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## Summary

- This chapter presents results of questions to adults about their hearing difficulties (if any), whether participants have had a hearing test in the last 12 months, and their use of hearing aids. The chapter also presents results of a screening test to identify objective hearing loss at mid (1 kHz) and high (3 kHz) frequencies.

### Self-reported hearing difficulties

- 19% of men and 17% of women reported hearing difficulties. This included 6% and 5% respectively reporting current hearing aid use. Prevalence of self-reported hearing difficulties increased with age, reaching 71% of men and 59% of women aged 85 and over.
- The prevalence of reported hearing difficulties varied by quintile (fifth) of the Index of Multiple Deprivation (IMD) but not by quintiles of equivalised household income.
- Among participants aged 65 and over, the prevalence of reported hearing difficulties and/or current hearing aid use varied according to whether they needed help with social care, that is needed help with at least one activity of daily living (ADL). Prevalence was higher among those with social care need (48% of men and 39% of women) than for those without (39% of men, 28% of women).
- Both probable mental ill health (a 'high' score of 4 or more in the General Health Questionnaire, GHQ-12) and positive well-being (as measured by the Warwick-Edinburgh Mental Well-being Scale, WEMWBS) varied by self-reported hearing difficulties. The proportion of participants with a high GHQ-12 score was highest among those who reported hearing difficulties but no current hearing aid use (14% of men and 26% of women in this category). There was a similar picture for the proportion of participants with a low well-being score.
- 4% of men and 3% of women reported moderate or worse difficulty when conversing with a single person in a quiet room, 9% and 7% respectively reported moderate or great difficulty with conversing in a group, and 7% and 6% respectively reported moderate or great difficulty with following television programmes at a normal volume.
- 53% of men and women aged 55 and over with reported great difficulty in hearing were moderately or severely annoyed with their hearing difficulty.
- 13% of men and 9% of women reported having had a hearing test in the last 12 months. The proportion who had had a hearing test in the last 12 months increased with age (to 37% of men and 27% of women aged 85 and over).
- Both current and ever-use of a hearing aid increased with the self-reported degree of hearing difficulties. For example, 46% of men and 45% of women reporting great difficulty with their hearing currently used hearing aids.
- More than two in five adults reporting great hearing difficulties had never used a hearing aid (42% of men, 45% of women), while around one in ten of this group had used them in the past but were not currently using them (12% of men and 9% of women).

## Objective hearing loss

- Hearing loss is described using decibel Hearing Level (dB HL). This equates to the number of decibels by which a sound must be amplified for that person to be able to hear it reliably at least half the time. Hearing is considered 'normal' at a level of 25 dB HL or lower.
- 14% of adults had objective hearing loss at the mid-frequency sound (1 kHz): 10% of adults were unable to hear a 1 kHz sound at a level of 20 dB HL, and 4% had at least a moderate problem (unable to hear a 1 kHz sound at a level of 35 dB HL).
- 13% had objective hearing loss at the 3 kHz high-frequency sound (moderate or worse loss).
- Objective hearing loss increased sharply with age. The burden of objective hearing loss at 3 kHz was higher for men than for women at ages 65-84, but was similar between the sexes at other ages.
- 31% of adults aged 65 and over had good hearing or only minimal objective hearing loss in both ears at both 1 kHz and 3 kHz. The remainder had some hearing loss for at least one frequency in at least one ear.
- As with self-reported data, objective measures of hearing loss were associated with area deprivation, social care need, and positive well-being:
  - Objective hearing loss at 1 kHz and at 3 kHz was highest in the most deprived IMD quintiles. Unlike self-reported hearing difficulties, objective hearing loss also increased with decreasing equivalised household income. For example, 19% of men and 22% of women in the most deprived areas had objective hearing loss at 1 kHz; 19% of men and 13% of women in the lowest income households had objective hearing loss at 3 kHz.
  - Among participants aged 65 and over, objective hearing loss at 1 kHz and at 3 kHz was higher for those who needed help with social care. For example, 60% of men who had social care needs had objective hearing loss at 3 kHz, compared with 48% without social care needs.
  - Well-being (mean WEMWBS score) was on average lower for participants with objective hearing loss. For instance, men with moderate or worse loss (at least 35 dB HL) at 3 kHz had a well-being score of 49.1, compared with 51.8 among those with good hearing or mild loss. The equivalent figures for women were 45.1 and 51.3 respectively.
- Objective measures of hearing loss in older adults related strongly to self-reported data on hearing difficulties, hearing aid use, and hearing tests.
  - Among both sexes aged 55 and over, the prevalence of objective hearing loss at 1 kHz and at 3 kHz increased sharply with the self-reported degree of hearing difficulties. Participants who reported current hearing aid use were around twice as likely to have objective hearing loss compared with those reporting difficulties with their hearing but no hearing aid use. For example, 86% of men and 75% of women currently using hearing aids had objective hearing loss at 3 kHz, compared with 46% of men and 40% of women who reported difficulty with their hearing but were not currently using hearing aids.
  - Among both sexes aged 55 and over, the prevalence of objective hearing loss at 1 kHz and at 3 kHz increased sharply with the self-reported degree of hearing difficulty when conversing with a single person in a quiet room, with having a group conversation, and with following television programmes at a normal volume.
  - The proportion of participants aged 55 and over who reported having had a hearing test in the last 12 months increased with the degree of objective hearing loss. However, only 26% with moderate or worse loss (at least 35 dB HL) at 3 kHz reported having had a hearing test in the last 12 months.
  - Similarly, prevalence of both current and ever-use of a hearing aid increased as objective hearing loss increased. Of those aged 55 and over with at least moderate loss (35 dB HL or worse) at 3 kHz, only 31% were currently using a hearing aid.

## 4.1 Introduction

### 4.1.1 Contents of the chapter

HSE 2014 included for the first time an interview module on self-reported hearing difficulties and their management. The HSE 2014 nurse visit included a new module on objective hearing loss, using the HearCheck screener for adult participants.<sup>2</sup> The HearCheck screener can identify hearing problems and predict people who could benefit from technical/clinical intervention. The HSE 2014 report presents data from the second comprehensive, nationally representative objective measurement of hearing loss in England over all adult age groups obtained by this quick and efficient screening method,<sup>3</sup> and is the first to be undertaken within a broader health examination survey.

This chapter provides information both for self-reported hearing difficulties and for objectively measured disabling hearing loss. It covers:

- how common these are in the general adult population;
- which subgroups are particularly affected;
- what proportion of adults have had a hearing test in the last 12 months;
- what proportion wear or have tried hearing aids;
- what people's experience is of obtaining and wearing hearing aids; and
- how well subjective reporting of hearing difficulties relates to objective measurements of hearing loss, overall and by subgroups of the population.

The introduction to this chapter summarises what was already known about the prevalence of hearing problems, both self-reported difficulties and objectively measured hearing loss. It then summarises the impacts of hearing problems on health, well-being, and social interaction, the causes of hearing loss, and national policies and guidance. It is restricted to adults aged 16 and over, as HSE 2014 did not collect information about hearing problems in children.

In this chapter, the term 'hearing difficulty' refers to self-reported problems. 'Hearing loss' is used to refer to objectively measured hearing loss.

### 4.1.2 Prevalence of self-reported hearing problems

In 2015, the World Health Organization (WHO) estimated that 360 million people worldwide (more than 5% of the global population) have disabling hearing loss.<sup>4</sup> The large majority of these have mild, moderate or severe hearing loss and may benefit greatly from hearing aids,<sup>5</sup> unlike the smaller numbers with profound bilateral deafness (affecting both ears).

The main National Study of Hearing in Great Britain was conducted by the MRC Institute of Hearing Research among a random sample of adults in Cardiff, Glasgow, Nottingham and Sheffield between 1980 and 1986. 10% of participants reported bilateral hearing difficulty in a quiet environment.<sup>6</sup> 26% of participants reported great hearing difficulty in the better hearing ear in noisy conditions, while 14% had mild or worse difficulty understanding speech in a quiet room, even with their better ear.<sup>7</sup> In 2005, 43% of male and 29% of female HSE participants aged 65 and over reported they were unable to follow a television programme at a volume that others find acceptable.<sup>8</sup> The GP Patient Survey for England found that 9% of adults aged 55 or over reported 'deafness'.

Hearing problems are associated with socioeconomic status. This is partly due to differential exposure to occupational noise, particularly among older cohorts, but deprivation in childhood may also predispose to hearing loss in later life.<sup>3</sup>

### 4.1.3 Prevalence of objective hearing loss

The National Study of Hearing in Great Britain in the 1980s found in their main study that the prevalence of hearing loss of at least 25 decibel Hearing Level (dB HL) in the better hearing ear was:

- 8% among adults aged 41-50
- 19% aged 51-60
- 37% aged 61-70
- 60% aged 71-80.<sup>6,7</sup>

In 1991, it was estimated that there were 7.4 million people in England aged 18 and over with hearing loss of at least 25 dB HL, 80% of whom were aged 60 or over. An increase of 20% in the numbers of adults with hearing impairment at this level was predicted over the next 20 years, due to demographic changes alone.<sup>7</sup>

Applying the National Study of Hearing prevalence data to the 2011 Census figures gives an estimated 3.5 million adults aged 18-80 in England and Wales with hearing loss of at least 35 dB HL. Of these, almost 1 million are aged 61-70 and 1.5 million aged 71-80.<sup>9</sup> Estimates more recently from Action on Hearing Loss are that 10 million people in the UK have some degree of hearing loss, including 3.7 million aged 16-64 and 6.3 million aged 65 and over. This is predicted to rise to 14.5 million by 2031.<sup>10</sup> More than 800,000 are estimated to be severely or profoundly deaf.<sup>10</sup>

Worldwide, the prevalence of hearing impairment of 35 dB HL or more in the better ear was estimated in 2008 as 10% for females and 12% for males aged 15 and over.<sup>11</sup> The prevalence was higher in low- and middle-income countries than in high income countries.<sup>4,11</sup>

#### **4.1.4 Impacts of hearing loss**

Hearing loss interferes with communication. The main factors associated with auditory disability in one study were difficulties in everyday conversations, and hearing problems that restricted enjoyment of social and personal life, made people feel cut off from things, and/or led to embarrassment. Interference with conversations in quiet locations and with localisation (being able to judge direction and distance of sounds) were less disabling.<sup>12</sup> The UK data from the Global Burden of Disease Study 2013 estimated that hearing loss accounted for about 4% of years lived with disability in the UK, for the whole population. Hearing loss accounted for about 9% of years lived with disability among people aged 70 and over, being the top cause in men and the fourth most frequent cause of disability in women of that age.<sup>11</sup>

Hearing loss can impede communication in social, educational and work settings, leading to a sense of isolation as well as the consequences of misunderstanding. These can lead to social withdrawal and to depression. Other consequences of hearing loss reported include psychological strain and functional decline,<sup>13</sup> which can impact on older people's independence, exacerbating the effects of age-related declines in other functions. Although hearing difficulties have been linked to cognitive function and dementia, in most studies the ageing process is a confounding factor; in other studies, the apparent cognitive decline was a consequence of difficulties with communication and concentration.<sup>14</sup> There can also be problems from discrimination and prejudice. People of working age who have serious hearing problems are less likely to be in employment than their peers,<sup>3</sup> while employees with hearing problems earn on average 75% of their hearing peers' income.<sup>14</sup>

Although many, if not most, people with hearing loss would benefit from hearing aids, only about one in five people in the UK with hearing loss (about two million people) have hearing aids and only about 1.4 million use their hearing aids regularly. Many people experience hearing difficulties for at least ten years before seeking help; and not all those with a hearing aid wear it. Hearing aids can improve audibility (being able to hear sounds) but can be less helpful in understanding speech in noisy environments and have limited benefits for localisation of sound.<sup>15,16</sup>

There are also impacts for society. In 2004, hearing difficulties were estimated to cost Europe 284 billion euros, including the psychosocial impacts of hearing loss.<sup>14</sup> In the UK, it is estimated that lost productivity and unemployment due to hearing problems cost the country between £18 billion<sup>14</sup> and £25 billion.<sup>17</sup>

#### **4.1.5 Causes of hearing loss**

Hearing loss can be conductive (a problem conducting sound waves anywhere along the route through the outer ear, eardrum or middle ear), sensorineural (damage to the hair cells within the cochlea, or damage to the hearing nerve), or mixed. Hearing loss can be

congenital, i.e. present from the time of birth; however, most hearing loss is acquired and is sensorineural, due to problems in the inner ear and less commonly the auditory (eighth cranial) nerve.<sup>18</sup> The damage to tiny hair cells in the inner ear can be caused by exposure to loud noise over a period of time and by ageing; noise damage remains the most common preventable cause of hearing loss. This damage is dose-dependent, cumulative, and not reversible. No pharmacological treatment has yet been shown to prevent it. With a reduction in occupational noise exposure, more awareness of the problems associated with listening to loud music through headphones, and an increase in the older population, the most frequent cause of hearing loss is now ageing. Presbycusis, deafness associated with ageing, is a gradual and progressive hearing loss affecting both ears as people age. Typically, it initially affects the ability to hear high frequency sounds, then progresses to hearing loss at mid- and eventually low-frequency sounds. It probably does not have a single mechanism.

