	65.4
<i>Female total</i>	389.9	44.3	345.6	69.5
Total	1,126.5	83.3	1,043.2	209.9

Source: Deloitte Access Economics estimates.

In total, it was estimated that 209,851 vulnerable Australians would be eligible for an expanded HSP.

4.3 Costs and benefits of proposed expansion

To estimate the costs and benefits of such an expansion to the HSP eligibility criteria, three scenarios were considered:

- **Scenario 1:** hearing services are fully subsidised and there is no co-payment
- **Scenario 2:** individuals seeking a hearing aid are required to contribute \$100 to the cost of the aid
- **Scenario 3:** individuals seeking a hearing aid are required to contribute \$200 to the cost of the aid.

Noting the well-documented relationship between hearing aid cost and hearing aid adoption,^{35,36} it is expected that the number of vulnerable Australians who would obtain hearing aids following the proposed expansion of the HSP would vary under each scenario.

In each case, the starting point for establishing hearing aid uptake was based on a comparative approach with the UK. In the UK, hearing aids are supplied to everyone who needs them free of charge.³⁷ Despite this, as many as 54% of people with moderate hearing loss in the UK do not use hearing aids.³⁸ Possible explanations for this lack of uptake include denial, stigma and awareness of bad experiences of friends and family with hearing aids. These sentiments were commonplace among vulnerable Australians who were interviewed for this report.

"I grew up thinking that hearing loss was something to hide and be ashamed of" – Margot

"Discussing my hearing loss with work could lead me to lose my job" – David

³⁵ Gopinath, B, Schneider, J, Hartley, D, Teber, E, McMahon, CM, Leeder, SR, and Mitchell, P, 'Incidence and predictors of hearing aid use and ownership among older adults with hearing loss' (2011), 21(7) *Annal of Epidemiology* 497.

³⁶ Garstecki, DC, and Erler, SF, 'Hearing loss, control, and demographic factors influencing hearing aid use among older adults' (1998), 41(3) *Journal of Speech Language and Hearing Research* 527.

³⁷ RNID 2012, 'Everything you need to know about getting hearing aids', Action on Hearing Loss, London, United Kingdom.

³⁸ European Hearing Instrument Manufacturers' Association 2015, EuroTrak UK 2015, www.ehima.com/wpcontent/uploads/2016/02/EuroTrak_2015_UK.pdf, accessed February 2020.

Given that most people in the UK who require hearing aids do not access them despite them being free,³⁹ it was assumed that uptake rates would be no higher in Australia under a scenario where hearing aids were provided for free. Hearing aid ownership rates were based on the 2018 SDAC.⁴⁰

As such, the approach in this study for Scenario 1 (no co-payment) assumed that hearing aid uptake for those who are in the labour market would reach that of the UK. For Scenario 2 (\$100 co-payment) and Scenario 3 (\$200 co-payment), a linear relationship was assumed, whereby the rate of vulnerable Australians taking up hearing aids reduces by the proportion of the cost to the individual to the total cost of the aid. Table 4.3 shows there would be 13,523 hearing aid recipients under the base case of no co-payment, with 12,830 and 12,138 recipients respectively under \$100 and \$200 co-payment scenarios.

Hearing aid ownership in Australia and the UK by age is presented in Appendix D, along with the expected additional hearing aids under each scenario.

Table 4.3: Expected hearing aid uptake in Australia with expanded HSP eligibility criteria

Scenario	HA ownership rate (Australia)	HA ownership rate (UK)	Gain in % with HAs	Target population	Additional HA recipients
No co-payment					
26-49	15.5%	31.1%	15.6%	9,677	1,510
50-64	29.0%	35.0%	6.0%	200,173	12,013
Total	24.7%	31.6%	6.9%	209,851	13,523
\$100 co-payment					
26-49	15.5%	31.1%	14.8%	9,677	1,433
50-64	29.0%	35.0%	5.7%	200,173	11,397
Total	24.7%	31.6%	6.5%	209,851	12,830
\$200 co-payment					
26-49	15.5%	31.1%	14.0%	9,677	1,356
50-64	29.0%	35.0%	5.4%	200,173	10,782
Total	24.7%	31.6%	6.2%	209,851	12,138

Source: Deloitte Access Economics estimates.

4.3.2 Costs of HSP expansion

The cost to the Australian Government to provide a pair of Category 2 hearing aids (suitable for mild to severe hearing loss), including associated services, is around \$1,950, while a single aid costs around \$1,240 (see Appendix D). Approximately 88.5 per cent of hearing aid recipients through the HSP received binaural hearing aids, while the remaining 11.5 per cent received a single aid. These costs apply to Scenario 1 and reduce to \$1,850 and \$1,750 for binaural aids under Scenario 2 and Scenario 3, respectively, and \$1,140 and \$1,040 for monaural aids.

It should be noted that this average cost is lower than those quoted by some interviewees and represents the cost of basic aids only. While the exact requirements and cost of an aid(s) will vary for each individual, it is likely that many will require an aid with more sophisticated technology (for example, due to the nature of their work). In these situations, it is proposed that the individual would cover the additional expense of a more sophisticated aid, while an expanded HSP would subsidise this cost and allow more vulnerable Australians to obtain the aids they need.

³⁹ Ibid.

⁴⁰ Australian Bureau of Statistics, 4430.0.30.002 – Microdata: Disability, Ageing and Carers, Australia, 2018 (2019).

To estimate the total cost of subsidised hearing aids under an expanded HSP in 2019-20, the expected uptake of hearing aids was distributed by age for each modelled scenario and multiplied by the respective unit costs of providing Category 2 hearing aids for each scenario. This is presented in Appendix D.

Supplying free hearing aids to the working age population would cost around \$25.3 million in 2019-20, assuming 13,523 vulnerable Australians are supplied with hearing aids. With a \$100 or \$200 co-pay, this cost reduces to \$22.7 million and \$20.3 million for an additional 12,830 and 12,138 hearing aids, respectively (Table 4.4).

Table 4.4: Cost of providing hearing aids to working age population, 2019-20

Scenario	Expected recipients (monaural)	Cost (\$, monaural)	Expected recipients (binaural)	Cost (\$, binaural)	Total cost (\$ millions)
No co-pay					
26-49	174	1,240	1,337	1,950	\$2.83
50-64	1,381	1,240	10,631	1,950	\$22.47
Total	1,555	1,240	11,968	1,950	\$25.30
\$100 co-pay					
26-49	165	1,140	1,268	1,850	\$2.54
50-64	1,311	1,140	10,087	1,850	\$20.18
Total	1,475	1,140	11,355	1,850	\$22.72
\$200 co-pay					
26-49	156	1,040	1,200	1,750	\$2.26
50-64	1,240	1,040	9,542	1,750	\$18.02
Total	1,396	1,040	10,742	1,750	\$20.28

Source: Deloitte Access Economics estimates.

These represent annual costs of expanding the HSP in 2019-20. It should be noted that further costs would be incurred beyond the initial expansion to supply replacement hearing aids, maintenance and ongoing support, meaning that the overall cost of an expansion would be higher than what is reported here when looking beyond 2019-20.

4.3.3 Benefits from HSP expansion

The benefits of providing free hearing aids to people of working age population accrue to individuals, government and businesses. This occurs through greater ability to work (e.g. return to work, or ability to work more hours) and improved quality of life, reduced welfare payments and increased tax revenue, and improved productivity and reduced absenteeism.

There are a number of plausible reasons why improved access to hearing aids would coincide with greater employment of people with hearing loss. For example, a survey by the European Hearing Instrument Manufacturers' Association found that 81% of people in work who wear hearing aid considered that their hearing aids

Alfred commented on the impact of hearing loss in an office environment:

"If you were in that environment, it would be very off-putting as it would be crucial to be able to hear and understand people."

were useful on the job.⁴¹ Moreover, the survey also found that people with hearing aids consider that they “increase the chance of hearing impaired people to get promoted, to get the right job and to get more salary”.

Another study found a substantial difference in average household income among those who do not use hearing aids and those who do.⁴² In fact, for those with moderate hearing loss, this difference was US\$14,100 per year and reached as high as US\$30,000 for severe hearing loss. The study also found that hearing aid use largely mitigates these differences.

This study again considered comparative employment rates among those with hearing loss in Australia and the UK. In Australia, the employment rate for adults with hearing loss is 26% compared with 34% in the UK.⁴³ In relative terms, the hearing population in the UK is 1.7 times as likely to be employed as the hearing impaired, compared with 2.5 times as likely in Australia. This means that the ‘gap’ between employment outcomes between the hearing and the hearing impaired is 1.5 times bigger in Australia than in the UK, where the key difference is the availability of free hearing aids. For working age Australian men with hearing loss, this would increase employment from 70% to 74%, compared to 84% for men without hearing loss. For women, the corresponding figures would increase from 61% to 64%, compared with 71% for those without hearing loss.

Case study 3: David aged 60

David moved to Australia 20 years ago and now lives with his wife and his small dog. He is currently in his sixties and spent most of his working life with hearing loss. His hearing loss has deteriorated to the stage where he would now qualify for a cochlear implant.

David spent his early career working with loud machinery, a job which he believes caused the onset of his hearing loss. Later he transitioned into a job at a call centre where he worked 10 hour shifts answering customer enquiries. Though David was a competent employee, he began noticing that customers were arguing with him or were upset with his tone of voice. At the time, David was not sure what was happening although on reflection he realises that he was probably yelling at the customers without realising. David did not receive any support for hearing loss in this job and, to prevent other employees from being distracted by David, he was made to ‘work from the corner’ where he described answering phone calls while facing a wall.

David’s family life was also strained because of his hearing loss. He had increasing numbers of arguments with his wife (mostly caused by him accidentally yelling), while his dog would run out of the living room while he was watching TV because it was too loud. Holding conversations in groups became difficult and David found himself withdrawing from the rest of society.

David now has hearing aids, the first set of which he paid over \$8,000 for out of his own pocket. His hearing aids have made a significant difference: he argues less with his wife and the volume on the TV no longer scares his dog. David lives a private life with his wife and is yet to reintegrate with the rest of society. He is now working in a new line of business on reduced hours, though he is certain that he would not be able to work at all without his hearing aids.

