

Addressing the rising prevalence of hearing loss

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**World Health
Organization**

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ACRONYMS

DALY = Disability-adjusted Life Year

DHL = Disabling Hearing Loss

GBD = Global Burden of Disease

NHANES = National Health and Nutritional Examination Survey

NIHL = Noise-induced Hearing Loss

SCENIHR = Scientific Committee on Emerging and Newly Identified Health Risks

UNHS = Universal Neonatal Hearing Screening

WHO = World Health Organization

Executive Summary

Hearing loss is the fourth highest cause of disability globally, with an estimated annual cost of over 750 billion dollars. These facts are well known and have contributed to growing global consciousness on the need for accessible hearing care in all regions of the world. Looking forward however, the demand for hearing care is likely to grow significantly in coming decades. This report highlights the potential escalation of hearing loss to the middle of the century, and focusses on the factors responsible for hearing loss and the means to address them.

Key findings

- It is estimated that there are currently around 466 million people with disabling hearing loss globally.¹
- With the rise and ageing of the global population, the number of people with hearing loss is growing at a rapid pace.
- WHO projections suggest that unless action is taken, there will be 630 million people living with disabling hearing loss by the year 2030, with that number expected to grow to over 900 million by 2050.¹

Reasons for the projected rise

The projections reflect current demographic trends. As the global population is growing and ageing, there is likely to be a corresponding rise in the number of people who experience hearing loss across the world.

Risk factors for hearing loss

The data presented in this document are mainly driven by demographic population shifts. However, there are many factors across the course of life which affect hearing and need to be considered while addressing this issue.

While some of the risk factors associated with hearing loss are declining, such as rubella and in some places, meningitis, the same does not hold true in all parts of the world and for other causes. Noise-induced hearing loss, ototoxic hearing loss and ear infections are common causes that contribute to hearing loss and need to be addressed through appropriate preventative actions. In recent years especially, there has been a significant increase in the number of people listening to loud sounds in recreational settings, which puts them at risk of hearing loss.

¹ These projections are based on the 2008 age-, gender- and region-specific prevalence of disabling hearing loss. The estimates take into account the demographic shifts across the world.

Actions required

Public health action is required to prevent hearing loss through control of risk factors; and ensure that the needs of those who experience hearing loss can be addressed adequately.

Such action must consist of:

- Policy development to integrate ear and hearing care into health systems: such policies should
 - a) initiate preventative actions that address the common causes of hearing loss, and
 - b) identify hearing loss early and intervene to mitigate its impact.
- Advocacy: to raise awareness among policymakers and civil society on ear and hearing care.
- Capacity building: to address the gap in human resources through educational programmes and training of available care providers.
- Improving accessibility: of hearing devices and technologies to ensure that these are available to all those who need them.

Conclusion

The rising numbers of people with hearing loss poses a cause for concern. However, by identifying the leading causes of hearing loss and implementing preventative action, the trend of escalating hearing loss could be controlled. With foresight, planning and implementation of good policies, we can limit the adverse impact of hearing loss around the world.

Introduction

Hearing loss affects millions of people around the world and is estimated to be the fourth leading cause of disability globally (WHO GHE 2015; Cunningham and Tucci, 2017). WHO estimates in 2008 found that 360 million people worldwide live with disabling hearing loss², including 32 million children and 180 million older adults (WHO, 2012). Our most recent estimations place this figure at over 466 million people with disabling hearing loss in 2018. The main areas of the world affected by disabling hearing loss are the South Asian, Asia Pacific and Sub-Saharan African regions, with a prevalence rate almost four times that of the high income regions. Unless hearing loss is appropriately addressed, it can have a profound impact on those affected, and poses a significant challenge to their everyday lives. It is estimated that each year the cost of unaddressed hearing loss exceeds 750 billion international dollars globally (WHO, 2017a).

The world's population continues to grow, with current research estimating a global population increase from 7.5 billion now, to almost 10 billion people by 2050 (United Nations, 2017). As expected, there will also be an increase in the amount of disabling hearing loss (Vos *et al.*, 2016; Wilson *et al.*, 2017). This report aims to highlight the changing profile of global hearing loss over the next century, and summarize the actions required to prevent hearing loss where possible, and mitigate its adverse impact.