#### **4.1.6 National policies and guidance**

Health and Safety legislation, such as the Noise at Work Regulations 1989,<sup>19</sup> requiring reductions in noise at source and/or use of protective equipment, has greatly reduced the incidence of occupational hearing loss. The Control of Noise at Work Regulations 2005<sup>20</sup> came into force on 6 April 2006, reducing the threshold for action by 5 dB.<sup>21</sup> It is intended that full compliance with these regulations will eliminate occupational noise-induced hearing loss. The Health and Safety Executive intends that by 2030 there should be no new cases of work-related noise-induced hearing loss.<sup>18</sup> Occupational hearing loss<sup>22</sup> in certain occupations is an industrial disease (number A10) for which compensation is available.<sup>23</sup>

There is some recognition that hearing loss may be caused by regularly listening to music at a high volume through headphones.<sup>24,25</sup>

The only guidance from the National Institute for Health and Care Excellence, NICE, relates to the use of cochlear implants in children and adults with profound deafness.<sup>26</sup> National policies published since the data in the chapter were collected are described in section 4.9.5.

## **4.2 Methods**

### **4.2.1 Interview questions**

All participants were asked whether they had been given a hearing test in the last 12 months and then were asked if they ever wore a hearing aid nowadays. Participants who reported that they did not wear a hearing aid nowadays (or preferred not to say) were then asked whether they had any difficulty with their hearing, and also asked whether they had ever tried a hearing aid. Participants who reported current use of a hearing aid were asked how many hearing aids were usually worn, the type of hearing aid (behind the ear or wholly in the ear), the level of satisfaction with their current hearing aid, and the source (free through the NHS, paid for privately, or both).

All participants were asked to rate their hearing difficulty in three specific circumstances:

- conversing with a single person in a quiet room (asked twice, once referring to the right ear and once to the left ear)
- having a conversation with several people in a group
- following television programmes at a volume others find acceptable.

Participants were asked to rate their ability to hear in each circumstance with the response options of having no, slight, moderate or great difficulty in hearing (with an additional response option of 'not being able to hear at all' for the two questions on conversation in a quiet room). Participants who normally used a hearing aid were instructed to report the degree of hearing difficulties as if not wearing it. For the two questions on conversing with a single person in a quiet room, one for each ear, the response for the better ear (the side with less hearing difficulty) has been used.

The group of participants reporting any hearing difficulties was identified, i.e. those currently using a hearing aid, those not currently using a hearing aid but reporting some hearing difficulty (unspecified), and/or having at least slight difficulty with hearing in at least one of the three specific circumstances listed above. This group was asked whether hearing difficulties worried, annoyed, or upset them.

In every year in HSE, if someone living in a selected household is profoundly deaf, the interviewer assesses whether an interview is possible, for instance by showing the questions on the interviewer's computer screen. Sign interpreters are not used, whether within the family or not, for the same reason as not using informal language interpreters, because of the need for a direct and precise translation; nor are proxy interviews conducted, in line with HSE policy.

#### 4.2.2 Objective test

All adult HSE participants who had a nurse visit were eligible for the objective hearing test, except for those with a cochlear implant or with a current ear infection in either ear. Hearing was tested with the HearCheck screener device.<sup>2,27,28,29</sup> This is a simple, low-cost, hand-held device which produces a fixed series of three pure high frequency (3 kHz) sounds and three mid-frequency (1 kHz) sounds. These were chosen for the HearCheck based on a Health Technology Assessment report into screening for hearing loss<sup>30</sup>; they were identified as being the most useful frequencies for screening for hearing loss that would benefit from a hearing aid.

The effectiveness of a measurement and the rate of false positives and false negatives are dependent not only on the equipment but also the criteria used. The criterion used in this chapter for hearing loss was 'not hearing at least one of the three sounds' at 1 kHz (mid-frequency) and at 3 kHz (high frequency).

Participants who wore hearing aids were asked to remove them before the test was conducted. The nurse first used the HearCheck screener held against the adult participant's left ear. Participants were asked to indicate when they heard a beep when a 1 kHz frequency sound was made at three, decreasing, volumes (55 dB HL, 35 dB HL and 20 dB HL) by their left ear. This was followed by three beeps (at 75 dB HL, 55 dB HL and 35 dB HL) for a 3 kHz sound. Both tests were then repeated against the participant's right ear.

Results are presented for a summary measure in the better hearing ear, and for sounds at both mid- (1 kHz) and high- (3 kHz) frequencies. Where the nurse conducted a second set of tests (in most cases because the participant reported hearing a quieter but not a louder sound at a given frequency in the initial set of tests), the report uses the second set of results.

#### 4.2.3 Definitions

##### *Hearing difficulties and hearing loss*

In this chapter, the term 'hearing difficulty' refers to self-reported problems, while 'hearing loss' is used to refer to objectively measured hearing loss.

##### *Interview questions: self-reported hearing difficulties*

Those reporting not using a hearing aid and replying 'No' to the initial question about having any hearing difficulties are defined as 'No hearing difficulties'. A derived variable summarising self-reported prevalence of hearing difficulties therefore comprises three categories:

- no hearing difficulties (and no hearing aid use),
- hearing difficulties but not currently wearing a hearing aid, and
- reporting currently wearing a hearing aid.

A second summary variable has been based on responses to the questions about hearing difficulties in the three specific circumstances outlined in Section 4.2.1 (conversing in a quiet room, conversation in a group, following TV programmes at a volume acceptable to others). Those with levels of difficulty that vary depending on the different situations have



been included in the highest category of difficulty they mentioned. Participants who reported that they could not hear at all when conversing with a person in a quiet room have been combined with those reporting great difficulty. Any participants who mentioned that they had some hearing difficulties but not any of the specific difficulties have been included as having slight difficulties.

For hearing difficulties when conversing with a person in a quiet room, the response for the ear with less difficulty (better hearing) has been used throughout this chapter except when combined into this second summary variable, specifically for questions on annoyance (Table 4.8), having had a hearing test in the last 12 months (Table 4.11), and use of a hearing aid (Table 4.16) in relation to degree of self-reported hearing difficulties. For these analyses, the individuals who reported difficulty in having a conversation for their worse ear but no difficulty for the better ear, and no other specific hearing difficulty were coded as having slight (rather than no) difficulties.

### **Hearing test: measured hearing loss**

Hearing loss is described using decibel Hearing Level (dB HL). This equates to the number of decibels by which a sound must be amplified for a person to be able to hear it reliably at least half the time. This will vary in an individual for sounds at different frequencies (i.e. sounds at a different pitch – high, low or medium). Speech recognition requires good high frequency hearing. Hearing is considered ‘normal’ at a level of 25 dB HL or lower. By definition, ‘otologically normal’ young adults with no hearing loss at all have a hearing level of 0 dB HL.<sup>31</sup> A Health Technology Assessment found that impairment in the better hearing ear to the level of 35 dB HL or more at a frequency of 3 kHz is the best marker for identifying people who are likely to benefit from hearing aids and other supportive interventions.<sup>30</sup>

High frequency hearing loss usually precedes the loss of hearing at lower frequencies. When comparing the results in this chapter for hearing loss at mid- (1 kHz) and at high- (3 kHz) frequencies it should be noted that the HearCheck screener did not test for 20 dB HL at 3 kHz, so the lowest level of objective hearing loss detected at 3 kHz (35 dB HL) is greater than the lowest level of hearing loss detected at 1 kHz (20 dB HL).

It should be noted that the term ‘hearing impairment’ is used by other authors to refer to hearing loss, for example in Table 4A, which shows the categorisation of hearing impairment agreed by the Global Burden of Disease Expert Group, showing both the objective hearing level in the better ear and also the likely hearing difficulties experienced.<sup>32</sup>

Table 4A			
Global Burden of Disease Expert Group hearing impairment categories <sup>a</sup>			
Hearing impairment category	Better ear hearing level (dB HL)	Hearing in a quiet environment	Hearing in a noisy environment
Unilateral (in one ear)	Up to 20 in the better ear; at least 35 in the worse ear	Does not have problems unless sound is near poorer hearing ear	May have real difficulty following/taking part in a conversation
Mild	20–34	Does not have problems hearing what is said	May have real difficulty following/taking part in a conversation
Moderate	35–49	May have difficulty hearing a normal voice	Has difficulty hearing and taking part in conversation
Moderately Severe	50–64	Can hear loud speech	Has great difficulty hearing and taking part in conversation
Severe	65–79	Can hear loud speech directly in one’s ear	Has very great difficulty hearing and taking part in conversation
Profound	80–94	Has great difficulty hearing	Cannot hear any speech

<sup>a</sup> Hearing impairment categories used in this analysis are defined using the better ear hearing threshold in decibels averaged over frequencies 0.5, 1, 2 and 4 kHz (dB HL).

In the HSE nurse visit hearing test, those who did not hear the mid-frequency (1 kHz) tone at 20 dB HL were defined as having an **objective hearing problem at 1 kHz**, regardless of whether they heard the tones at 35 dB HL or 55 dB HL, as indicated by the shaded cells for the 1 kHz tone in Table 4B below.

Those who did not hear the high-frequency (3 kHz tone) at 35 dB HL were defined as having an **objective hearing problem at 3 kHz**, regardless of whether or not they heard the tones at 55 dB HL and/or 75 dB HL, again as indicated by the shaded cells for the 3 kHz tone (Table 4B).

Table 4B				
Definitions of categories of hearing problem				
Label	Screener tone(s) heard in better hearing ear			
	20 dB HL	35 dB HL	55 dB HL	75 dB HL
<b>1 kHz (mid-frequency)</b>				
Good hearing	Heard	Heard	Heard	a
Mild to moderate problem	No	Heard	Heard	a
Moderate problem	No	No	Heard	a
Moderate to severe problem	No	No	No	a
<b>3 kHz (high frequency)</b>				
Good hearing to mild problem	a	Heard	Heard	Heard
Moderate problem	a	No	Heard	Heard
Moderate to severe problem	a	No	No	Heard
Severe problem	a	No	No	No

<sup>a</sup> There was no test at 75 dB HL for the 1 kHz sound and no test at 20 dB HL for the 3 kHz sound.

Three participants who continued to report hearing a quieter but not a louder sound at 1 kHz in the second set of tests were excluded from the analyses of objective hearing loss at this frequency.

Of the 5,339 participants with data on objective hearing loss at 1 kHz, the nurse noted that there was quite a lot of background noise in 109 cases. These results have been included in the data presented in the tables, since the small numbers do not substantially change the overall results. Participant characteristics and results are shown in Table 4C below for those with or without substantial background noise.