Appendix D presents these changes, along with the expected growth in the number employed. The gap with free hearing aids was estimated by multiplying the current gap in employment rates by the ratio of UK hearing aid employment to Australian hearing aid employment.

⁴¹ European Hearing Instrument Manufacturers’ Association 2015, EuroTrak UK 2015, www.ehima.com/wpcontent/uploads/2016/02/EuroTrak_2015_UK.pdf, accessed February 2020.

⁴² Kochkin S 2010, ‘The efficacy of hearing aids in achieving compensation equity in the workplace’, *The Hearing Journal*, 63(10):19-24.

⁴³ Australian Bureau of Statistics, 4430.0.30.002 – *Microdata: Disability, Ageing and Carers, Australia, 2018* (2019).

Table 4.5: Employment rates among those with and without hearing loss, before and after free hearing aids

Age/gender	Existing (no hearing loss)	Existing (with hearing loss)	Current gap	Gap with free HAs	New (with hearing loss and free HAs)
Male					
26-49	89.1%	74.8%	-14.4%	-9.9%	79.2%
50-64	78.2%	65.5%	-12.8%	-8.8%	69.4%
<i>Male total</i>	<i>83.7%</i>	<i>70.1%</i>	<i>-13.6%</i>	<i>-9.4%</i>	<i>74.3%</i>
Female					
26-49	77.0%	69.3%	-7.7%	-5.3%	71.6%
50-64	65.4%	52.5%	-12.9%	-8.9%	56.5%
<i>Female total</i>	<i>71.2%</i>	<i>60.9%</i>	<i>-10.3%</i>	<i>-7.1%</i>	<i>64.1%</i>
Total	77.4%	65.5%	-11.9%	-8.2%	69.2%

Source: Deloitte Access Economics estimates.

Table 4.6: Growth in employment with free hearing aids

Age/gender	Target population	Previous employment	New employment	Gain in employment
Male				
25-49	5,542	4,144	4,390	246
50-64	134,793	88,237	93,552	5,315
<i>Male total</i>	<i>140,336</i>	<i>98,394</i>	<i>104,278</i>	<i>5,884</i>
Females				
25-49	4,135	2,865	2,963	98
50-64	65,380	34,357	36,956	2,599
<i>Female total</i>	<i>69,515</i>	<i>42,343</i>	<i>44,550</i>	<i>2,207</i>
Person total	209,851	137,479	145,209	8,091

Source: Deloitte Access Economics estimates.

Of the 13,523 vulnerable Australians who would receive hearing aids under Scenario 1, it is expected that 8,091 would gain employment, assuming that the employment 'gap' between those with hearing loss and those without reduces to the same proportional size as in the UK. This analysis conservatively assumes that these newly employed people with hearing loss would enter the labour market into jobs paying the minimum wage. With the minimum wage in Australia currently at \$38,522 annually, this results in a productivity gain to the economy of approximately \$311.7 million.

There are further benefits to the economy relating to the average \$29,068 in unemployment benefits that will no longer be provided to the 8,091 vulnerable Australians who gain employment. Adding to this the average tax paid on a minimum wage job of \$4,067, the budget is estimated to be improved by approximately \$33,135 per vulnerable Australian who gains employment. Applied to the 8,091 expected to gain employment, there is an estimated fiscal benefit of \$268.1 million, and the overall financial BCR from the perspective of government was estimated to be 10.6 to 1.

The use of hearing aids has also been shown to improve social, emotional and communication functions in people who have experienced hearing loss.⁴⁴ For example, Margot noted how hearing loss has negatively impacted her social life and restricted her ability to participate in her normal life.

“Totally. Completely. If you’re in a situation where you know that you aren’t going to hear... you just don’t want to join in because you know you won’t be able to keep up your end of the conversation” - Margot

These improvements can be captured through the use of quality-adjusted life years (QALYs), a measure of health-related quality of life. Specifically, a QALY measures the quality of a person’s life when living with a health condition relative to perfect health, where a QALY of 1 indicates perfect health and 0 is equivalent to death (the inverse of the DALY scale). This means that if a person lives in perfect health for one year, that person will have 1 QALY.

As an input to the QALY calculation, a measure of the change in an individual’s quality of life is required. The Visual Analog Scale (VAS) is part of a multi-attribute questionnaire used to measure the effects of interventions for hearing impairment and disability on quality of life.⁴⁵ Joore et al (2003) found that hearing aid fittings had a substantial and highly significant positive impact on VAS scores. This improvement translated to an average of 0.05 QALYs being gained.⁴⁶

Applying this average change in QALYs to the 13,523 vulnerable Australians expected to receive hearing aids if they were provided free of charge results in a total gain of 676 QALYs. Converting this to a monetary value using the VSLY gives a total benefit of approximately \$146.5 million.

The benefits considered here are annual, meaning that additional benefits are likely to continue accruing beyond 2019-20. However, as costs are only considered in 2019-20, it is necessary to also only consider the benefits over the same time period.

It is also important to note that the benefits included in this analysis do not cover the full range of benefits experienced by many individuals after receiving an appropriate hearing aid. For example, the alleviation of safety concerns arising from not hearing alarms or vehicles has not been quantified, nor has the lower likelihood of experiencing workplace accidents. These benefits, while not quantified in this analysis, are likely to provide significant additional benefit to recipients and should not be overlooked when considering hearing care interventions.

Table 4.7 provides a breakdown of each cost and benefit component for the Scenario 1 (no co-payment) modelling by payer.

⁴⁴ Mulrow, CD, Aguilar, C, Endicott, JE, ‘Quality-of-life changes and hearing impairment: a randomized trial’ (1990) 113 *Annals of Internal Medicine* 188.

⁴⁵ Hawker, GA, Mian, S, Kendzerska, T, French, M, ‘Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP)’ (2011), 63(S11) *Arthritis Care & Research* S240.

⁴⁶ Joore, MA, van der Stel, H, Peters, JM, ‘The cost-effectiveness of hearing-aid fitting in the Netherlands’ (2003), 129(3) *Archives of Otolaryngology - Head & Neck Surgery*

Table 4.7: Benefits of expanded HSP, by payer (\$ millions)

Cost component	Individual	Government	Society
Employment	278.8	32.9	311.7
Transfers	-235.2	235.2	0.0
Wellbeing	146.5		146.5
Cost of additional hearing services		-25.3	-25.3
Total	190.1	242.8	432.8

Source: Deloitte Access Economics estimates.

4.4 Conclusions

As demonstrated in 2017 and in this report, hearing loss imposes substantial costs on Australian society and its members including government. In 2019-20, the costs of hearing loss reached an estimated \$41.2 billion, exceeding the estimates in 2017 (\$33.3 billion).

Extending access to government funded hearing services in Australia may reduce the extent of these costs, at least in part, for a number of vulnerable Australians who are currently ineligible for government funded hearing services, either through the HSP or the NDIS. The fiscal benefits of such a policy were estimated to be \$268.1 million in 2019-20, greatly exceeding the estimated cost of extending eligibility for the program (around \$25.3 million).

Considering the estimated \$25.3 million cost of providing hearing aids to 13,523 vulnerable Australians free of charge and the \$311.7 million in productivity gains, the society-wide financial benefit to cost ratio was estimated to be 12.3 to 1 (10.6 to 1 from the perspective of government). Therefore, on average, for each dollar invested in expanding the HSP, there is a \$12.30 return in benefits.

The use of hearing aids has also been shown to improve social, emotional and communication functions in people who have experienced hearing loss. As such, there are also substantial (non-financial) wellbeing gains, valued at an additional \$146.5 million.

Overall, expanding access to government-funded hearing services in Australia is likely to offer substantial benefits to a number of vulnerable, hearing impaired Australians, and to Australian society as a whole.

Appendix A: Health system costs of hearing loss

Health system costs include the costs of running hospitals, GP and specialist services funded through Medicare and patient contributions, the cost of pharmaceuticals provided over-the-counter or prescribed, allied health services, residential aged care services, and research.

Health system costs are primarily funded by government though individuals also contribute through out-of-pocket payments. Third party private health insurers also pay for some health services.

Key findings

- The total health system costs due to hearing loss were estimated to be \$1.02 billion in 2019-20, or \$259 per person with hearing loss.
- The largest component of health expenditure was the HSP (\$590.0 million), which was followed by hearing aid expenditure in the private market (\$206.9 million). Expenditure on other health professionals associated with assessing, fitting and maintaining hearing aids was also significant (\$46.0 million).

A.1 Hospital inpatient expenditure

Hospital costs related with hearing loss in Australia in 2019-20 were estimated by multiplying the annual number of hospital visits attributable to hearing loss by the average cost per hospitalisation.

Hearing loss specific separation statistics were retrieved from the National Hospital Morbidity Database for 2017-18⁴⁷ for the H90 and H91 ICD-10 codes⁴⁸. There were estimated to be 5,647 hearing loss related separations in 2019-20 (5,496 separations in 2017-18 adjusted for demographic changes).

Some of these separations are for the insertion of a cochlear implant; there were an estimated 1,566 implants in 2019-20, as discussed later in this section. These separations were costed separately, and consequently removed from the 5,647 separations, leaving 4,081 separations due to other reasons.

The average cost per separation for hearing loss was based on a range of procedure codes for ear, nose, mouth and throat procedures in both public and private hospitals (D12 and D66).^{49,50} After

⁴⁷ Australian Institute of Health and Welfare, *National Hospital Morbidity Database 2016-2017* (3 February 2020) <<https://www.aihw.gov.au/about-our-data/our-data-collections/national-hospitals-data-collection>>.

⁴⁸ ICD-10 stands for the International Statistical Classification of Disease and Related Health Problems. The H90 and H91 codes are Conductive and sensorineural hearing loss, and other hearing loss, respectively.

⁴⁹ Independent Hospital Pricing Authority, *National Hospital Cost Data Collection: Australian Public Hospitals Cost Report 2015-2016 Round 20* (2018) <<https://www.ihpa.gov.au/publications/national-hospital-cost-data-collection-public-hospitals-cost-report-round-20-0>>.

⁵⁰ The Department of Health, *Private Hospital Data Bureau (PHDB) Annual Reports 2016-17* (25 July 2018) <<https://www.health.gov.au/internet/main/publishing.nsf/Content/health-casemix-data-collections-publications-PHDBAnnualReports>>.

adjusting for health inflation since 2016-17,⁵¹ the average cost weight for a hearing related separation was estimated to be \$4,334 in 2019-20.

To calculate the cost of inpatient care due to hearing loss (excluding cochlear implants), the number of separations (4,081) was multiplied by the average cost weight (\$4,334). This cost was estimated to be \$17.7 million in 2019-20.

The other significant source of inpatient expenditure is for cochlear implants. Publicly funded cochlear implant procedures are recorded in the Independent Hospital Pricing Authority's National Hospital Cost Data Collection reports,⁵² while privately funded implants are recorded in the Private Hospital Data Bureau's (PHDB) Annual Reports.⁵³ It was estimated that there were 1,566 cochlear implants in 2019-20 after adjusting for demographic changes. The average cost of the procedure in 2019-20 was estimated to be \$33,467, which is the average of the prices in private and public hospitals from the datasets, updated to the base year using health inflation. Thus, the total expenditure on cochlear implants was \$52.4 million.

Overall, the total admitted patient hospital expenditure for hearing loss was estimated to be \$70.1 million in 2019-20.

A.2 Public hearing health services

Publicly funded hearing services are administered through the HSP. The program provides vouchers to eligible participants, which allows them to purchase hearing services funded by the government. The services include the costs of assessment, rehabilitation, fitting and maintenance of hearing aids. Total funding for the HSP was \$590.0 million in 2019-20.⁵⁴

A.3 Private hearing health services

Given the current restricted access to the HSP (highlighted in section 1) and the NDIS, it is assumed that the majority of people with hearing loss aged 26-64 would have to acquire hearing aids from the private market. According to the SDAC, 128,400 people with hearing loss between the ages of 26 and 64 also had a hearing aid in 2018.⁵⁵ Adjusting for demographic changes, this represents 133,708 people in 2019-20.

People with hearing loss may use either one hearing aid (monaural) or two hearing aids (binaural). According to the Department of Health approximately 87.3% of people are fitted with binaural hearing aids.⁵⁶ It is estimated that there were 250,435 privately

Most interviewees indicated that their hearing aids should be replaced every 5 years. However, several participants indicated that they had taken longer to replace their hearing aids due to the financial cost.

⁵¹ Australian Institute of Health and Welfare, *Health expenditure Australia 2016-17* (2 October 2018) <<https://www.aihw.gov.au/getmedia/e8d37b7d-2b52-4662-a85f-01eb176f6844/aihw-hwe-74.pdf.aspx?inline=true>>.

⁵² Independent Hospital Pricing Authority, *National Hospital Cost Data Collection Report, Public Sector, Round 21 (Financial year 2016-17)* (2019) <<https://www.ihpa.gov.au/publications/national-hospital-cost-data-collection-report-public-sector-round-21-financial-year>>.

⁵³ The Department of Health, *Private Hospital Data Bureau (PHDB) Annual Reports 2018-19* (6 January 2020) <<https://www1.health.gov.au/internet/main/publishing.nsf/Content/health-casemix-data-collections-publications-PHDBAnnualReports>>.

⁵⁴ The Department of Health, *Health Portfolio Budget Statements 2019-20* (2019) <<https://www.health.gov.au/sites/default/files/health-portfolio-budget-statements-2019-20.pdf>>.

⁵⁵ Australian Bureau of Statistics, *4430.0.30.002 – Microdata: Disability, Ageing and Carers, Australia, 2018* (2019).

⁵⁶ The Department of Health, *Annual Program Statistics 2018-2019* (2019) <http://www.hearingservices.gov.au/wps/portal/hso/site/about/program_stats/annual-program-stats!/ut/p/a1/rVJNT4NAEP0reuhxs1NgWziSfiDU0hirAheyLJ9adikspv33LqYXE0WbOLd5mXnzZt7gCAc44vS9KqjsBKeHIY9m8eaBzKYuaBvzbecG2_af7r21ocEO8AuOcMS4bGSJw7ITN0xwmXE5gaZPDhWbQCnqbAI0Ef0AtqJoaR13>.

owned hearing aids in 2019-20.⁵⁷ It was assumed that hearing aids require replacement every five years, so it was estimated that 50,087 new hearing aids were provided in 2019-20.

The average purchase price of a hearing aid was estimated by calculating the average price of hearing aids. The average cost of a hearing aid was \$4,130 as of February 2020.⁵⁸ Multiplying this cost by the total number of new hearing aids purchased in 2019-20, it was estimated that private market expenditure on hearing aids was \$206.9 million in 2019-20. It is noted that this cost does not include the cost of maintaining existing aids nor any additional costs from the hearing assessment and hearing aid fitting process.

It is assumed that for every hearing aid sold there were approximately 1.7 additional hearing tests, based on data from the Department of Health.⁵⁹ According to the HSP Fee Schedule for 2019-20 the cost of a hearing assessment is \$141.90.⁶⁰

The HSP Fee Schedule identifies the cost of an initial fitting and rehabilitation of a monaural aid as \$440 and \$528 for binaural aids. Under the assumption that 87.3% of fittings are for binaural hearing aids, it was estimated that there were 23,345 binaural fittings and 3,396 monaural fittings.

It was assumed that audiologists and audiometrists provide maintenance services to all hearing aids that were not new or replaced in 2019-20. The HSP Fee Schedule lists the costs of maintenance and battery supply for a single hearing aid at \$76.80 and \$203.49 for two hearing aids. It was estimated that 13,585 people received maintenance for a monaural aid while 93,381 people received services for binaural hearing aids.

The total cost of privately funded hearing aids and other health professionals' costs, including assessments, fittings and maintenance are summarised in Table A.1. The total costs of private hearing aids and the associated services was estimated to be \$252.8 million.

[kspOoZz39IAuKPPeB8KGVSkO89QilJszRGaUIInkFFIALaTnCdNJxliqJ0phqBTCD2HDnxYYKQFyKRgZESoN81gzl_a dZUzd3cpdgb1w9p5jupqzJpJxyqXGCfdwNaH32xnUGbV2u9gWipbKEIU8Fzj4YhcOvrVLdVavx2Nkqz8YvD9JHPzPIz R1bepn9Jb7PqKJeT6R8PYD2Pyf_A!!/dl5/d5/L2dBIS9nQSEh/](http://www.hearingservices.gov.au/wps/portal/hso/site/about/legislation/contracts/schedule_fees_2019-2020/!ut/p/a1/rZFPT4NAEMW_iheOmx0WCtjpv-ktW2MVYELWZYFVinQsjX227sYY7wUbelCzVlymzfzcIxDHNf8TRVcq6bmVd_HXrK6H3I2AGRFn7ZzYGzzeLecuwS2gJ9xjGNR61aXOCq75kY0tZa1tqA9pZUSFpTNXlrA0-ZkhpUsVfD90i3opUcudGdBJ0qZnSqZ5FJ2COF7jAgQ6OGtUBmOMseXNHcpsm1PIJengFJuZ8j3c9fxuEe5kxq3kXELF4rBn44ZkMDoSzCwIjIe_ITQKbsdu3awnQUzYJPFbrmgAVIMR_jhyqOGgTu4Grj87Q3mjerlcIiZSbZP813j8P-jNVvIcT1ZF8Y81yVSddq8AcFh98UHF6itPs9dc7oNd9sEE_p2akK9gFfIH2o/dl5/d5/L2dBIS9nQSEh/)>.

⁵⁷ $250,435 = 133,708 * 2 * 0.873 + 133,708 * 0.127$. Note: Does not sum to exactly 250,435 due to rounding.

⁵⁸ This price was benchmarked using a range of hearing aids available for purchase online.

⁵⁹ Deloitte Access Economics, *The social and economic cost of hearing loss in Australia*. (2017). Report for the Hearing Care Industry Association, Canberra.

⁶⁰ The Department of Health, *Schedule of Fees 2019-20* (2019)

<http://www.hearingservices.gov.au/wps/portal/hso/site/about/legislation/contracts/schedule_fees_2019-2020/!ut/p/a1/rZFPT4NAEMW_iheOmx0WCtjpv-ktW2MVYELWZYFVinQsjX227sYY7wUbelCzVlymzfzcIxDHNf8TRVcq6bmVd_HXrK6H3I2AGRFn7ZzYGzzeLecuwS2gJ9xjGNR61aXOCq75kY0tZa1tqA9pZUSFpTNXlrA0-ZkhpUsVfD90i3opUcudGdBJ0qZnSqZ5FJ2COF7jAgQ6OGtUBmOMseXNHcpsm1PIJengFJuZ8j3c9fxuEe5kxq3kXELF4rBn44ZkMDoSzCwIjIe_ITQKbsdu3awnQUzYJPFbrmgAVIMR_jhyqOGgTu4Grj87Q3mjerlcIiZSbZP813j8P-jNVvIcT1ZF8Y81yVSddq8AcFh98UHF6itPs9dc7oNd9sEE_p2akK9gFfIH2o/dl5/d5/L2dBIS9nQSEh/>.

Table A.1: Other health professionals' expenditure summary, 2019-20

Component	Monaural/binaural	Number of people	Cost per person/aid	Total expenditure (\$ million)
New hearing aids	-	26,741	4,130	206.9
Assessments*	-	150,261	141.90	12.1
Fittings	Monaural	3,396	440.45	1.5
Fittings	Binaural	23,345	528.3	12.3
Maintenance	Monaural	13,585	76.81	1.0
Maintenance	Binaural	93,381	203.49	19.0
Total	-	133,708		252.8

Source: Deloitte Access Economics calculations based on ABS data (2019) and the Department of Health (2020).

*refers to the number of aids and not the number of people.

A.4 Other health services due to hearing loss

Additional health system costs derive from GP, specialist and outpatient visits as well as imaging, pathology and pharmaceuticals. The Australian Institute of Health and Welfare's (AIHW) disease expenditure report provides up to health system costs for close to 200 conditions, including hearing loss, by age, gender and cost component. These costs were adjusted for health inflation and demographic changes since 2015-16. The health system costs of hearing loss were estimated to be \$82.0 million in 2019-20.