Table 4C		
Characteristics of participants and prevalence of objective hearing loss by presence or absence of background noise		
	Nurse report of quite a lot of background noise	
	Yes	No
Number of participants	109	5230
Mean age (years)	42.1	47.0
% male	45	49
Moderate or great hearing difficulty reported (%)	7	10
Objective hearing problem at 1 kHz (mid-frequency; at least 20 dB HL) (%)	29	14
Objective hearing problem at 3 kHz (high frequency; at least 35 dB HL) (%)	12	13

Participants with quite a lot of background noise (2% of the total) were younger, and were twice as likely to be unable to hear the HearCheck tones at 1 kHz (29% and 14% for participants with and without a lot of background noise respectively). Levels of objective hearing loss at 3 kHz were similar (12% and 13% respectively).



## Mental health and well-being

The impact of hearing loss on social interaction has been noted above, and individuals with hearing difficulties may feel isolated and socially excluded. This chapter looks at the relationship between self-reported hearing difficulties and objective hearing loss and measures of mental health and well-being.

The 12-item General Health Questionnaire (GHQ-12) is a widely used measure of mental health covering characteristics such as general levels of happiness, depression and self-confidence. Participants rate each item on a four-point scale to indicate whether symptoms of mental ill health are 'not at all present', or present 'no more than usual', 'rather more than usual' or 'much more than usual'. A score of zero is applied for the first two responses, and a score of 1 for the third and fourth responses; a score between 0-12 is calculated for each individual. Scores range from 0-12: 0 indicates no evidence of probable mental ill health; 1-3 indicates less than optimal mental health; and a score of 4 or more, referred to as a 'high GHQ-12 score', indicates probable psychological disturbance or mental ill health. Overall, 12% of men and 17% of women had a high GHQ-12 score.

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS)<sup>33</sup> was developed to capture a broad concept of positive mental well-being and incorporates both eudaimonic and hedonic perspectives on well-being.<sup>34</sup> A eudaimonic perspective relates to people's functioning, social relationships, and perceptions of whether the things they do in life are meaningful or worthwhile. A hedonic perspective focuses on affect, and relates to experience of pleasure, happiness and the avoidance of pain.

WEMWBS has 14 statements which cover psychological functioning, cognitive-evaluative dimensions and affective-emotional aspects of well-being. For each statement participants are asked to tick the box that best describes their experience over the previous two weeks. They can answer on a 5-point scale: 'None of the time', 'Rarely', 'Some of the time', 'Often', or 'All of the time'. The statements are all expressed positively – for example, 'I've been feeling optimistic about the future'. The responses, numbered 1 to 5, are aggregated to form the Well-being Index, which can range from 14 (those who answer 'rarely' on every statement) to 70 (those who answer 'All of the time' to all statements). The mean well-being score in HSE 2014 was 51.1 for men and 50.7 for women. Participants with low well-being scores were also identified: the lowest 10% had scores below 40 in HSE 2014.

## 4.3 Self-reported hearing difficulties

### 4.3.1 Self-reported hearing difficulties, by age and sex

19% of men and 17% of women reported hearing difficulties, including 6% and 5% respectively currently using a hearing aid. Figure 4A shows that the proportion with hearing difficulties, including those using hearing aids, increased with age. From the age of 65 onwards the proportion with difficulties increased more sharply for men than for women, and in the group aged 85 and over, considerably more men than women had difficulties.

Table 4.1, Figure 4A

### 4.3.2 Self-reported hearing difficulties, by region

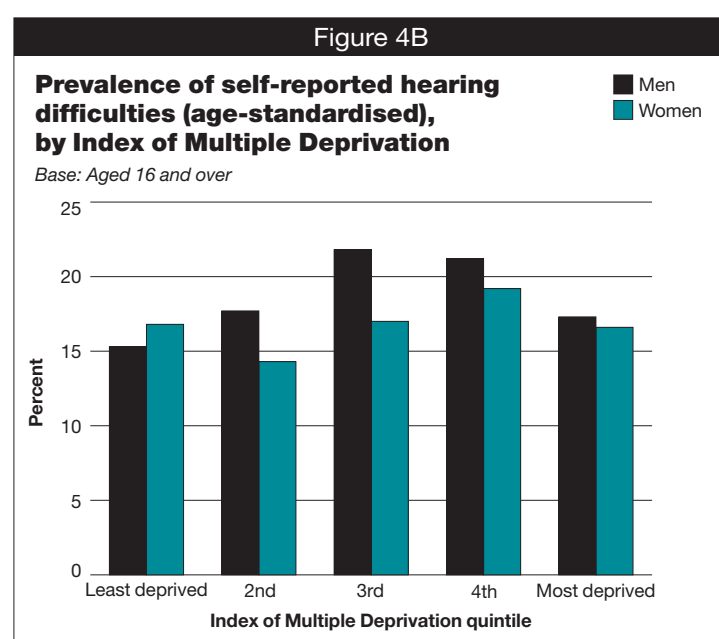
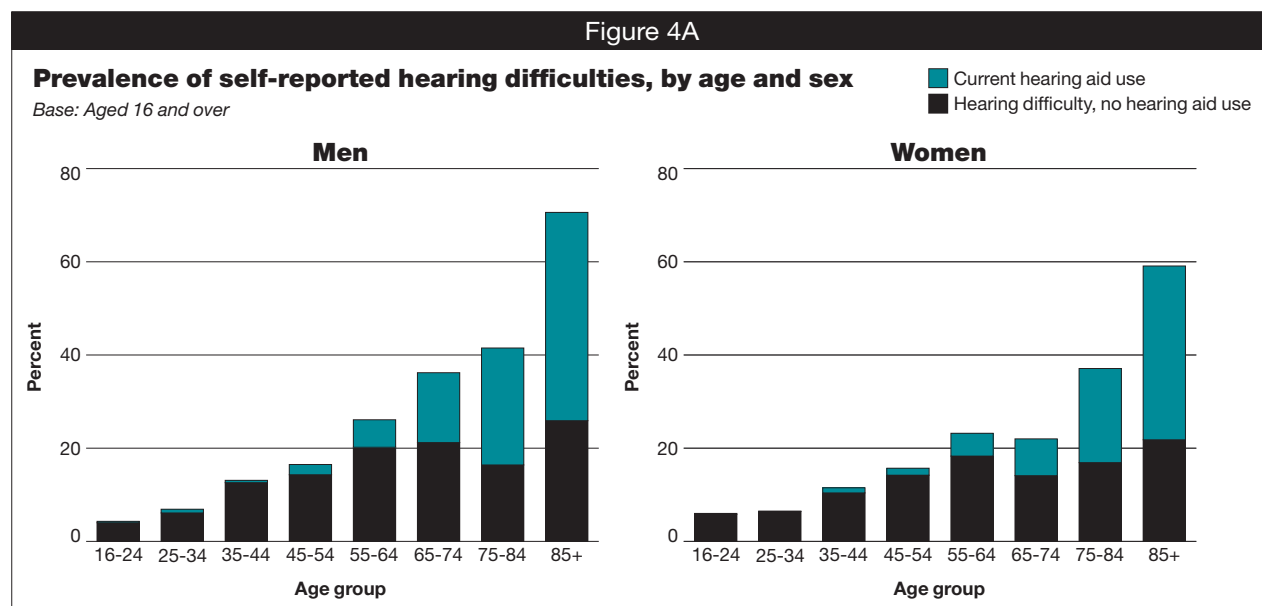
There was no significant variation by region in the proportion of participants who reported hearing difficulties or who reported current hearing aid use.

Table 4.2

### 4.3.3 Self-reported hearing difficulties, by socio-economic variables

There was no significant variation across quintiles of equivalised household income in the proportion of participants who reported hearing difficulties or who reported current hearing aid use.

However, there was variation in the proportion who reported hearing difficulties among both men and women by quintiles of the Index of Multiple Deprivation (IMD) (see Figure 4B). This was highest in the third and fourth IMD quintiles for men, while it was highest in the fourth IMD quintile for women. Current hearing aid use showed no variation by IMD. Tables 4.3, 4.4, Figure 4B

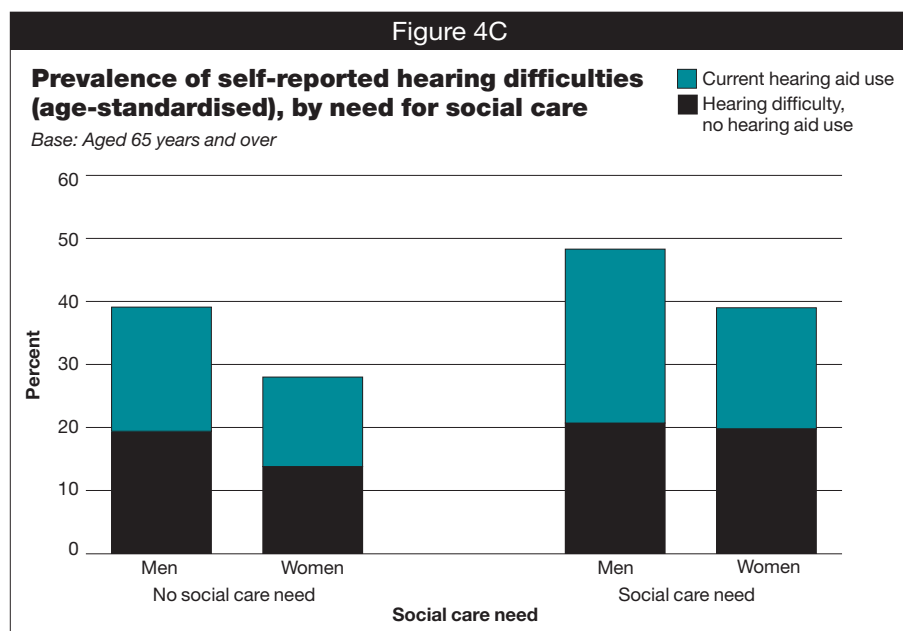


#### 4.3.4 Self-reported hearing difficulties, by need for social care

With the prevalence of hearing difficulties increasing with age, it is useful to see how this is associated with other needs for care and support among older adults. Participants aged 65 and over were asked about their ability to do a range of activities of daily living (ADLs) such as getting up and down stairs, having a bath or shower, and dressing or undressing. Those not needing help could do all activities without difficulty. Those needing help were those who said they could do an activity but with difficulty, those who could do the activity only with help, and those who were unable to do the activity. Overall, 24% of men and 33% of women aged 65 and over needed help with at least one ADL (see Chapter 5 for more details on social care).

48% of men and 39% of women aged 65 and over who needed help with social care reported hearing difficulties (including those using a hearing aid), compared with 39% and 28% respectively among those with no need for social care. There was a similar pattern looking just at the proportion who reported current hearing aid use, with prevalence of hearing aid use higher among men and women who needed social care (see Figure 4C).

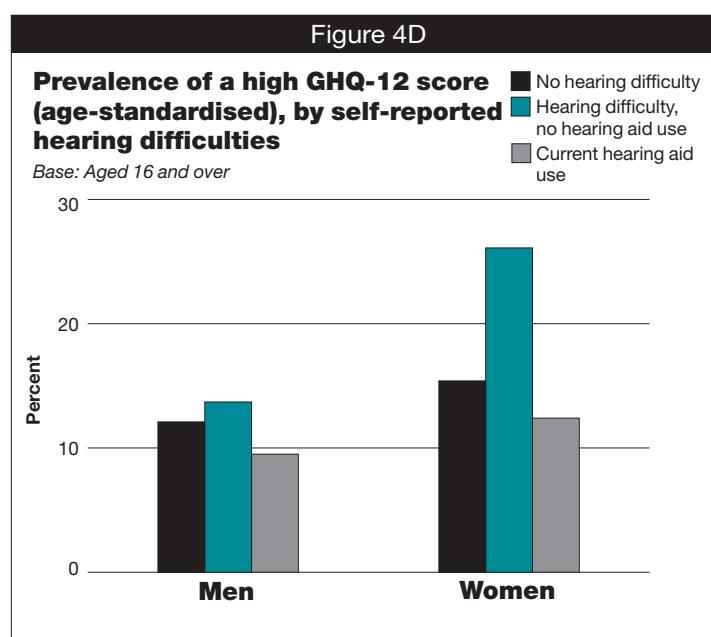
**Table 4.5, Figure 4C**



#### 4.3.5 Mental health and positive mental well-being, by self-reported hearing difficulties

The impact of hearing loss on social interaction has been noted in the introduction, and individuals with hearing difficulties may feel isolated and socially excluded. This section looks at the relationship between self-reported hearing difficulties and measures of mental health and well-being. Mental health was measured using the General Health Questionnaire (GHQ-12) and well-being was measured using the Warwick-Edinburgh Mental Well-being Scale (WEMWBS). Details of these measures are given in Section 4.2.