Table A.2: Other health system costs summary, 2019-20

Component	Cost (\$ million)	Cost per person (\$)
Outpatient	25.7	6
GP	12.5	3
Medical specialists (other than GPs)	41.6	11
Imaging and pathology	2.1	1
Pharmaceuticals	0.2	0
Total other expenditure	82.0	21

Source: Based on AIHW (2019). Note: components may not sum to totals due to rounding.

A.5 Research

Research expenditure is included within the cost to the health system as, in the absence of hearing loss, there would not be a need for any research into the condition. In 2017, it was estimated that the value of research for all hearing loss was \$7.7 million.⁶¹ It is noted that it is difficult to accurately estimate the amount of private research undertaken annually due to a lack of available data, so any estimate of funding for hearing loss research may be an underestimate of the true cost.

After updating for health inflation since 2017, the cost of research expenditure was estimated to be \$8.0 million in 2019-20, assuming that research funding is relatively comparable year-on-year.

⁶¹ Deloitte Access Economics, *The social and economic cost of hearing loss in Australia*. (2017). Report for the Hearing Care Industry Association, Canberra.

A.6 Summary of health system costs

Total health system costs associated with hearing loss in Australia were estimated to be \$1.02 billion in 2019-20. The largest component was the HSP (\$590.0 million) followed by hearing aid expenditure in the private market (\$206.9 million).

The health system costs also include an allowance for unallocated costs such as capital expenditures, public health programs and health administration. These costs were estimated based on work by the AIHW (2005) where the unallocated component was estimated as 12.5/87.5 or 14.3% of all health expenditure.⁶² This ratio was applied to hospital costs, outpatient services, GPs, specialists, pathology and imaging, pharmaceutical costs, other professionals and research.

Table A.3 and Chart A.1 summarise the total health system costs of hearing loss in 2019-20.

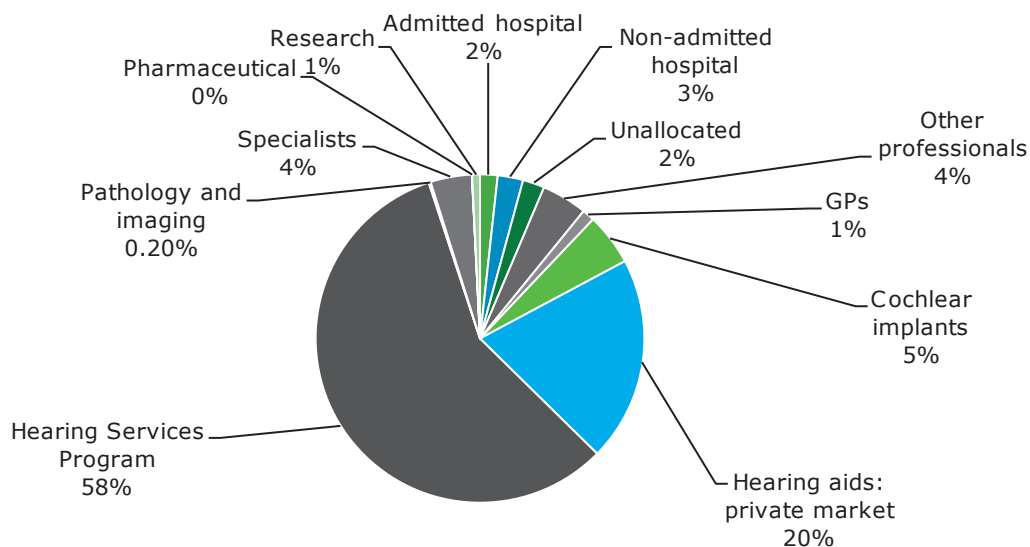
Table A.3: Health system costs, total and per person, 2019-20

Health system component	Cost (\$ million)	Cost per person (\$)
Admitted hospital	17.7	4
Outpatient	25.7	6
GPs	12.5	3
Cochlear implants	52.4	13
HSP	590.0	149
Hearing aids: private	206.9	52
Other health professionals	46.0	12
Research	8.0	2
Specialists	41.6	11
Pharmaceuticals	0.2	0
Pathology and imaging	2.1	1
Unallocated	21.9	6
Total	1,024.8	259

Source: Deloitte Access Economics estimates.

⁶² Australian Institute of Health and Welfare. 2005. *Health system expenditure on disease and injury in Australia, 2000-01 Second edition*, Cat. No. HWE 28, Health and Welfare Expenditure Series No 21, Canberra.

Chart A.1: Health system expenditure by component, 2019-20 (% total)

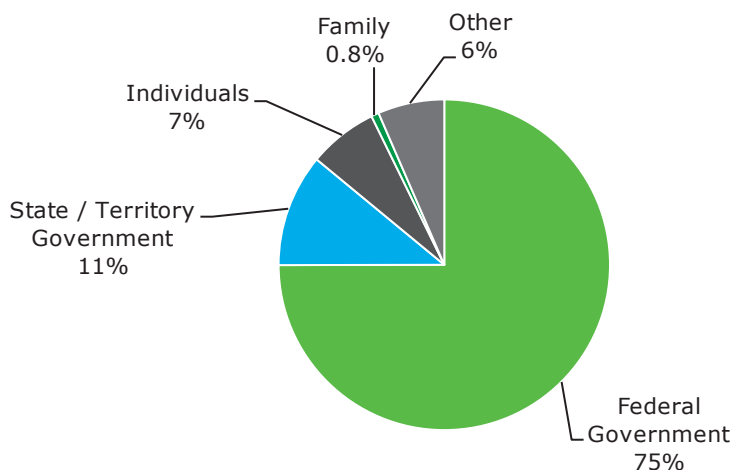


Source: Deloitte Access Economics estimates.

Chart A.2 estimates the breakdown of health system costs upon different sectors of society based on data from the AIHW.⁶³ In 2019-20, hearing loss was estimated to cost:

- the Federal Government \$768.3 million;
- State/Territory Governments \$113.1 million;
- individuals and families \$77.0 million; and
- other parties (such as private health insurers) \$66.5 million.

Chart A.2: Health system expenditure by who pays, 2019-20 (% total)



Source: Deloitte Access Economics estimates.

⁶³ Australian Institute of Health and Welfare, *Health expenditure Australia 2014-15* Cat. No. HWE 67, Canberra: AIHW.

Appendix B: Other financial costs of hearing loss

Hearing loss may place a significant burden on the individual, limiting their ability to function and engage in work or schooling. The productivity costs of hearing loss are estimated in terms of reduced workforce participation, absenteeism and presenteeism.

A human capital approach was adopted to estimate the productivity losses due to hearing loss in Australia. This approach calculates the differences in employment and production between people with hearing loss and that of the general population, with the difference multiplied by the average weekly earnings (AWE).

In addition, there are services that provide special education, additional training or other assistance to people with hearing loss. These are modelled as an additional cost upon society. Other financial costs include the deadweight losses resulting from higher taxes and government spending to support the provision of these services.

Key findings

- The total other financial costs due to hearing loss were estimated to be \$19.0 billion in 2019-20, or \$4,808 per person with hearing loss.
- The largest component of other financial costs was productivity losses from people with hearing loss (\$16.2 billion), followed by deadweight loss (\$1.9 billion) and education and support services (\$393.9 million).

B.1 Individual productivity losses

B.1.1 Reduced employment

Hearing loss may reduce the likelihood of employment for an individual either through disadvantages in job-seeking or self-selection out of the labour force. This productivity loss is captured through the lost wages that the individual otherwise would have gained if not for their hearing loss.

An overview of the existing literature assessing the extent that hearing loss leads to reduced employment is provided in Table B.1.

Table B.1: Summary of literature evaluating the effect of hearing loss on employment

Source	Setting	Employment gap
Hogan et al, 2009	Australia	Increased rate of non-participation in employment of 11.3%-16.6%.
Winn, 2007	Australia	Congenitally deaf males have a 26.9% higher unemployment rate.
Hogan et al, 1999	Australia	Employment rate for people aged 45-64 years with hearing loss was 20.5% lower for males and 16.5% lower for females than for people without hearing loss.
Dammeyer et al, 2019	Denmark	Employment rate for deaf and hard of hearing population was 29.4% lower than for people without hearing loss.
Mohr et al, 2000	United States	Labour force participation gap (severe to profound hearing loss) found to be 18% for ages 18-44, 19% for ages 45-64, and 6% for ages 65 and older.

Source: as noted.

Analysis of the 2018 SDAC found that the overall employment rate for persons with hearing loss in Australia was 58%. Males with hearing loss were comparatively more likely to be employed than females with hearing loss. Both males and females with hearing loss had, on average, a lower likelihood of being employed compared to their hearing colleagues (Table B.2). Hearing males have an average employment rate of 81%, while hearing females experience a 72% employment rate.

The significant exception is that hearing impaired males and females have a greater likelihood of employment between the ages 35-44. This finding was also evident in previous analysis of the 2015 SDAC.⁶⁴ The reason for the difference in this age-group is unclear, noting that some forms of early intervention or other factors may affect later employment rates. For example, analysis has previously shown that children who receive educational assistance through the First Voice early intervention program achieve better year 12 completion rates than the general population.⁶⁵

⁶⁴ Deloitte Access Economics, *The social and economic cost of hearing loss in Australia*. (2017). Report for the Hearing Care Industry Association, Canberra.

⁶⁵ Deloitte Access Economics, *Cost-benefit analysis of First Voice's early intervention program* (report for First Voice, 2017).

Table B.2: Employment rates for people with and without hearing loss, by age and gender

Gender/age	With hearing loss	Without hearing loss	Difference
Male			
15-24	40%	67%	-26%
25-34	77%	90%	-13%
35-44	93%	90%	3%
45-54	63%	87%	-24%
55-64	55%	71%	-15%
Female			
15-24	36%	66%	-31%
25-34	48%	77%	-29%
35-44	80%	78%	2%
45-54	71%	79%	-7%
55-64	40%	57%	-18%

Source: ABS, 2018

The difference in employment rates for people with hearing loss in each age category was applied to the general employment rates in Australia and AWE at different age categories. This resulted in a **total cost of \$12.6 billion in reduced employment due to hearing loss.**

B.1.2 Absenteeism

Absenteeism captures the average number of days per year that an employee takes off work as a result of hearing loss. This presents a productivity cost to the employer where the absenteeism rates for employees with hearing loss are higher than those for their employees without hearing loss.

There is limited literature studying the relationship between hearing loss and absenteeism. This may be attributed to the inconspicuous nature of the symptoms associated with hearing loss, which may not require sick leave to manage, that other more acute or episodic conditions do. However, people with hearing loss may still need to be absent from work to attend appointments for their hearing health, have aids fitted or maintained, or for other reasons related to their hearing loss.

It is well documented that a significantly higher proportion of people with hearing loss may need to take sick leave.^{66,67,68} One study found that the higher likelihood of hearing-impaired employees taking sick leave may be due to additional mental stress compared to their hearing able colleagues.⁶⁹

During the interview process, some interviewees were forced to withdraw due to a sudden recurrence of conditions associated with their hearing loss (e.g. ear infection). In one case, the infection prevented the person from using their hearing aids, meaning they were unable to talk to us or participate in work.

⁶⁶ Carlsson, PI, Hjaldaahl, J, Magnuson, A, Ternevall, E, Edén, M, Skagerstrand, Å, & Jönsson, R, 'Severe to profound hearing impairment: quality of life, psychosocial consequences and audiological rehabilitation' (2015) 37(20) *Disability and rehabilitation* 1849.

⁶⁷ Rydberg, E, Gellerstedt, LC, and Danermark, B, 'The position of the deaf in the Swedish labor market' (2010) 155(1) *American Annals of the Deaf* 68.

⁶⁸ Dammeyer, J, Crowe, K, Marschark, M, & Rosica, M, 'Work and Employment Characteristics of Deaf and Hard-of-Hearing Adults' (2019) *The Journal of Deaf Studies and Deaf Education* 1.

⁶⁹ Kramer, SE, Kapteyn, TS, and Houtgast, T, 'Occupational performance: Comparing normally-hearing and hearing-impaired employees using the Amsterdam Checklist for Hearing and Work: Desempeño laboral: Comparación de empleados con audición normal o alterada usando el Listado Amsterdam para Audición y Trabajo' (2006) 45(9) *International journal of audiology* 503.

Three studies were identified that estimate the specific impact of hearing loss on absenteeism, summarised in Table B.3. Briefly, these studies are summarised as follows:

- Joore et al (2003)⁷⁰ focused on the impact of hearing aid fittings on societal and quality of life outcomes among moderately hearing impaired people. Only 10 of the studied people were in paid employment, although none of them reported any absence from work for any health condition.
- Kramer et al (2006)⁷¹ measured occupational difficulties in 150 hearing impaired employees using then Amsterdam Checklist for Hearing and Work. On average, the hearing impaired cohort were absent from work for 26.3 days during a 12 month period compared to 6.0 days for participants with normal hearing.
- Nachtegaal et al (2012)⁷² studied 1,295 adults and reported the amounts of sick leave taken by those with hearing loss and their hearing colleagues. Of those with “good” hearing, employees reported an average of 3.1 days of sick leave in the past 4 months. In comparison, the average reported days of sick leave across people classified as having “insufficient” or “poor” hearing was 4.3 days. The annualised difference between the two groups was an estimated 3.5 days of additional sick leave.

Table B.3: Impact of hearing loss on absenteeism

Reference	Sample size	Average difference in sick days
Joore et al, 2003	10	0
Kramer et al, 2006	150	20.3
Nachtegaal et al, 2012	181	3.5

Source: as noted.

To estimate the impact of hearing loss on absenteeism, the results of the study by Nachtegaal et al (2012) were used, as it was the largest, most representative and well-constructed study. Applying this to the estimated number of employed people with hearing loss and by AWE by age and gender resulted in a **total cost from absenteeism due to hearing loss of \$1.5 billion.**

B.1.3 Presenteeism

Presenteeism refers to the average number of hours per working day that an employee experiences reduced performance as a result of their condition. Presenteeism has the potential to place a significant cost on employers by reducing the quality of work produced by affected employees or by reducing the efficiency by which the work is performed.

Due to the relative infancy of this area of study in academia, limited data on presenteeism were available. In one study, self-reported productivity estimated were collected using the World Health Organization Health Performance Questionnaire (HPQ).⁷³

Differential work productivity, which measured each employee’s perception of their own performance against their perception of the performance of the average employee, was found to be higher for employees in the National Hearing test “Good” category, at an average of 0.32, than for employees in the “Insufficient” and “Poor” categories, who reported averages of

I noticed customers were arguing with me because of my tone. Later I realised that I was yelling at the customers by accident. – David

⁷⁰ Joore, MA, Brunenberg, DE, Chenault, MN, & Anteunis, LJ, ‘Societal effects of hearing aid fitting among the moderately hearing impaired: Efectos sociales de la adaptación de auxiliares auditivos en pacientes con impedimentos auditivos moderados’ (2003) 42(3) *International Journal of Audiology* 152.

⁷¹ Kramer, SE, Kapteyn, TS, and Houtgast, T, ‘Occupational performance: Comparing normally-hearing and hearing-impaired employees using the Amsterdam Checklist for Hearing and Work: Desempeño laboral: Comparación de empleados con audición normal o alterada usando el Listado Amsterdam para Audición y Trabajo’ (2006) 45(9) *International journal of audiology* 503.

⁷² Nachtegaal, J, Festen, JM, and Kramer, SE, ‘Hearing ability in working life and its relationship with sick leave and self-reported work productivity’ (2012) 33(1) *Ear and hearing* 94.

⁷³ Nachtegaal, J, Festen, JM, and Kramer, SE, ‘Hearing ability in working life and its relationship with sick leave and self-reported work productivity’ (2012) 33(1) *Ear and hearing* 94.

0.18 and 0.04 respectively. Relative productivity was calculated for each of the categories and a weighted average produced for the “Insufficient” and “Poor” categories. In comparison to the “Good” score of 1.04, the average score for relative productivity for “Insufficient” and “Poor” was found to be 1.02.

Based on calculations with data from Nachtegaal et al (2012), it was estimated that hearing loss leads to a small increase in presenteeism, resulting on average in a 2.8% ($=1.02/1.04-1$) decrease in productivity relative to that of an employee without hearing loss. Applying this to the Australian general population employment rates and AWE by age and gender, the **total cost associated with presenteeism due to hearing loss was estimated to be \$2.2 billion in 2019-20.**

B.2 Informal care productivity losses

Informal care refers to assistance provided free of charge by family members or friends to the person with hearing loss. Although this assistance is provided free of charge, there is an opportunity cost associated with the loss of time that could otherwise have been spent by the carer on labour or leisure activities. An opportunity cost approach was used to estimate the cost of informal care.

B.2.1 Recipients of care

The 2018 SDAC provides data on the number of people with hearing loss as their main disability type who reported requiring assistance with communication. According to the survey there were approximately 43,400 people who met this criterion in 2018. Inflating this number by prevalence growth led to an estimate of the number of people requiring informal care in 2019-20 of 45,194.

B.2.2 Hours of informal care provided

The 2018 SDAC provided an indication of the number of hours per week that people with hearing loss receive, which was equal to about 22.1 hours of informal care per week. By comparison, people with no hearing loss and no other disability received on average 14.3 hours of informal care per week. The difference of 7.8 hours per week represents the additional number of care hours each week for someone with hearing loss.

B.2.3 Cost of informal care

To derive the annual estimate of the provision of informal care, the number of people requiring care was multiplied by the annual hours of care provided ($=7.8$ hours per week $\times 52$ weeks $\times 45,194$ people).

The value of each hour of informal care was calculated by estimating the opportunity cost of an informal carer’s time. This was calculated by multiplying the AWE (adjusted for age and gender) for the carers (and translated to an hourly wage of \$30.73) by the probability that they were employed.

Multiplying the opportunity cost of a carer’s time by the number of hours of informal care provided to people with hearing loss resulted in an estimated **cost of informal care provided to people with hearing loss of \$174.7 million in 2019-20.**

B.3 Education and support services

Children who have hearing loss on average tend to have poorer educational and employment outcomes than children without hearing loss.⁷⁴ The Australian education system provides supports through early intervention services and additional vocational training services, which can lead to improved educational outcomes for participants. The following sections outline the estimated costs of these programs.

B.3.1 Early intervention services

Early intervention services available to children with hearing loss include:

- neo-natal hearing screening services;

⁷⁴ Deloitte Access Economics, *Cost-benefit analysis of FirstVoice’s early intervention program* (report commissioned by FirstVoice, 2017).

- early intervention programs for children aged less than 3 years, involving individual and/or group interventions and encompassing mode specific (sign/speech) interventions; and
- pre-school education programs either at a specialist centre or visiting services to existing pre-schools.

First Voice is the national voice for member organisations whose primary focus is the provision of listening and spoken language therapy services in Australia and New Zealand. Early intervention services are offered to children with hearing impairment from birth until the child starts compulsory schooling (typically the age of 5 years). In 2015 terms, the cost of providing these programs through First Voice were approximately \$18,000 per child or \$19,347 in 2019-20 dollars.⁷⁵ After adjusting 2018 program numbers for demographic changes, it was estimated that the First Voice spoken languages outcomes program was available to 1,589 children in 2019-20.⁷⁶ The **total program costs were estimated to be approximately \$30.7 million.**

B.3.2 Primary and secondary education services

The *Disability Standards for Education 2005* outline the obligations of education and training providers and seek to ensure that students with disability can have access to education on the same basis as other students. The Nationally Consistent Collection of Data on School Students with Disability (NCCD) provides an outline of the support available to people with hearing loss. The four levels of support are:

- **Support provided within quality differentiated teaching practice:** These adjustments are provided through usual school processes, without drawing on additional resources, and by meeting proficient-level Teaching Standards (AITSL) – no additional funding.
- **Supplementary adjustments:** These adjustments are supplementary to the strategies and resources already available for all students within the school - \$4,764 per student per annum.
- **Substantial adjustments:** These adjustments are for more substantial support needs and are provided with considerable adult assistance - \$16,561 per student per annum.
- **Extensive adjustments:** These adjustments are for high support needs, provided with extensive targeted measures and sustained levels of intensive support. The adjustments are highly individualised, comprehensive and ongoing - \$35,390 per student per annum.