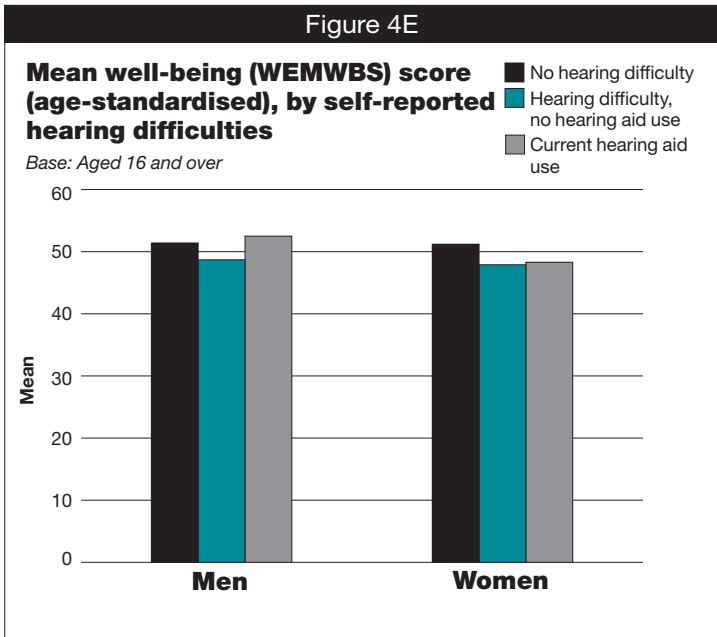
As Figure 4D shows, the prevalence of a 'high' GHQ-12 score of 4 or more was greatest among participants who reported hearing difficulties but did not report current hearing aid use (14% of men and 26% of women). By contrast, 12% of men and 15% of women with no hearing difficulties had a high GHQ-12 score suggesting probable mental ill health.



There was a similar pattern for mean well-being scores, and for the proportion of participants with a well-being score below the 10th centile. As Figure 4E shows, mean scores were lowest among participants who reported hearing difficulties but no current hearing aid use (48.7 for men, 47.9 for women, compared with 51.4 and 51.2 respectively among those with no hearing difficulties).

For HSE 2014, participants with a WEMWBS score less than 40 were below the 10th centile. There was a higher proportion in this lowest scoring group among participants with hearing difficulties who did not currently use hearing aids (13% of men and 20% of women, compared with 9% of both men and women with no hearing difficulties).

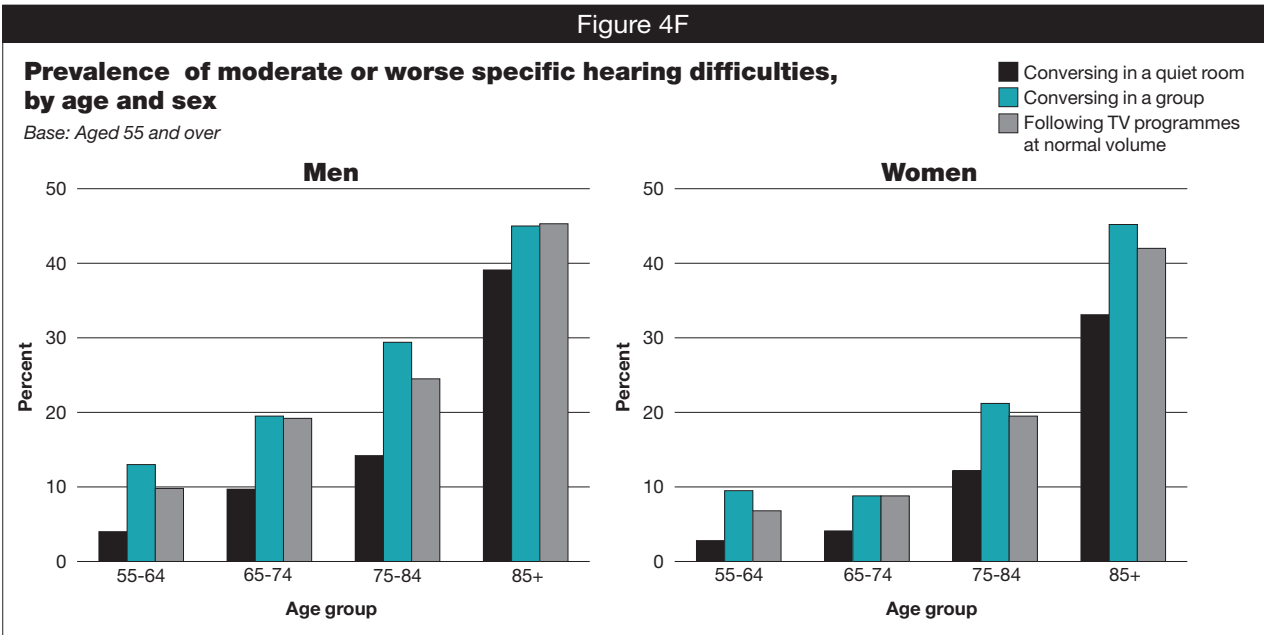
Table 4.6, Figures 4D, 4E



### 4.3.6 Specific hearing difficulties, by age and sex

4% of men and 3% of women reported moderate difficulty or worse when conversing with a single person in a quiet room, 9% and 7% respectively reported moderate or great difficulty when conversing with several people in a group, and 7% and 6% respectively reported moderate or great difficulty with following television programmes at a normal volume. Very few below the age of 55 reported these specific difficulties. Figure 4F shows how, for each situation, the proportion experiencing the problem increased with age from 55 upwards. The proportion with moderate or great difficulty with conversing in a group, or with following television programmes at a normal volume, increased with age more sharply for men than for women between the ages of 65-84.

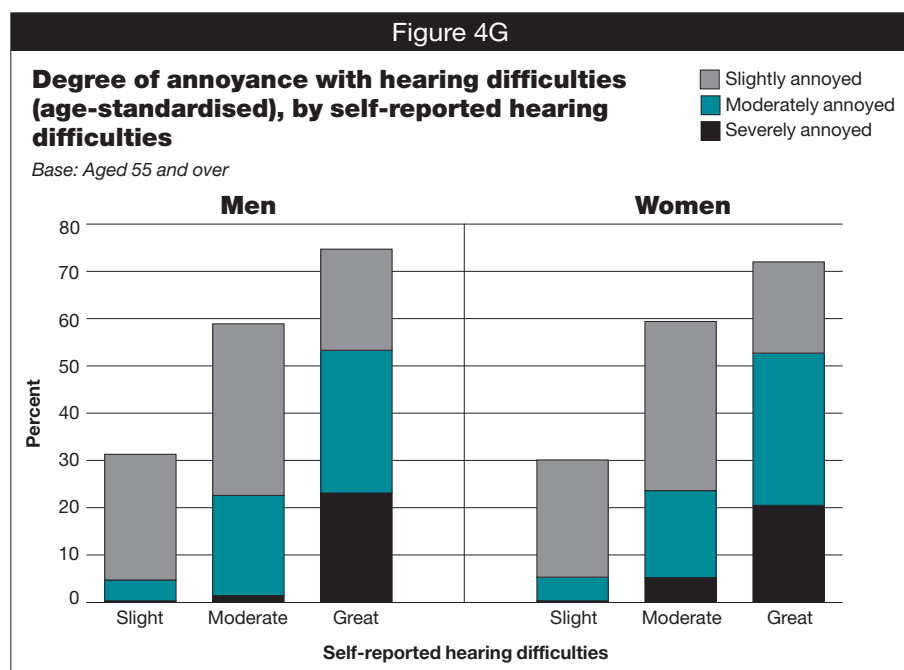
Figure 4F, Table 4.7



### 4.3.7 Degree of annoyance with hearing difficulties, by self-reported hearing difficulties

Among both sexes, the degree of annoyance with hearing difficulties increased with the self-reported degree of hearing difficulties, as shown in Figure 4G. This analysis is restricted to adults aged 55 and over, accounting for most of those with self-reported difficulties. Over half of adults aged 55 and over with reported great difficulty in hearing were moderately or severely annoyed with their difficulty in hearing (53% of both sexes).

Figure 4G, Table 4.8



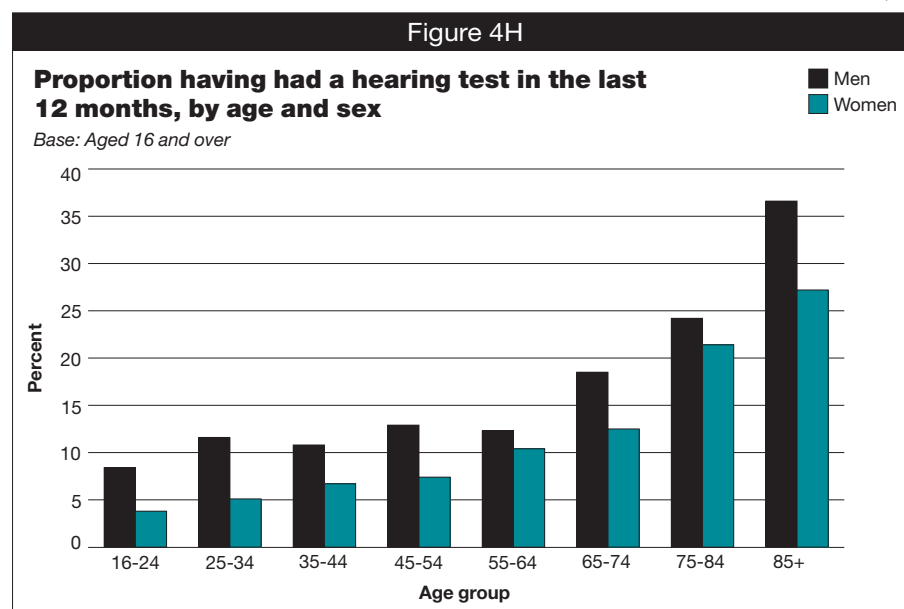
## 4.4 Reported hearing tests

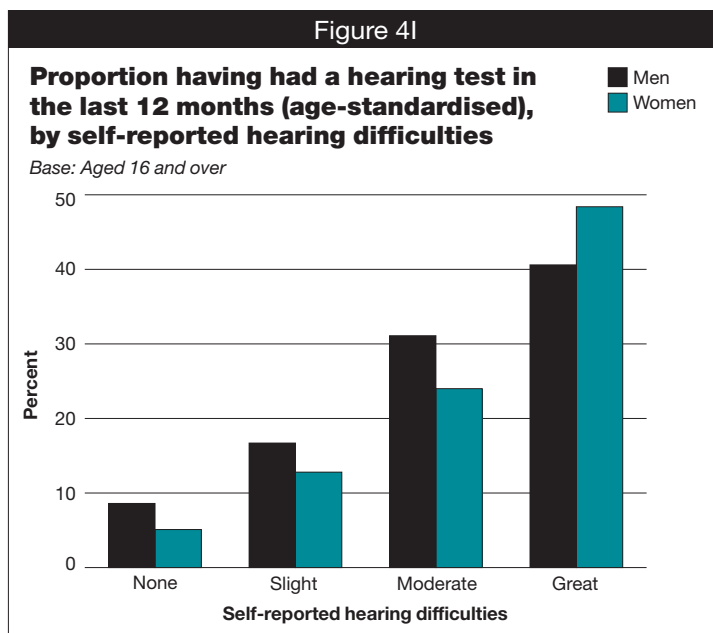
Men were more likely than women to report that they had a hearing test in the last 12 months (13% of men and 9% of women). Figure 4H shows that the proportion reporting that they had a hearing test in the last 12 months increased sharply with increasing age.

Among both sexes, the proportion reporting a hearing test in the last 12 months increased with the self-reported degree of hearing difficulties, as shown in Figure 4I.

There was no significant variation across quintiles of equivalised household income in the proportion of participants who reported having had a hearing test in the last 12 months.

Tables 4.9-4.11, Figures 4H, 4I





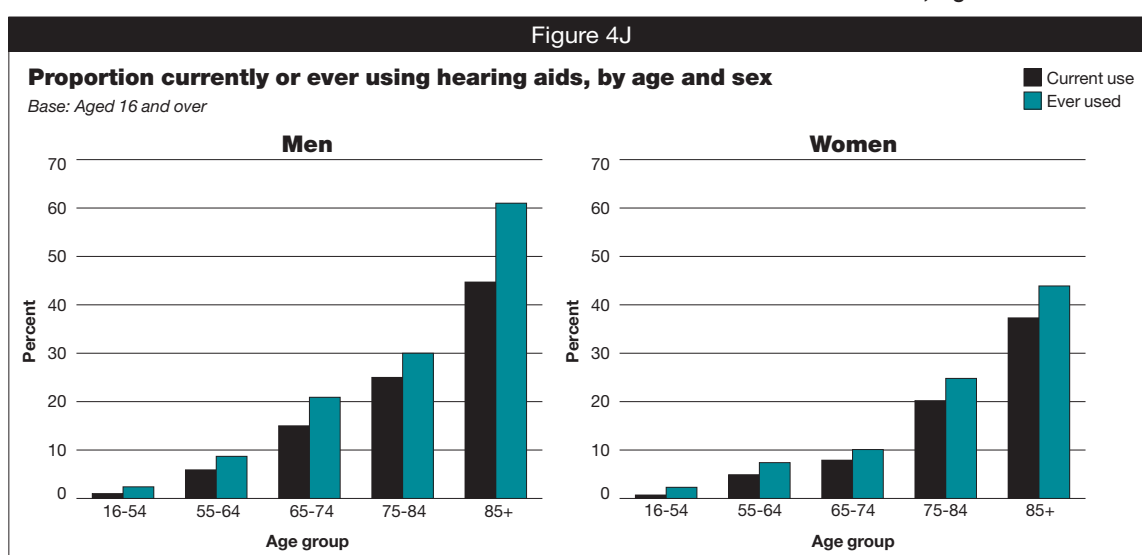
## 4.5 Use of hearing aids

### 4.5.1 Use of hearing aids, by age and sex

Current use of a hearing aid was included within the definition of having hearing difficulties, as discussed in Section 4.3. This section looks at whether people had ever used hearing aids (currently wearing a hearing aid or had tried hearing aids in the past but not currently wearing one).

8% of men and 7% of women had ever used a hearing aid, with 6% and 5% currently doing so. Figure 4J shows the increase with age in the proportion of participants who reported that they currently used, or had ever used, a hearing aid. Men in the oldest age groups were more likely than women of similar age to report that they had ever used a hearing aid.

Table 4.12, Figure 4J



### Number and position of hearing aids

The majority of those currently using a hearing aid used two (64% of men and 56% of women). Younger users were slightly more likely than older users to have only one hearing aid. 28% of men and 32% of women reported that they wore their hearing aid(s) wholly in the ear, rather than behind the ear. Among both sexes, wearing a hearing aid behind the ear was most common; however, the proportion wearing an aid wholly in the ear was highest in the oldest age groups.



### Source of hearing aids

Most of those who were currently using a hearing aid reported that they received this free through the NHS (82% of men and 80% of women), rather than paying for it privately.

### Satisfaction with hearing aids

Among participants who reported current hearing aid use, 70% of men and 71% of women were fairly or very satisfied with their hearing aid; 21% and 18% respectively were fairly or very dissatisfied. Participants' level of satisfaction with their hearing aid showed no significant variation by age or sex.

Tables 4.17-4.19

## 4.5.2 Use of hearing aids, by region, income, and Index of Multiple Deprivation

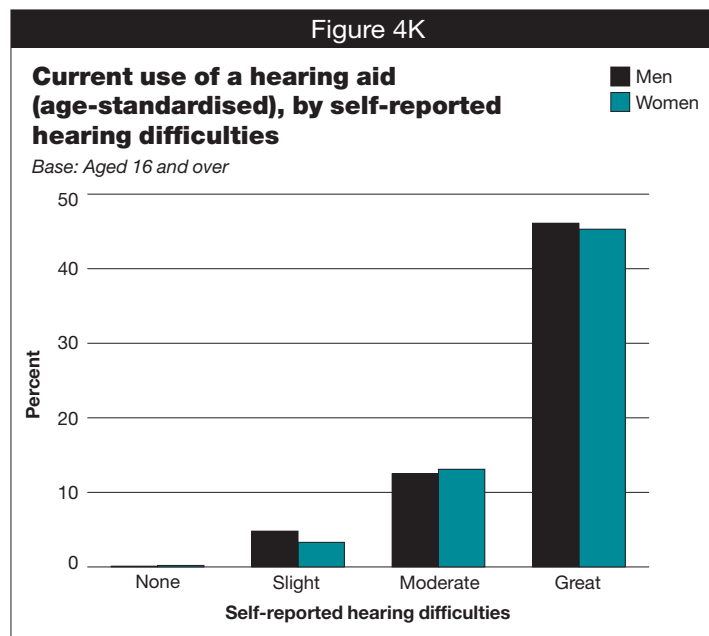
There was no significant variation in the proportion of adults currently or ever using hearing aids by region, income, or area deprivation (measured by IMD).

Tables 4.13-4.15

## 4.5.3 Use of hearing aids, by self-reported hearing difficulty

Among both sexes, the proportion of participants who reported current hearing aid use increased with the self-reported degree of hearing difficulties, as shown in Figure 4K. Those reporting great difficulties were by far the most likely to be using a hearing aid. A similar pattern was found for the proportion of participants who reported that they had ever used a hearing aid. Nevertheless, more than two in five adults reporting great hearing difficulties had never used a hearing aid, while around one in ten of this group had used them in the past but were not currently using them.

Table 4.16, Figure 4K



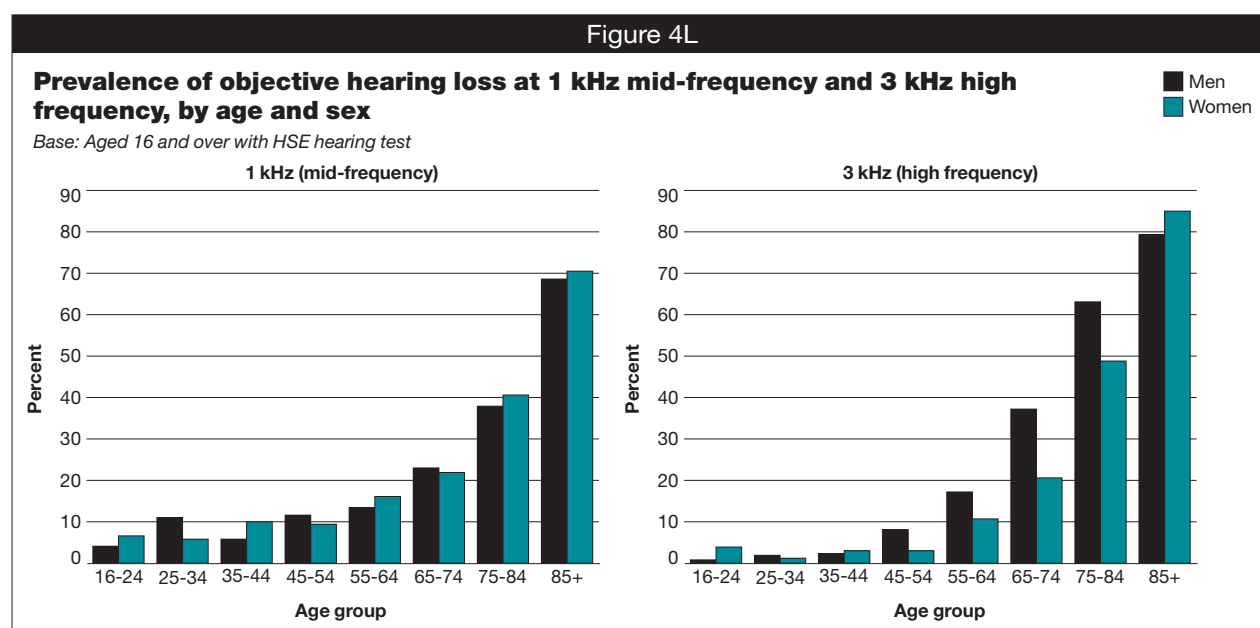
## 4.6 Objective hearing loss

### 4.6.1 Objective hearing loss by age and sex

Objective hearing loss was measured during the HSE nurse visit. The proportions with hearing loss at mid (1 kHz) and high (3 kHz) frequencies were very similar. 14% of men and 15% of women had objective hearing loss at 1 kHz, while 14% and 12% respectively had objective hearing loss at 3 kHz.

Figure 4L shows how objective hearing loss increased with increasing age. The age gradient was similar for both sexes at 1 kHz, increasing steeply from the age of 65. Objective hearing loss at 3 kHz was higher for men than for women from the age of 45 and over, with the most marked differences at ages 65-84.

Prevalence of objective hearing loss was low below the age of 65 (9% of both sexes at 1 kHz; 6% of men and 4% of women at 3 kHz). In the rest of this chapter many of the analyses and comments on the objective hearing tests are therefore focused on older adults, among whom the problems of hearing loss are most common.



Analysis in this chapter presents information for the better ear, if hearing is different in each ear. Table 4D focuses on adults aged 65 and over, and looks at the proportion with good hearing in both ears at each of the two frequencies tested, and with good hearing at both frequencies. 31% of adults aged 65 and over had good hearing or only minimal objective hearing loss in both ears at both 1 kHz and 3 kHz, with women slightly more likely than men to be in this group (35% and 25% respectively).

Prevalence of good hearing or minimal objective hearing problem in both ears among adults aged 65 and over, by sex			
No or minimal objective hearing problem in both ears	Men	Women	All
	%	%	%
Good hearing at 1 kHz (mid-frequency) <sup>a</sup>	48	50	49
Good hearing or minimal problem at 3 kHz (high frequency) <sup>b</sup>	31	46	39
Both good hearing at 1 kHz <sup>a</sup> and good hearing or minimal problem at 3 kHz <sup>b</sup>	25	35	31

<sup>a</sup> Able to hear 20 dB HL at 1 kHz.

<sup>b</sup> Able to hear 35 dB HL at 3 kHz.

Table 4E summarises the prevalence of objective hearing loss in the better ear at either or both of the two frequencies tested, again among adults aged 65 and over. Half of adults of this age group had objective hearing loss in the better ear at 1 kHz and/or at 3 kHz (54% of men and 46% of women). Similar proportions of men and women had hearing loss either at low frequency only or at both frequencies, but more men than women had high frequency loss only.

Tables 4.20, 4D, 4E, Figure 4L

Prevalence of hearing problem in the better ear among adults aged 65 and over, by sex			
Objective hearing problem in the better ear	Men	Women	All
	%	%	%
At 1 kHz (mid-frequency) but not at 3 kHz (high frequency)	4	8	6
At 3 kHz but not at 1 kHz	22	12	16
At both 1 kHz and 3 kHz	28	26	27
At 1 kHz and/or at 3 kHz	54	46	50

### 4.6.2 Objective hearing loss, by region

There was no significant variation by region in the proportion of participants with objective hearing loss at 1 kHz (mid-frequency). Although the proportion of participants with objective hearing loss at 3 kHz (high frequency) appeared to vary by region, again the differences were not statistically significant.