Children with hearing loss will receive different levels of support depending on their personal circumstances. Some students may be able to work independently through the use of hearing aids or cochlear implants, though other students may require full time signing interpreters or support from a teacher of the deaf.⁷⁷

In 2017, it was estimated that 28,985 students with a sensory disability required support from the NCCD.⁷⁸ It was assumed that 50% of these students required support for hearing loss. After adjusting for demographic changes it was estimated that 15,103 children required support from the NCCD in 2019-20.

Jennifer did not receive support for her hearing loss during her primary and secondary schooling. She found it difficult to concentrate because of her hearing loss and left school without taking her final exams.

Data from the Australian Curriculum, Assessment and Reporting Authority indicates that 34.3% of children with a sensory impairment receive support through quality differentiated teaching practice, 40.0% required supplementary adjustments, 17.1% required substantial adjustments

⁷⁵ Deloitte Access Economics, *Cost-benefit analysis of FirstVoice's early intervention program* (report commissioned by FirstVoice, 2017).

⁷⁶ First Voice, *The Future is hear* (2019) <https://www.firstvoice.org.au/wp-content/uploads/2019/12/2019-December-Newsletter_Our-Voice_WEB.pdf>.

⁷⁷ NCCD, *Case Study: Alistair, Extensive, Sensory* (2019) NCCD <<https://www.nccd.edu.au/case-studies/alistair-extensive-sensory>>.

⁷⁸ Nationally Consistent Collection of Data, *2017 data on students in Australian schools receiving adjustments for disability* (2017) <<http://www.educationcouncil.edu.au/site/DefaultSite/filesystem/documents/Reports%20and%20publications/Publications/Glossy%202017%20NCCD%20Public%20Report%20FINAL.pdf>>.

and the remaining 8.5% required extensive adjustments.⁷⁹ Taking a weighted average of the adjustment types, it was assumed that each child with hearing loss requiring educational supports required approximately \$7,864 in 2019-20.

After multiplying the total number of children receiving additional support by the cost of providing these services, it was estimated that the **total cost of educational support in 2019-20 was \$118.8 million.**

B.3.3 Post school education services

Hearing impaired students consume considerable services in higher education. Interpreters and note takers have been identified as particularly high cost items.⁸⁰ Many post-secondary education institutions such as TAFE New South Wales and the University of Melbourne provide Auslan Sign Language Interpreters and note takers where appropriate for deaf or hearing impaired students; however, no national or state based cost estimate was available.

The Disability Support Programme (DSP) helps to remove barriers to access for domestic students with disabilities so they can participate in higher education. In 2011, \$6.1 million was made available to higher education providers to support access to and participation in higher education by people with disability. The program consists of three components, of which the Additional Support for Students with Disabilities (ASSD) makes up approximately 85% of the total funds. In a review of the DSP in 2013, approximately 12% of students claiming higher education support through the ASSD had a hearing related disability.⁸¹ After adjusting total expenditure on the DSP to 2019-20 dollars (\$7.5 million), it was estimated that \$6.4 million was attributed to the ASSD program. Of this it was estimated that **\$0.8 million in funding was allocated to people with hearing disabilities under the ASSD.**

B.3.4 Interpreter services

The private cost of Auslan services was based on the estimates published in Deloitte Access Economics report (2017), adjusted for prevalence growth to estimate the number of hours for interpreter services for 2019-20 (338,252 hours). The Auslan Connections website lists the hourly rate for Auslan interpreting service as \$107.50 in 2020.⁸² The hourly rate was multiplied by the total number of hours of interpreting services provided in 2019-20. The **total cost of interpreting services was estimated to be \$36.4 million.**

B.3.5 Captioning

The Australian Communications and Media Authority regulates television captioning in Australia. Captions must comply with requirements set out in legislation, industry codes of practice and the Television Captioning Quality Standard. Free-to-air television broadcasters are required to caption all news and current affairs programs and any program screened on their primary or main channels between 6am to midnight, unless the program is music-only or not in English. Subscription television licensees have annual targets on the number of programs that must be captioned. These targets vary depending on the category of the channel.⁸³

⁷⁹ Australian Curriculum, Assessment and Reporting Authority, *School Students with Disability* (2017) <<https://www.acara.edu.au/reporting/national-report-on-schooling-in-australia-data-portal/school-students-with-disability>>.

⁸⁰ Devlin, Y, 'Students with disabilities in higher education: at whose cost and at what price?' (Discussion paper, Equity and Diversity Unit, University of New South Wales, August 2000, Sydney).

⁸¹ KPMG, 2015, *Department of Education and Training Evaluation of Disability Support Program Final Report*, https://docs.education.gov.au/system/files/doc/other/dsp_evaluation_report_final_june_2015.pdf, accessed January 2020.

⁸² Auslan Connections, *Fees and Agreements* (2020) <<http://auslanconnections.com.au/fee-agreements/>>.

⁸³ Department of Communications and the Arts, *Accessible Television* (2017) Department of Communications and the Arts <<https://www.communications.gov.au/what-we-do/television/accessible-television>>.

In 2017-18, the Australian Communications and Media Authority reported that free-to-air television broadcasters provided approximately 600,000 hours of captioned programs on their primary services.⁸⁴

The average cost of captioning services was based on a submission made by the Australian Broadcasting Corporation in 2010. The Australian Broadcasting Corporation estimated that captioning 100% of content across 4 channels would cost \$12 million per annum.⁸⁵ For this report, it was conservatively assumed that all hours of content would be captioned (i.e. 24 hours per day for four channels)⁸⁶, which means that the average cost of captioning was approximately \$342 per hour in 2010. For this report, we have assumed that the cost of captioning was therefore \$406 per hour, by updating the estimate to 2019-20 dollars using consumer price inflation. Accurate captioning services are typically resource intensive and require human translation, which means that captioning costs are likely to grow with inflation. It is possible in the future that technology improvements will reduce the cost of captioning.

There is a need for greater accessibility, such as movies having subtitles – Rhonda

Captioning services for hearing loss were estimated to cost \$243.6 million in 2019-20.

B.3.6 Telecommunications

The National Relay service (NRS) is a government initiative that allows people who have a hearing and/or speech impediment to make and receive phone calls. The service is available 24 hours a day and relays more than a million calls each year throughout Australia.⁸⁷ The cost of providing the service is reported by the Department of Communications and the Arts each quarter. In 2017-18, the total cost of the NRS was estimated to be \$31.2 million.⁸⁸ It is assumed that two thirds of this cost is attributed to people with hearing loss while the other third is attributed to people with speech impairments. After adjusting for inflation, it was estimated that the **total cost of the NRS was \$21.2 million in 2019-20.**

B.4 Formal Care

The National Disability Insurance Scheme (NDIS) is one of the major formal care services in Australia that provide supports to people with permanent and significant disabilities. To be an eligible participant under the NDIS, a person with hearing loss must satisfy one of the following criteria:

- Under 65 years of age at the time of applying to the NDIS
- People aged between birth and 25 years of age with confirmed results from a specialist audiological assessment consistent with hearing loss ≥ 25 dBHL in either ear.
- People aged 26 years or older who have *substantially reduced functional capacity* (The NDIS Operational Guidelines provide that this is generally satisfied for hearing impairment ≥ 65 dBHL in the better ear).

NDIS funding is used for a range of supports and may be related to a person's education, employment, social participation, independence, living arrangements and health and wellbeing.⁸⁹ It

⁸⁴ Australian Communications and Media Authority, *TV captioning results in 2017-18* (2018)

<<https://www.acma.gov.au/Citizen/TV-Radio/Television/Captioning/tv-captioning-results-in-2017-18>>.

⁸⁵ Australian Broadcasting Network, *Access to Electronic Media for the Hearing and Vision Impaired: Discussion Report. Submission to Department of Broadband, Communications and the Digital Economy* (2010)

<<https://about.abc.net.au/wp-content/uploads/2012/06/ABCSubmissionAccessElectronicMediaFeb2010.pdf>>

⁸⁶ Some services are excluded from captioning requirements: for example, non-English shows or music only.

⁸⁷ Department of Communication and the Arts 2019, *National Relay Service*,

<<https://www.communications.gov.au/what-we-do/phone/services-people-disability/accesshub/national-relay-service>>.

⁸⁸ Department of Communications and the Arts 2018, *National Relay Service—quarterly performance report—quarter 4, 2017-2018*, <<https://www.communications.gov.au/documents/national-relay-service-quarterly-performance-report-quarter-4-2017-2018>>.

⁸⁹ Department of Communications and the Arts 2018, *National Relay Service—quarterly performance report—quarter 4, 2017-2018*, <<https://www.communications.gov.au/documents/national-relay-service-quarterly-performance-report-quarter-4-2017-2018>>.

is noted that communication aids such as reading, writing or speaking aids are likely to be available to individuals through the NDIS. As such, these costs have not been considered elsewhere in the report.

As of December 2019, there were 15,272 participants on the NDIS with a hearing impairment, with the average funding estimated to be \$15,192 per participant.⁹⁰ The **total estimated NDIS funding for hearing impairment is \$232.0 million in 2019-20.**

B.5 Deadweight losses

Funding transfers from one economic entity to another through taxation creates distortions and inefficiencies in the economy. These distortions present real net costs to the economy known as deadweight losses.

Though taxation transfers are not real costs of themselves they have been estimated, along with public funding of health care and other government programs to calculate the cost associated with a loss in allocative efficiency due to hearing loss.

The following sections outline the reduced taxation revenue available to government and deadweight losses associated with taxation required to fund public systems (e.g. health, disability and education payments).

B.5.1 Taxation revenue

People with hearing loss experience reduced earnings from lower employment participation and lower productive output. This results in forgone income and consumption taxation (revenue collected by the Australian government). Lost taxation revenue was estimated by applying an average personal income tax rate and average indirect taxation rate to lost earnings.

The average rates of taxation were derived by dividing net income tax and net indirect tax by the taxable income. This method was also used to derive the average company tax rate, which was then applied to lost company earnings (through reduced output). Again, net tax for companies was divided by the total taxable income for companies. The respective tax rates used in the calculation of deadweight losses were:

- 22.4% average personal income tax rate, and 12.6% average indirect tax rate; and
- 23.7% average company tax rate.

Applying these tax rates to the total productivity impacts (including informal care costs), the total loss of tax revenue was estimated to be \$5.3 billion in 2019-20.