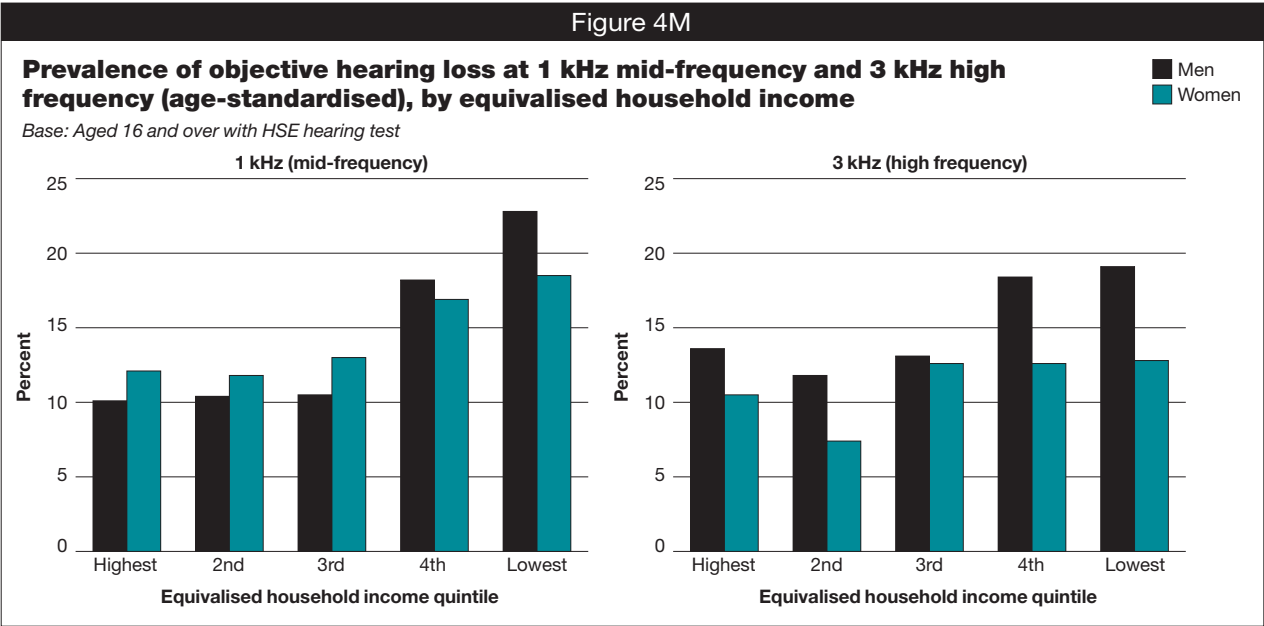
Table 4.21

### 4.6.3 Objective hearing loss, by income and Index of Multiple Deprivation

Figure 4M shows the proportion of participants with objective hearing loss, by equivalised household income quintile. Among both sexes, objective hearing loss at 1 kHz (mid-frequency) increased with decreasing household income. A similar picture was found for objective hearing loss at 3 kHz (high frequency).

There was a broadly similar pattern for the prevalence of objective hearing loss by quintiles of IMD. Among both sexes, the prevalence of hearing loss was highest in the fourth and fifth quintiles for both 1 kHz (mid-frequency) and at 3 kHz (high frequency) sounds.

Tables 4.22, 4.23, Figure 4M



### 4.6.4 Objective hearing loss, by need for social care

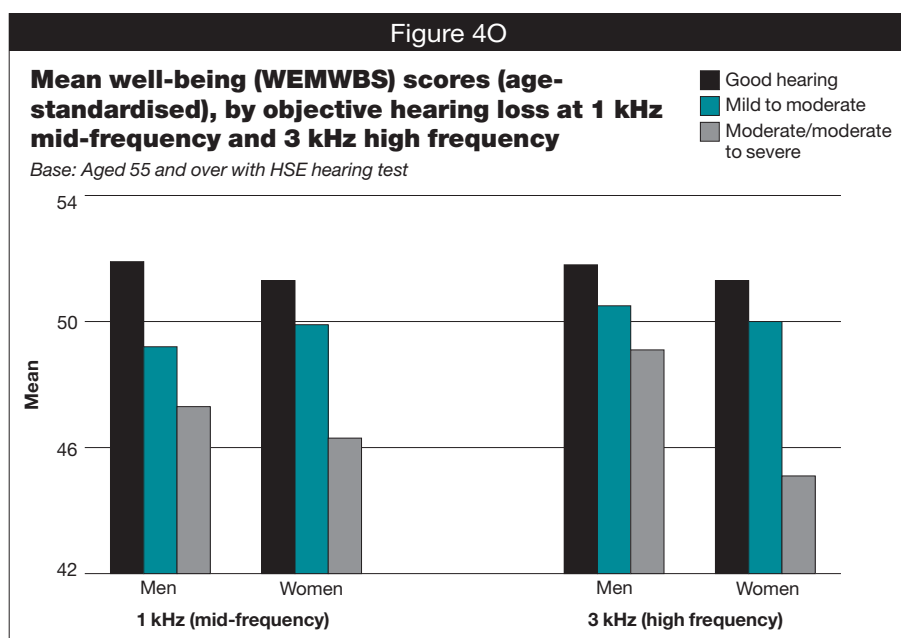
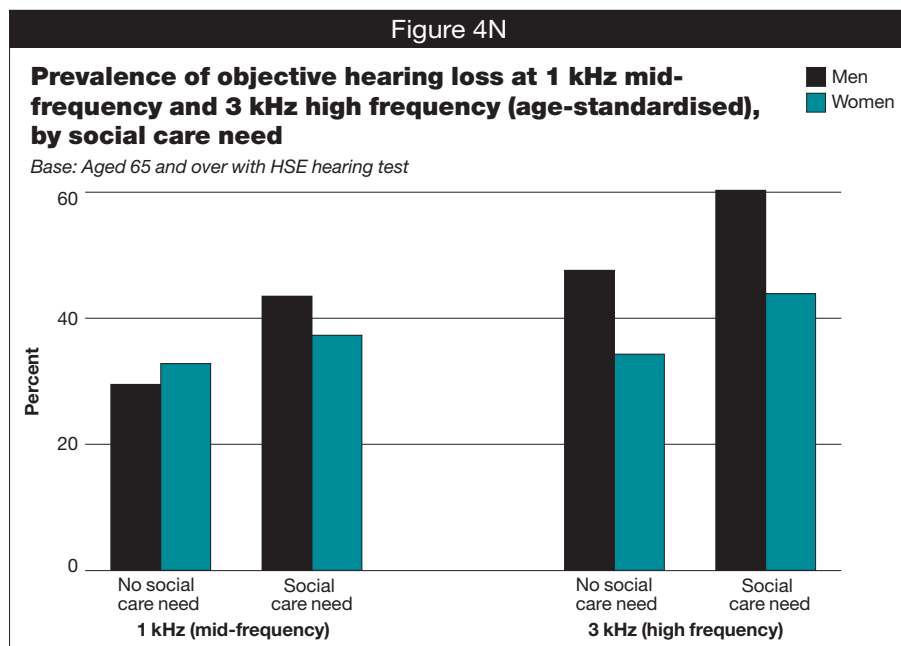
Figure 4N shows the prevalence of objective hearing loss for adults aged 65 and over, according to whether or not they needed social care support. At both 1 kHz (mid-frequency) and at 3 kHz (high frequency), prevalence of hearing loss was higher for participants with a need for social care than for those with no need for social care.

Table 4.24, Figure 4N

## 4.7 Mental health and positive mental well-being, by objective hearing loss

The prevalence of a GHQ-12 score of 4 or more, indicating probable mental ill health, did not vary by objective hearing loss at either 1 kHz or 3 kHz. There was significant variation according to mean well-being scores, however, as shown in Figure 4O. Mean scores were lower on average for participants with objective hearing loss, with similar patterns for men and women. A similar picture was found for the proportion of participants having a well-being score below the 10th centile.

Figure 4O, Table 4.25

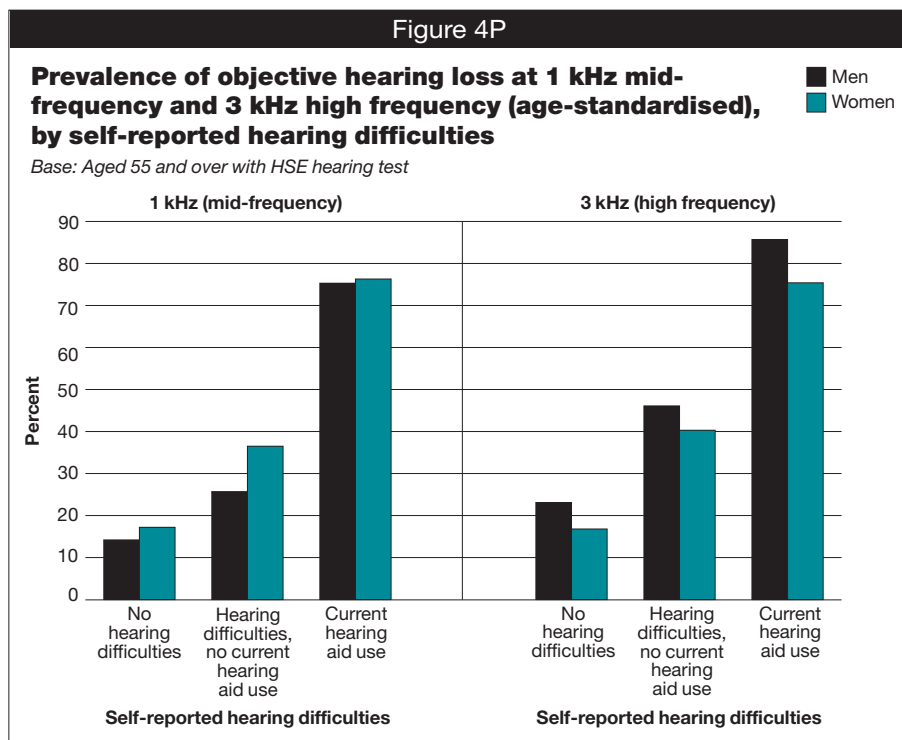


## 4.8 Relationship between objective hearing loss and self-reported hearing difficulties, hearing tests, and use of hearing aids

### Self-reported hearing difficulties

Objective measures of hearing loss related strongly to self-reported data on hearing difficulties. Figure 4P shows, for adults aged 55 and over, the sharp increase in prevalence of objective hearing loss at both 1 kHz (mid-frequency) and 3 kHz (high frequency) with increasing self-reported degree of hearing difficulties, for both men and women. Participants who reported current hearing aid use were two to three times as likely to have objective hearing loss compared with those who reported hearing difficulties but no hearing aid use. For example, 76% of women who reported wearing a hearing aid had objective hearing loss at 1 kHz (mid-frequency) compared with 37% of women who reported hearing difficulties but did not use a hearing aid.

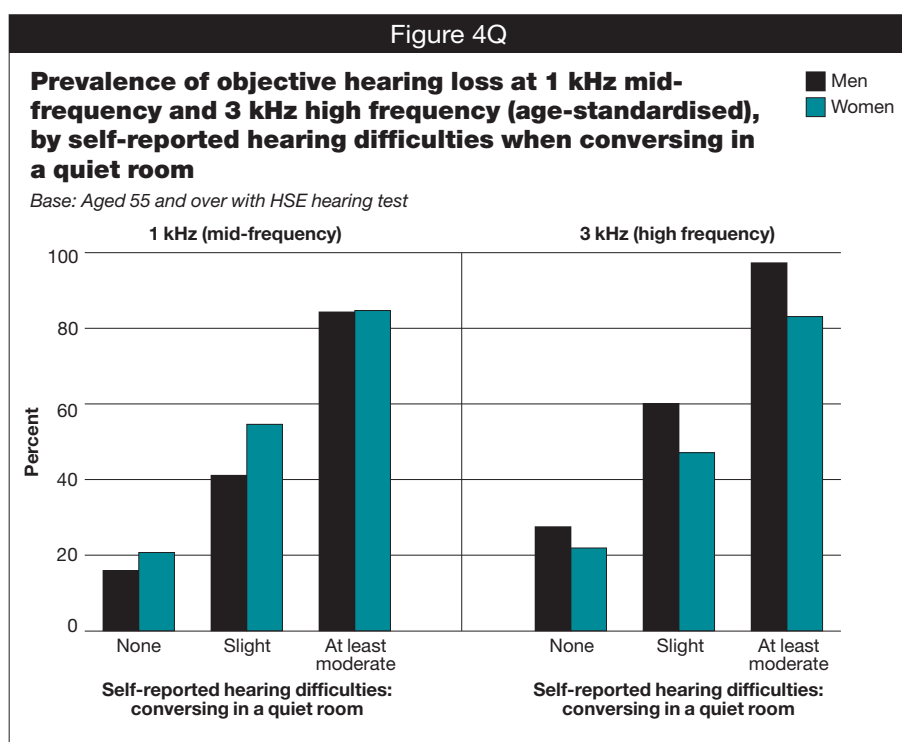
**Table 4.26, Figure 4P**

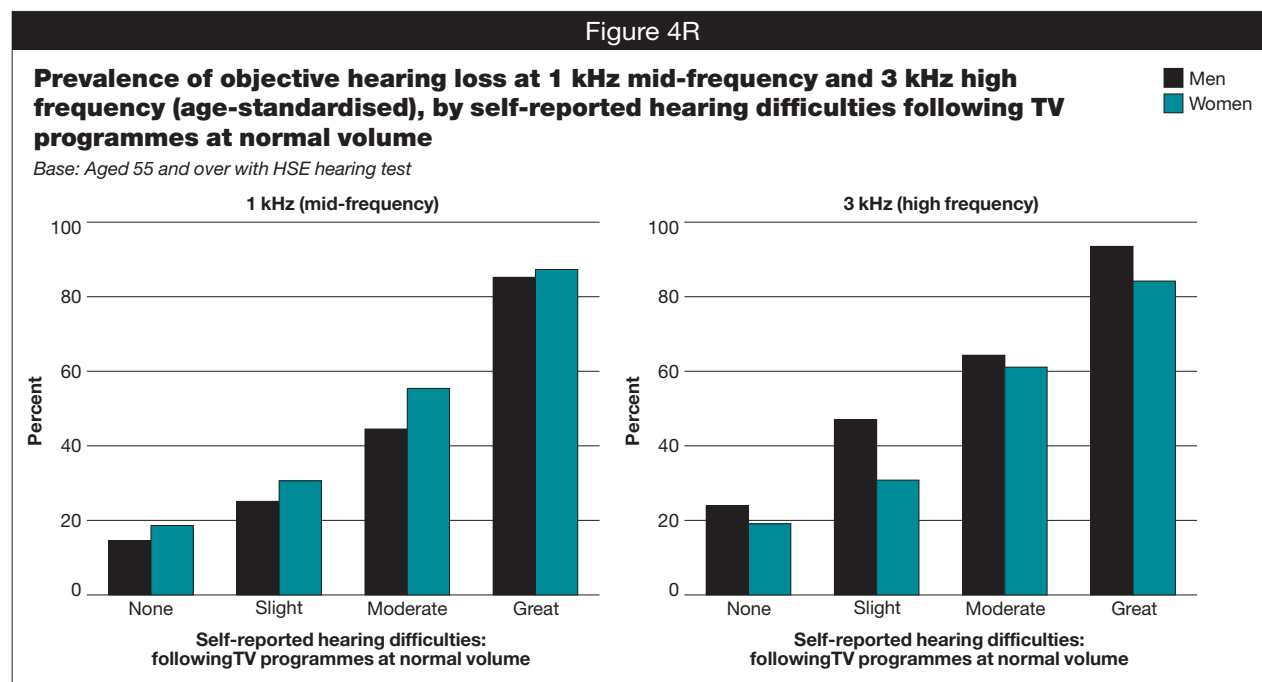


### Hearing difficulties in specific situations

Objective hearing loss has been compared with the proportions who reported hearing difficulties in specific situations; this analysis is restricted to those aged 55 and over, accounting for most of those with self-reported difficulties. Figure 4Q shows the prevalence of objective hearing loss by the self-reported degree of hearing difficulty when conversing with a single person in a quiet room, while Figure 4R shows the same information for those reporting difficulties with following television programmes at a normal volume. The results for difficulties having a group conversation are very similar (not shown). In each case the prevalence of objective hearing loss increased sharply with the self-reported degree of hearing difficulty.

Tables 4.27-4.29. Figures 4Q, 4R

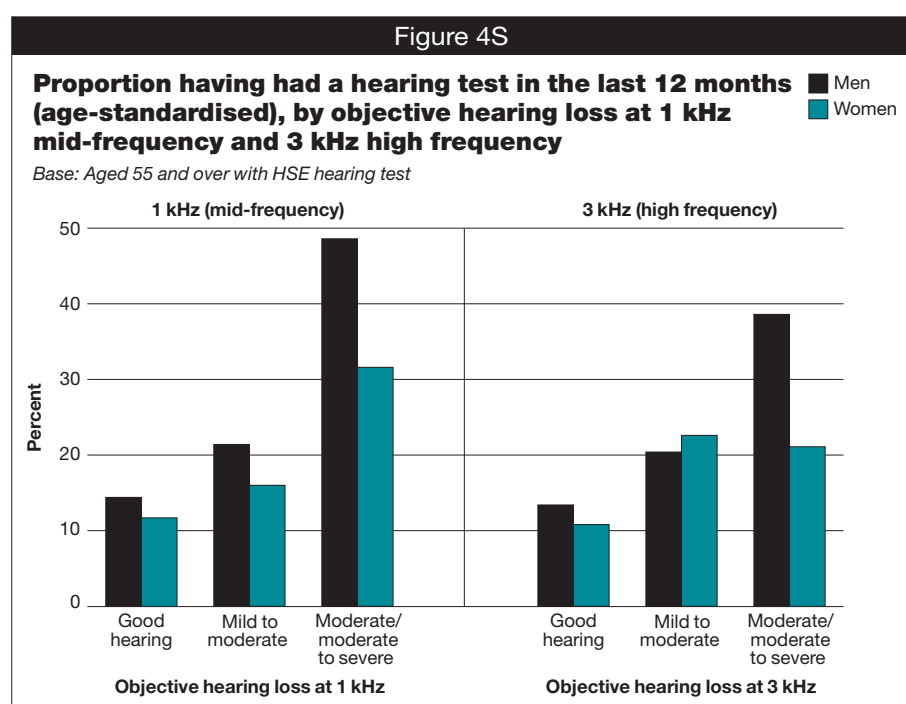




### Hearing test in the last 12 months

Among both men and women aged 55 and over, the proportion of participants who reported having had a hearing test in the last 12 months generally increased sharply with the degree of objective hearing loss, as shown in Figure 4S.

Table 4.30, Figure 4S

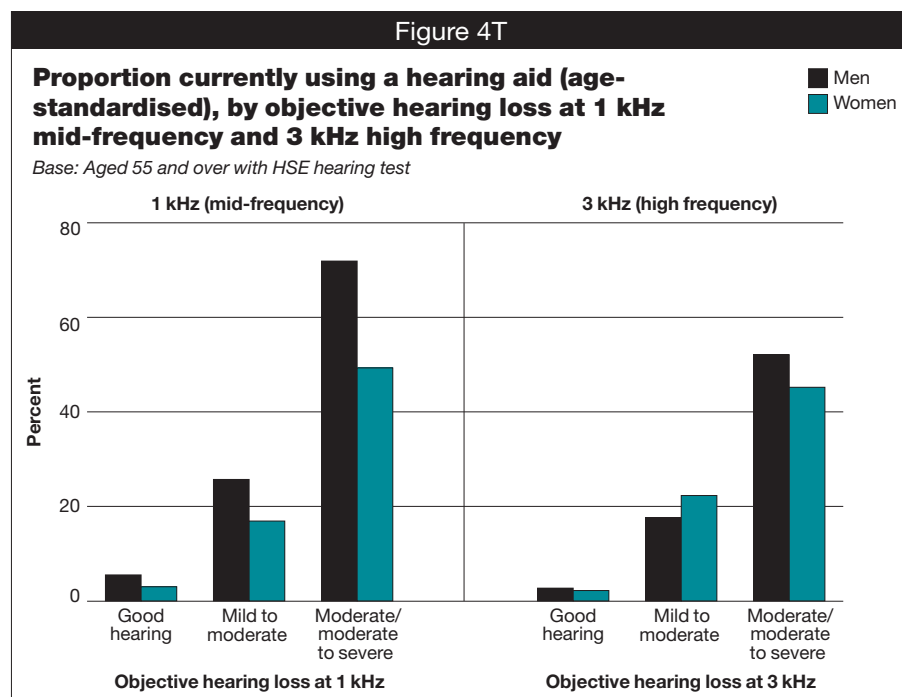


### Hearing aid use

Among both men and women aged 55 years and over, the proportion who reported current hearing aid use increased with the degree of objective hearing loss, as would be expected; see Figure 4T. A similar picture was found for the proportion of participants who reported that they had ever used a hearing aid (not shown). Only 31% of adults of this age with hearing loss of at least 35 dB HL at 3 kHz (high frequency) were current hearing aid users. Thus a substantial proportion of adults aged 55 and over with hearing loss of at least 35 dB HL at 3 kHz had never used hearing aids (60%), suggesting that there is potentially considerable unmet need.

Table 4.31, Figure 4T





## 4.9 Discussion

### 4.9.1 Introduction

This section starts by considering discrepancies within the responses to the survey questions. It then compares HSE results with findings from other studies. It concludes by considering implications for hearing policy and provision.

### 4.9.2 Consistency of survey responses

#### Questions

Much of the focus in the chapter was on those aged 55 and over, as below this age hearing loss was comparatively rare. Among participants aged 55 and over, one in six (17%) of those who reported neither hearing aid use nor hearing difficulties in general did report difficulties with hearing in one or more of the three specific circumstances described in section 4.2.1. This was particularly the case with having at least slight difficulty following a group conversation. It has been shown that the prevalence of reported hearing difficulties is influenced by the context of the questions and the person of whom they are asked.<sup>35</sup> In the 1986 Cardiff Health Survey, the prevalence of self-reported hearing difficulties was below 15% in the context of a general health survey compared with 20% or greater when the same questions were asked together with other questions on auditory function.<sup>35</sup> In the HSE, the initial questions were more general; a higher prevalence of problems was found in response to direct questions about specific situations.

#### Correspondence between objective hearing loss and reported hearing difficulties

In HSE 2014 there was no straightforward relationship at an individual level between reported hearing difficulties and objective hearing loss. Among participants aged 55 and over who had reported having no hearing difficulties, 23% of men and 17% of women had hearing loss of at least 35 dB HL at the higher frequency (3 kHz).

Participants currently using hearing aids were asked to remove them before the hearing test. 14% of men and 25% of women currently using a hearing aid had no objective hearing loss at 3 kHz, and 25% and 24% respectively had no objective hearing loss at 1 kHz.

Despite the variations between reported hearing difficulties and measured hearing loss, among HSE participants as a whole current hearing aid users had much greater objective hearing loss and those reporting no hearing difficulties had the least objective hearing loss.

### 4.9.3 Comparing HSE results with other studies

There is little recent data, so the HSE 2014 questionnaire and objective tests provide much-needed information about the extent of hearing impairment in England and of unmet need for diagnosis and management. In particular, the differences between the number of people with hearing problems and the number reporting use of hearing aids demonstrates the scope for improvements in services.

#### *Self-reported hearing difficulties*

Overall, 18% of adults in HSE 2014 reported hearing difficulties, including 5% who wore hearing aids. 36% of adults aged 65 years and over in HSE 2014 reported hearing difficulties (42% of men and 32% of women). Comparing with older adults, a 2003 survey of participants of the British Regional Heart Study found that 27% of men aged 63-85 reported hearing difficulties (using similar questions).<sup>36</sup>

#### *Annoyance with hearing difficulties*

Different surveys, looking at different age groups, confirm that the upsetting or annoying nature of hearing difficulties occurs at all ages.