B.5.2 Welfare payments

The main forms of supports for people with hearing loss of working age or their carers include:

- The **Disability Support Pension (DSP)** is an income support payment for people who are unable to work for 15 hours or more per week at or above the relevant minimum wage, independent of a Program of Support, due to permanent physical, intellectual or psychiatric impairment.⁹¹
- **Newstart Allowance** is an income support payment for people who are looking for work, or participating in approved activities that increases a person's likelihood of finding a job. A Newstart Allowance claimant must be 22 years or older but under the pension age, prepared to enter a job plan and not involved in industrial action.⁹²
- **Carer Payment:** is a means-tested income support payment payable to people who cannot work full time because they provide home-based care to an adult or child who has a severe

⁹⁰ National Disability Insurance Scheme 'COAG Disability Reform Council' (Quarterly Report, 30 September 2019) <<https://www.ndis.gov.au/about-us/publications/quarterly-reports>>.

⁹¹ Department of Human Services, *Disability Support Pension* (2019) <<https://www.humanservices.gov.au/customer/services/centrelink/disability-support-pension>>.

⁹² Department of Human Services, *Newstart Allowance* (1 May 2019) <<https://www.humanservices.gov.au/individuals/services/centrelink/newstart-allowance>>.

and long-term disability or health condition, or the equivalent amount of care to a number of less disabled people.⁹³

- **Carer Allowance:** is a non-means tested income supplement for people who provide daily care to a person with a long-term disability or health condition.

Deloitte Access Economics (2017) reported that across all people with hearing loss, there were 3,367 receiving the DSP, 1,313 receiving Newstart Allowance, 1,534 receiving Carer Payments, and 7,891 receiving Carer Allowance. These were adjusted by prevalence growth to estimate the number of welfare recipients in 2019-20 (Table B.4).

Table B.4: Welfare payments to support people with hearing loss, 2019-20

Payment type	Average annual payment (\$)	Number of recipients	Total cost per annum (\$million)
DSP	\$22,207	3,585	69.1
Newstart Allowance	\$14,175	1,390	17.2
Carer Payment	\$19,656	1,640	32.2
Carer Allowance	\$3758	8,479	31.9
Total			150.4

Source: Based on Deloitte Access Economics (2017).

B.5.3 Deadweight loss of taxation payments and administration

Deadweight losses increase when taxes are raised above the level that they would otherwise have been in the absence of hearing loss. This report assumes that governments maintain a budget neutral position despite the decreased tax revenue and increased government spending (e.g. to pay for additional health services) resulting from hearing loss. Maintaining the revenue neutral position requires governments to increase taxes above what they would have been in the absence of hearing loss to:

- maintain the same amount of tax revenue despite a smaller pool of taxable income from individuals and taxable profits from businesses (see section B.5.1); and
- pay for additional government spending in areas such as health care and education as a result of hearing loss.

To estimate the deadweight loss due to lost taxation revenue, it is assumed the government raises taxation upon individuals and businesses. Every dollar of addition taxation imposes various burdens on the efficiency of society. Previous analyses have reported the marginal burden of various government taxes.^{94,95} These are:

- income tax: \$0.26 for every \$1 raised;
- company tax: \$0.51 for every \$1 raised;
- goods and services tax: \$0.19 for every \$1 raised; and
- state taxes impose a range of marginal burdens from taxes on gambling, insurance, motor vehicles, and payroll, and stamp duties.

Table B.5 shows the estimated reduced income and health expenditure payments, the applied efficiency loss of raising taxation, and the resulting deadweight losses due to hearing loss in

⁹³ Department of Human Services, *Carer Allowance* (4 February 2019) <<https://www.humanservices.gov.au/individuals/services/centrelink/carers-allowance>>.

⁹⁴ Cao L, Hosking A, Kouparitsas M, Mullaly D, Rimmer X, Shi Q, Stark W, Wende S, 'Understanding the economy-wide efficiency and incidence of major Australian taxes', (2015) The Australian Government the Treasury, Canberra.

⁹⁵ KPMG Econtech, *CGE analysis of the current Australian tax system (report commissioned by the Australian Government the Treasury, 2010)* <http://taxreview.treasury.gov.au/content/html/commissioned_work/downloads/kpmg_econtech_efficiency%20of%20taxes_final_report.pdf>.

2019-20. All rates of efficiency loss include a 0.8% administrative loss which covers expenses of administering taxation.⁹⁶

Total deadweight losses due to hearing loss were estimated as \$1.9 billion in 2019-20.

Table B.5: Deadweight losses due to hearing loss in 2019-20

Cost component	Total cost (\$m)	Rate of efficiency loss (%)	Resulting deadweight loss (\$m)
Commonwealth health expenditure	768.3	29.5%	226.7
State health expenditure	113.1	37.9%	42.8
Welfare payments	150.4	29.5%	44.4
Lost consumer taxes	4,393.5	23.7%	1,042.5
Lost company taxes	829.8	50.8%	421.9
Lost carer taxes	60.3	23.7%	14.3
Other government programs	384.3	29.5%	113.4
Total	6,699.5	-	1,906.0

Source: Deloitte Access Economics analysis.

B.6 Summary of other financial costs

Overall, the total cost of hearing loss outside of health system expenditure was estimated to be \$19.0 billion in 2019-20, or \$4,808 per Australian with hearing loss. The largest component of other financial costs is productivity losses associated with people with hearing loss (\$16.2 billion), followed by deadweight loss (\$1.9 billion) and education and support services (\$430.2 million). Table B.6 summarises the total other financial costs attributed to hearing loss in 2019-20.

Table B.6: Other financial costs due to hearing loss in 2019-20

Cost Component	Total (\$ million)	Per person (\$)
Productivity losses	16,238.7	4,109
Carers	406.7	103
Education and support services	430.2	109
NRS	21.2	5
Deadweight loss	1,906.0	482
Total	19,002.8	4,808

Source: Deloitte Access Economics. Note: components may not sum due to rounding.

⁹⁶ Australian Taxation Office (ATO), *Annual report 2015-16* (2016) <<https://annualreport.ato.gov.au/>>.

Appendix C: Loss of wellbeing due to hearing loss

Beyond financial costs, there are substantial losses of wellbeing for those who have experienced a loss of hearing. These arise from the suffering and premature death associated with hearing impairments and can be quantified using the burden of disease methodology.

Key finding

- Overall, it was estimated that there were 96,768 years lost to disability and 1,233 lives lost due to premature mortality (discounted at 3% per year) due to hearing loss in Australia in 2019-20. Thus, 98,001 years of healthy life were lost due to hearing loss.
- Converted to a dollar estimate using the value of a statistical life year, the total cost associated with the loss of wellbeing from hearing loss was estimated to be \$21.2 billion in 2019-20.

C.1 Valuing life and health

The burden of disease methodology is a non-financial approach to quantifying the loss of wellbeing, where life and health are measured in terms of DALYs. DALYs account for both years of healthy life lost due to disability (YLDs) and years of life lost due to premature mortality (YLLs). One DALY is equivalent to one year of healthy life lost.

Disability weights are assigned to various health states, where zero represents perfect health and one is equivalent to death. Other health states are given a weight between zero and one to reflect the loss of wellbeing from a particular condition relative to perfect health. For example, a disability weight of 0.2 is interpreted as a 20% loss in wellbeing relative to perfect health for the duration of the condition.

DALYs can be converted into a dollar figure using an estimate of the value of a statistical life year (VSLY), an estimate of the value society places on an anonymous life. The Department of Prime Minister and Cabinet (2019) estimated the net VSLY (that is, subtracting financial costs borne by individuals) to be \$213,000 in 2019 dollars,⁹⁷ or approximately \$216,626 when inflated to 2020 dollars.

C.2 Mortality and cognitive decline due to hearing loss

C.2.1 Risk of mortality

Hearing loss has been associated with mortality in several studies, even after controlling for confounding factors such as age, gender, comorbid conditions and other indirect factors.

⁹⁷ Department of Prime Minister and Cabinet, *Best Practice Regulation Guidance Note: Value of Statistical Life*, Australian Government, Canberra (2019) <https://www.pmc.gov.au/sites/default/files/publications/value-of-statistical-life-guidance-note_0_0.pdf>

There are a number of pathways through which people who have suffered hearing loss may experience a heightened risk of mortality. Genther et al (2015) suggested that hearing impairment may increase the risk of accident and injury, and cited studies that report an increased risk of falls and hospitalisations in people with hearing loss. For example, Lopez et al (2011) found that hearing loss was significantly associated with an increased risk of falls, and borderline significance for risk of being injured by a fall. Moreover, Genther (2013) found that hearing loss was significantly associated with any hospitalisation and number of hospitalisations.

The suggested mechanisms include confounding factors with shared conditions (e.g. microvascular conditions), increased brain processing requirements due to degraded auditory signals, and social isolation. Genther et al (2015) highlighted that these mechanisms are not mutually exclusive, meaning that they can coexist and contribute to increased mortality and reduced functioning in older adults with hearing loss.

People interviewed experienced numerous safety issues due to their hearing loss. These included dangers crossing the road, not hearing emergency vehicles or other alarms, and difficulty making phone calls to emergency services.

C.2.2 Deaths due to hearing loss

Deaths due to hearing loss were estimated using a population attributable fraction (PAF) approach.⁹⁸

The literature summarised in Deloitte Access Economics (2017) suggests that those aged 70 years or more who have suffered moderate or worse hearing loss may be at a 10% higher risk of mortality than the general population.⁹⁹ The mortality rates for this cohort were estimated by applying the PAF to the general population mortality rates for people aged 70 years or older. Deaths in the general population for 2019-20 were based on mortality rates from the ABS for 2017-18.¹⁰⁰

Chart C.1 shows the estimated number of deaths due to hearing loss by age and gender. Overall, it was estimated that there were 137 deaths due to hearing loss in Australia in 2019-20.

Table C.1: Estimated deaths due to hearing loss, by age and gender, 2019-20

Age	Male	Female	Person
70-74	13	2	15
75-79	40	8	48
80-84	32	7	40
85-89	16	4	21
90+	10	4	14
Total	111	26	137

Source: Deloitte Access Economics estimates. Components may not sum to totals due to rounding.