- In HSE 2014, almost a quarter (23%) of adults aged 55 and over with moderate reported hearing difficulties found this moderately or severely annoying; the proportion rose to 53% of adults of this age reporting great hearing difficulties.
- A survey of Scottish GP patients aged 15 and over found that hearing difficulties were worrying, upsetting or annoying for one in five of those with hearing difficulties, not dissimilar to the HSE findings.<sup>37</sup>
- The Health Technology Assessment survey found that 23% of people aged 75 and over reported hearing problems that caused them moderate or severe worry.<sup>30</sup>

#### *Hearing aid use and potential unmet need*

Overall, 5% of adults in HSE 2014 reported current use of a hearing aid; 2% of adults had tried hearing aids but did not currently use them. 28% of participants with reported hearing difficulties wore hearing aids, but the remainder did not. Comparisons with other studies show broadly similar levels of hearing aid use.<sup>5</sup>

Different surveys have provided different evidence about consistency of using hearing aids, once fitted. Both among adults aged 65 years and over in HSE 2014 and a 2011 face-to-face survey of adults in England aged 60 and over,<sup>5</sup> around 80% of those who had been fitted with hearing aids used them, particularly among the older adults. In contrast, a study in Wales found that fewer than half of GP patients aged 50-64 screened for hearing loss and fitted with hearing aids were still using their aids 8-16 years later.<sup>38</sup> Although the presence of hearing difficulties increased with age in both HSE 2014 and the British Regional Heart Study, current hearing aid use rose more substantially, so that in both surveys more than half of those aged 75 and over reporting hearing difficulties were using hearing aids.<sup>36</sup>

Overall, however, more than two in five adults reporting great hearing difficulties in HSE 2014 had never used a hearing aid, and a further one in ten had tried them in the past but were not currently using them.

#### *Hearing difficulties, mental health and well-being*

Participants in HSE 2014 who reported hearing difficulties but did not currently use hearing aids had higher prevalence of poor mental health and lower positive mental well-being than those who currently used hearing aids. Men in the British Regional Heart Study who reported hearing difficulties had poor physical functioning, poor quality of life, and poor social interaction.<sup>36</sup> A survey of patients in England also found that people with deafness had a lower quality of life than persons without sensory impairment. However, this was substantially better among those who felt that local services and organisations had supported them appropriately.<sup>3</sup>

#### 4.9.4 Prevalence of objective hearing loss

Overall, 13% of adults aged 16 and over in HSE 2014 had at least moderate hearing loss (35 dB HL or more) at 3 kHz (high frequency) in the better ear. This level of hearing loss in the better hearing ear is an accepted threshold for problems that would benefit from hearing aids and/or other support.<sup>30</sup> Applying the prevalence data to 2013 mid-year population estimates gives an estimated 5.7 million adults aged 16 and over in England with hearing loss of at least 35 dB HL. This figure will be a slight underestimate due to the exclusion of people with a cochlear implant or with a current ear infection in either ear.

As expected, hearing loss of this magnitude increased markedly with age: affecting 14% aged 55-64; 29% aged 65-74; 55% aged 75-84; and 83% aged 85 and over. In contrast, 95% of young adults aged 16-24 had good hearing (less than 20 dB HL) at 1 kHz (mid-frequency) and 98% had good hearing to mild problems (less than 35 dB HL) at 3 kHz (high frequency).

#### 4.9.5 Implications for hearing policy and provision

The national *Action Plan on Hearing Loss* was published in March 2015.<sup>17</sup> The five main objectives set out in the Action Plan are as follows:

- prevention
- early diagnosis
- integrated, patient centred management
- ensuring those diagnosed do not need unscheduled care or become isolated
- ability to partake in every-day activities, including work.<sup>17</sup>

##### *Prevention of hearing loss*

One source of preventable hearing loss is occupational noise. The revised Control of Noise at Work Regulations 2005<sup>20</sup> was implemented in 2006. A survey of young adults found that exposure to occupational noise had fallen from 9% in 1994 to 3.5% in 1999, while exposure to noise from gunfire had been static at 3%.<sup>39</sup>

A further source of preventable noise comes from recreational or social activities such as listening to loud music through headphones, or attending live concerts or similar events. In the study of young adults cited above, 19% of those aged 18-25 (around 1.3 million people) had been exposed to significant noise while at social activities (particularly nightclubs and live rock concerts); this had risen from 7% in 1994.<sup>39</sup> This is not addressed by the revised Control of Noise at Work Regulations except as workplaces for staff employed there.

##### *Early diagnosis and identification including screening for objective hearing loss*

The UK has a national screening programme for congenital deafness and hearing loss so that children can be helped to communicate and learn language, thus being able to access education and employment opportunities in the same way as other children. At present, there is no screening programme for acquired deafness or hearing loss, but there is increasing awareness that early identification of hearing loss would support better outcomes for these people. Among HSE 2014 participants, fewer than half the adults who reported great hearing difficulties, and only a quarter of adults with objective hearing loss at 3 kHz, reported having had a hearing test in the last 12 months. Given the benefits that hearing aids can bring, there is considerable scope for screening for hearing problems.

Pilot studies in general practice have found that GPs can use the HearCheck device to screen patients and refer them appropriately for support, including hearing aids.<sup>28</sup> The opportunity was also taken to alter the audiology pathway, to enable about a third of patients referred to be fitted with hearing aids at their initial visit. This was acceptable both to patients and audiology services.<sup>40,41</sup> Screening has also been found to be acceptable in other contexts such as the wider community.<sup>13</sup>

Screening for hearing loss is cost-effective,<sup>30</sup> and could help to identify unreported problems. One study found that people with hearing loss had generally had their problems for at least ten years before they were referred for assessment.<sup>28</sup> However, the older the

individuals are, the more difficult they tend to find it to adapt to using, and to care for, their hearing aids.<sup>28</sup> In the area where the GP pilot studies mentioned above took place, information about the clinical benefits of screening were also disseminated by colleagues through word of mouth. By the end of 2011, 51 other GP practices in the area had bought HearCheck screeners and had initiated their own testing of older patients<sup>28</sup>; the number of practices buying and using their own HearCheck screeners has continued to rise.<sup>5</sup>

Results from HSE 2014 suggest that, if capacity or resources for universal, age-based screening is not available, it would be possible to identify a group with higher likelihood of having objective hearing loss by asking patients aged 55 and over about their hearing, and testing those reporting moderate or great difficulties with group conversations. Another option is opportunistic screening focusing on adults with other long-term conditions, particularly with vision, memory or mental health problems.<sup>42</sup>

HSE data also suggest that there is greater prevalence of reported hearing difficulties and objective hearing loss in those from more deprived and less affluent backgrounds, but no greater prevalence of hearing aid use. Therefore screening for hearing problems and provision of hearing aids and other support could be targeted in such areas, and could be an effective strategy to reduce health inequalities.

### ***Management of hearing loss: Integrated, patient centred management***

A systematic review has described the range of options available for adults found through screening to have significant hearing loss. These include referral to audiologists or other hearing specialists, as well as communication programmes and other rehabilitations options.<sup>42</sup> In addition to a hearing loss of at least 35 dB HL at 3 kHz, other symptoms indicating that people are more likely to benefit from specialist services include tinnitus, annoyance from loud sounds, dizziness, and exposure to occupational noise.<sup>5</sup> Hearing aids are beneficial to most with hearing loss, although earlier sections have indicated that people do not always continue to wear them once fitted. Support, counselling and providing small aids are important to encourage people to continue using hearing aids.<sup>14</sup> Recent work has shown that the use of two hearing aids provides greater benefit than a single one.<sup>43</sup>

In HSE 2014, fewer than half of adults reporting great hearing difficulties reported current use of hearing aids (46% of men and 45% of women). There were similar proportions using hearing aids among women with objectively measured hearing loss of at least 35 dB HL at 1 kHz (49%) and for both men and women with at least 55 dB HL at 3 kHz (52% and 45% respectively). Only around a third of adults aged 55 and over with at least 35 dB HL at 3 kHz (high frequency) were current hearing aid users. This suggests that there are probably almost 4 million adults in England who would benefit from the use of proven technologies that reduce disability.

Recent research has raised further questions about possible benefits from providing hearing aids more widely. A follow-up study of men in the British Regional Heart study found that the incidence of stroke (but not heart disease) and cardiovascular mortality were higher for men reporting hearing difficulties but who did not use hearing aids than for men with no hearing difficulties or those who used hearing aids.<sup>44</sup> This increased risk is unlikely to be directly attributable to the hearing loss. Possible explanations include the lack of hearing aids as a proxy for not seeking healthcare, not taking prescribed preventive medicines, or having greater risk factors for chronic disease. Social networks can have a marked effect on cardiovascular mortality,<sup>45</sup> so a further possible explanation could be that the cardiovascular disease was a consequence of the social isolation brought about by untreated hearing difficulties.

### ***Monitoring trends in hearing***

This is the first time that the HSE series has included an interview module on self-reported hearing difficulties or a nurse module on objective hearing loss. Repeating the hearing module in the future would make it possible to assess trends in hearing difficulties, hearing loss and support.

## References and notes

- 1 We thank Professor Adrian Davis; Louise Hart of *Action on Hearing Loss* (the new name for RNID); and Professor Bernie Woll of UCL for their expert advice.
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and 100% specific (all the people identified would have the condition) but in general, there is a trade-off between these two characteristics: the more sensitive a test is (the higher the sensitivity), the more likely it is to detect people who do not actually have the condition (lower specificity).

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4.1	Prevalence of self-reported hearing difficulties, by age and sex	4.16	Current and previous use of a hearing aid (age-standardised), by self-reported hearing difficulties and sex
4.2	Prevalence of self-reported hearing difficulties (observed and age-standardised), by region and sex	4.17	Hearing aid wear, by age and sex
4.3	Prevalence of self-reported hearing difficulties (age-standardised), by equivalised household income and sex	4.18	Source of current hearing aid, by age and sex
4.4	Prevalence of self-reported hearing difficulties, by Index of Multiple Deprivation (IMD) and sex	4.19	Satisfaction with current hearing aid, by age and sex
4.5	Prevalence of self-reported hearing difficulties (age-standardised), by social care need and sex	4.20	Prevalence and severity of objective hearing loss, by age and sex
4.6	Mental health and well-being (age-standardised), by self-reported hearing difficulties and sex	4.21	Prevalence and severity of objective hearing loss (observed and age-standardised), by region and sex
4.7	Self-reported degree of specific hearing difficulties, by age and sex	4.22	Prevalence and severity of objective hearing loss (age-standardised), by equivalised household income and sex
4.8	Degree of annoyance with hearing difficulties (age-standardised), by self-reported hearing difficulties and sex	4.23	Prevalence and severity of objective hearing loss (age-standardised), by Index of Multiple Deprivation (IMD) and sex
4.9	Prevalence of having had a hearing test in the last 12 months, by age and sex	4.24	Prevalence and severity of objective hearing loss (age-standardised), by social care need and sex
4.10	Prevalence of having had a hearing test in the last 12 months (age-standardised), by equivalised household income and sex	4.25	Mental health and well-being (age-standardised), by objective hearing loss and sex
4.11	Prevalence of having had a hearing test in the last 12 months (age-standardised), by self-reported hearing difficulties and sex	4.26	Prevalence and severity of objective hearing loss (age-standardised), by self-reported hearing difficulties and sex
4.12	Current and previous use of a hearing aid, by age and sex	4.27	Prevalence and severity of objective hearing loss (age-standardised), by self-reported hearing difficulties in a conversation with one person in a quiet room, and sex
4.13	Current and previous use of a hearing aid (observed and age-standardised), by region and sex	4.28	Prevalence and severity of objective hearing loss (age-standardised), by self-reported hearing difficulties in a group conversation, and sex
4.14	Current and previous use of a hearing aid (age-standardised), by equivalised household income and sex	4.29	Prevalence and severity of objective hearing loss (age-standardised), by self-reported difficulties following television programmes at a normal volume, and sex
4.15	Current and previous use of a hearing aid (age-standardised), by Index of Multiple Deprivation (IMD) and sex		

- 4.30 Prevalence of having had a hearing test in the last year (age-standardised), by objective hearing loss and sex
- 4.31 Current and previous use of a hearing aid (age-standardised), by objective hearing loss and sex