⁹⁸ The PAF measures the contribution of a risk factor to a death. This is the proportional reduction in population mortality that would occur if hearing loss did not occur. The PAF is calculated using the formula:

$$PAF = P_{HL} * \frac{HR_{HL} - 1}{1 + P_{HL} * (HR_{HL} - 1)}$$

Where P_{HL} is the prevalence of hearing loss and HR_{HL} is the hazard ratio (HR) of mortality. The HR was assumed comparable to relative risk.

⁹⁹ Deloitte Access Economics, *The social and economic cost of hearing loss in Australia*. (2017). Report for the Hearing Care Industry Association, Canberra.

¹⁰⁰ Australian Bureau of Statistics, *Deaths, Australia, 2018*, Cat. No. 3302.0 (2019).

C.3 Estimating the lost wellbeing from hearing loss

The YLDs associated with hearing loss were estimated by applying the disability weights for mild, moderate and severe hearing loss to the number of people living with each level of hearing loss. These disability weights were taken from the Global Burden of Disease study,¹⁰¹ where disability weights are available for mild, moderate, severe, profound and complete impairments. Those used in this study were:

- 0.010 for mild hearing loss
- 0.027 for moderate hearing loss
- 0.176 for severe hearing loss.

If I didn't have my hearing aids I would likely be depressed – David

The YLLs due to hearing loss were estimated by multiplying the number of deaths in each age and gender group by the expected years of life remaining at the age of death. Average life expectancy data was obtained from the Australian Burden of Disease Study. A discount rate of 3% was applied to the calculations while no age weighting or discount was applied to the estimates of YLLs or YLDs.

Table C.2 breaks down the total estimated DALYs from hearing loss in Australia in 2019-20 by severity, age and gender.

¹⁰¹ Global Burden of Disease Collaborative Network. *Global Burden of Disease Study 2017 (GBD 2017) Disability Weights*. Seattle, United States: Institute for Health Metrics and Evaluation (IHME) (2018).

Table C.2: DALYs attributable to hearing loss in Australia in 2019-20, by age and gender

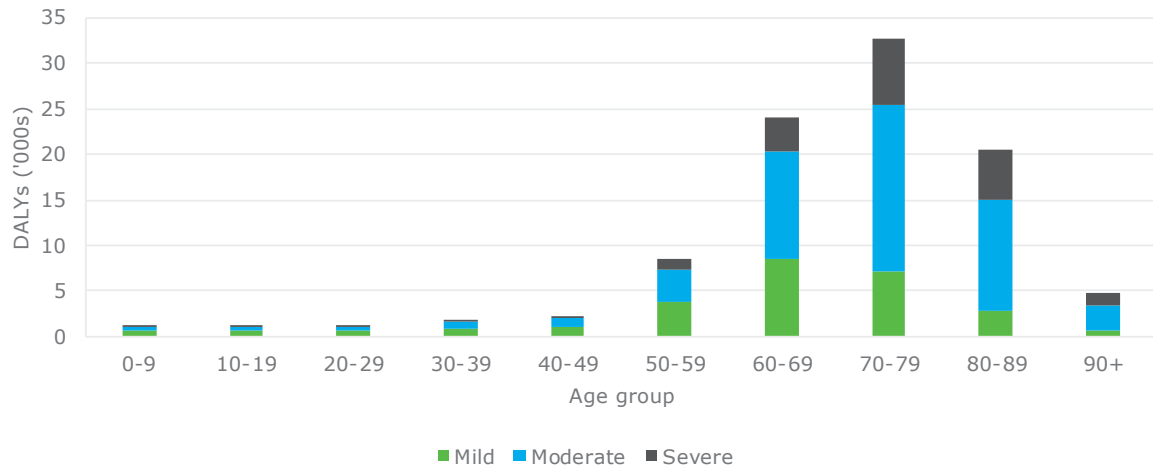
Age/gender	YLDs	YLLs	DALYs	DALYs (\$millions)
Male				
0-9	587	0	587	127
10-19	558	0	558	121
20-29	776	0	776	168
30-39	1,226	0	1,226	265
40-49	1,502	0	1,502	325
50-59	6,498	0	6,498	1,408
60-69	14,319	0	14,319	3,102
70-79	21,361	602	21,963	4,737
80-89	12,617	338	12,954	2,799
90+	2,528	39	2,567	556
<i>Male total</i>	<i>61,971</i>	<i>978</i>	<i>62,950</i>	<i>13,608</i>
Female				
0-9	555	0	555	120
10-19	528	0	528	114
20-29	347	0	347	75
30-39	526	0	526	114
40-49	825	0	825	179
50-59	1,947	0	1,947	422
60-69	9,682	0	9,682	2,097
70-79	10,694	144	10,838	2,342
80-89	7,460	95	7,555	1,634
90+	2,232	16	2,248	487
<i>Female total</i>	<i>34,797</i>	<i>255</i>	<i>35,052</i>	<i>7,585</i>
Person total	96,768	1,233	98,001	21,193

Source: Deloitte Access Economics estimates.

Overall, it was estimated that there were 96,768 YLDs and 1,233 YLLs (discounted at 3% per year) due to hearing loss in Australia in 2019-20, summing to a total 98,001 DALYs.

Converted to a dollar estimate using the VSLY, the total cost associated with the loss of wellbeing from hearing loss was estimated to be \$21.2 billion in 2019-20.

Chart C.1: Loss of wellbeing due to hearing loss in 2019-20 ('000s)



Source: Deloitte Access Economics estimates.

Appendix D: Hearing services costs and recipients

D.1 Existing recipients of hearing aids

Data for this section were drawn from a special data request submitted to the Department of Health and the literature to establish an estimate of the total number of individuals with hearing aids.

Data from the Department of Health provided the number of people with hearing loss in Australia who are recipients of hearing aids through the HSP, stratified by age and gender. It was estimated that government-funded hearing aids constitute approximately 80 per cent of the market in Australia.¹⁰² As such, the total number of hearing aid recipients through the HSP was adjusted to account for the additional 20% who have received an aid but are not recipients of the HSP (e.g. self-funded, philanthropic programs).

Table D.1: Estimated number of hearing aid recipients through the HSP and other pathways, 2019-20

Age/gender	HSP recipients	NDIS recipients	Other recipients	Total
Male				
26-49	6,359	243	1,347	7,949
50-64	24,809	1,765	4,437	31,012
<i>Male total</i>	<i>31,169</i>	<i>2,008</i>	<i>5,784</i>	<i>38,961</i>
Female				
26-49	8,995	349	1,900	11,244
50-64	26,439	1,906	4,704	33,049
<i>Female total</i>	<i>35,434</i>	<i>2,254</i>	<i>6,604</i>	<i>44,293</i>
Total	66,603	4,262	12,389	83,254

Source: Deloitte Access Economics estimates based on data from the Department of Health (2020) and APH (2017)

Note: HSP = Hearing Services Program

D.2 Cost to Commonwealth of hearing aids

To explore the cost of providing free hearing aids to vulnerable Australians, three scenarios were considered.

- **Scenario 1:** Hearing aids become free to all vulnerable Australians
- **Scenario 2:** Vulnerable Australians pay a \$100 co-payment
- **Scenario 3:** Vulnerable Australians pay a \$200 co-payment

Under Scenario 1, the cost to the Australian Government to provide a pair of Category 2 hearing aids (suitable for mild to severe hearing loss), including associated services, is around \$1,950.¹⁰³ This reduces to around \$1,850 and \$1,750 under Scenario 2 and Scenario 3, respectively.

¹⁰² Parliament of Australia, *The provision of hearing services under the National Disability Insurance Scheme (NDIS) Submission 23: Submission by EARtrak*, Australian Government, Canberra (2017).

¹⁰³ Department of Health, *Hearing Services Program: Schedule of Fees*, Australian Government, Canberra (2019), <http://www.hearingservices.gov.au/wps/wcm/connect/hso/1f47ebcc-42c1-4ff0-b8f8-da40e5c5ca0d/Schedule+of+Fees+2019-da40e5c5ca0d?MOD=AJPERES&CONVERT_TO=url&CACHEID=1f47ebcc-42c1-4ff0-b8f8-da40e5c5ca0d>

Table D.2: Cost to government and individual of providing a pair of hearing aids and associated services

Cost component	Cost to government (\$, binaural)	Cost to government (\$, monaural)	Cost to individual (\$)
Hearing aid	455.10	456.10	-
Second aid	455.10	-	-
First assessment	141.90	141.90	-
Audiological case management	45.00	45.00	-
Initial fitting and rehabilitation - binaural	528.30	440.45	-
Maintenance and battery supply - binaural	203.49	76.81	-
Client review / aid adjustment - binaural	123.95	80.00	-
Total (Scenario 1)	1,952.84	1,240.26	-
Total (Scenario 2)	1,852.84	1,140.26	\$100
Total (Scenario 3)	1,752.84	1,040.26	\$200

Source: Department of Health, 2019.

D.3 Expected recipients of monaural and binaural hearing aids

The Annual Program Statistics for the HSP shows that approximately 88.5 per cent of hearing aids supplied are binaural, with the remaining 11.5 per cent being monaural. Based on the expected total uptake of hearing aids under each scenario, it was estimated that the distribution of monaural and binaural hearing aids would be as presented in Table D.3.

Table D.3: Expected recipients of hearing aids, monaural and binaural

Scenario	Expected recipients (monaural)	Expected recipients (binaural)	Total recipients
No co-pay			
26-49	174	1,337	1,510
50-64	1,381	10,631	12,013
Total	1,555	11,968	13,523
\$100 co-pay			
26-49	165	1,268	1,433
50-64	1,311	10,087	11,397
Total	1,475	11,355	12,830
\$200 co-pay			
26-49	156	1,200	1,356
50-64	1,240	9,542	10,782
Total	1,396	10,742	12,138

Source: Deloitte Access Economics estimates.

*“Why should we not be eligible?
Why wait until I’m a pensioner?
I want to be an active member
of society and work.” Jennifer*



About the Hearing Care Industry Association

HCIA is the Hearing Care Industry Association. Our vision is to serve the Australian community by facilitating the delivery of world-class hearing healthcare.

HCIA's aim is to inform policy development, promote the value of the industry and provide a public voice on hearing related matters through collaborating with Government and other stakeholders. HCIA represents hearing healthcare providers in Australia who fit around 60% of the hearing devices used in Australia.

The Hearing Care Industry Association

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