² Disabling hearing loss is defined as hearing loss greater than 40 dB in the better ear for adults, and 30 dB in the better ear for children.

National trends

Studies from around the globe consistently show that the rates of hearing loss are increasing as time progresses. An Australian study in 2006 predicted an overall 1.5-fold increase in the national prevalence of hearing loss by the year 2050 (Opitz and Zbaracki, 2006). One in six Australians were found to be living with hearing loss at the time of the study (17.4%), and it is predicted that this will rise to one in four (26.7%) by 2050.

A study by the organization 'Action On Hearing Loss' in the UK, predicted that in 20 years there would be an increase in hearing loss of almost 50% in the UK (Action On Hearing Loss, 2015a) – from 11 million people in 2015 to 15.6 million people in 2035. This equates to an increase from one in every six people with hearing loss to one in every five people. This trend can be partially attributed to an ageing population, with 23% of the total population being over the age of 65 by the year 2035. This is coupled with the fact that age-related hearing loss is the single largest cause of hearing loss in the UK (Office for National Statistics, 2012). In fact, more than one in five people over the age of 50 (20.1%) have disabling hearing loss, as well as almost half of all people over the age of 70 (44.4%) (Action On Hearing Loss, 2015b).

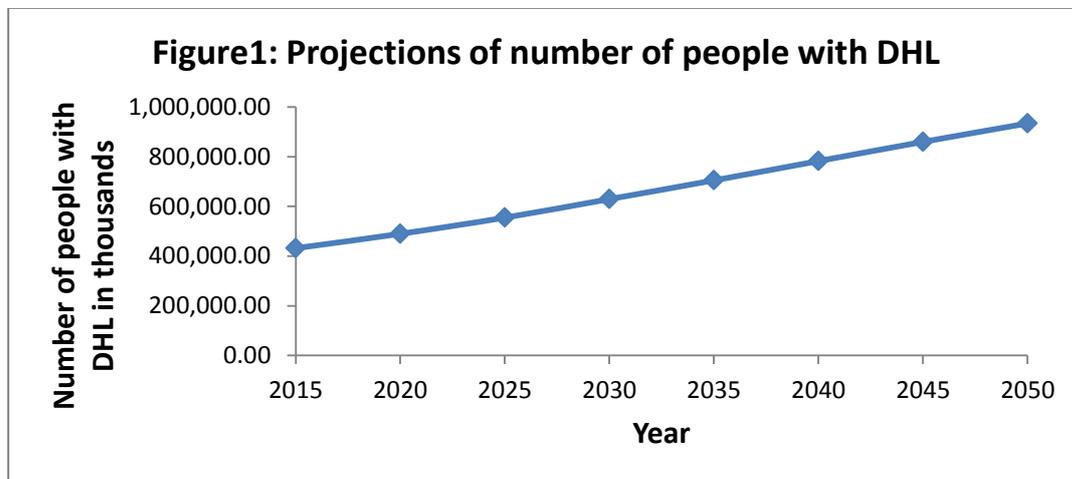
Another study based in New Zealand projected the changes in hearing loss rates over fifty years, taking into account the rapidly ageing population. A 1.5-fold increase in hearing loss was predicted in people older than 14 years of age by 2061 (Exeter *et al.*, 2015).

In the United States, a dramatic shift in age demographics is also likely to result in significantly higher numbers of disabling hearing loss in older adults (Lin, Niparko and Ferrucci, 2011). Evidence from the National Health and Nutritional Examination Survey (NHANES) suggests that within specific age ranges, hearing loss rates have improved over time (Hoffman *et al.*, 2010a). Comparing results from studies conducted in 1959-1962 and 1999-2004, it was found that hearing loss affected fewer Americans in each decade of life in the more recent survey (Hoffman *et al.*, 2010b). This result was attributed to the improvements to health and lifestyle in recent times, providing better hearing outcomes for older adults (Zhan *et al.*, 2010). However, despite these improvements, the overall picture of hearing loss continues to worsen due to more people living longer.

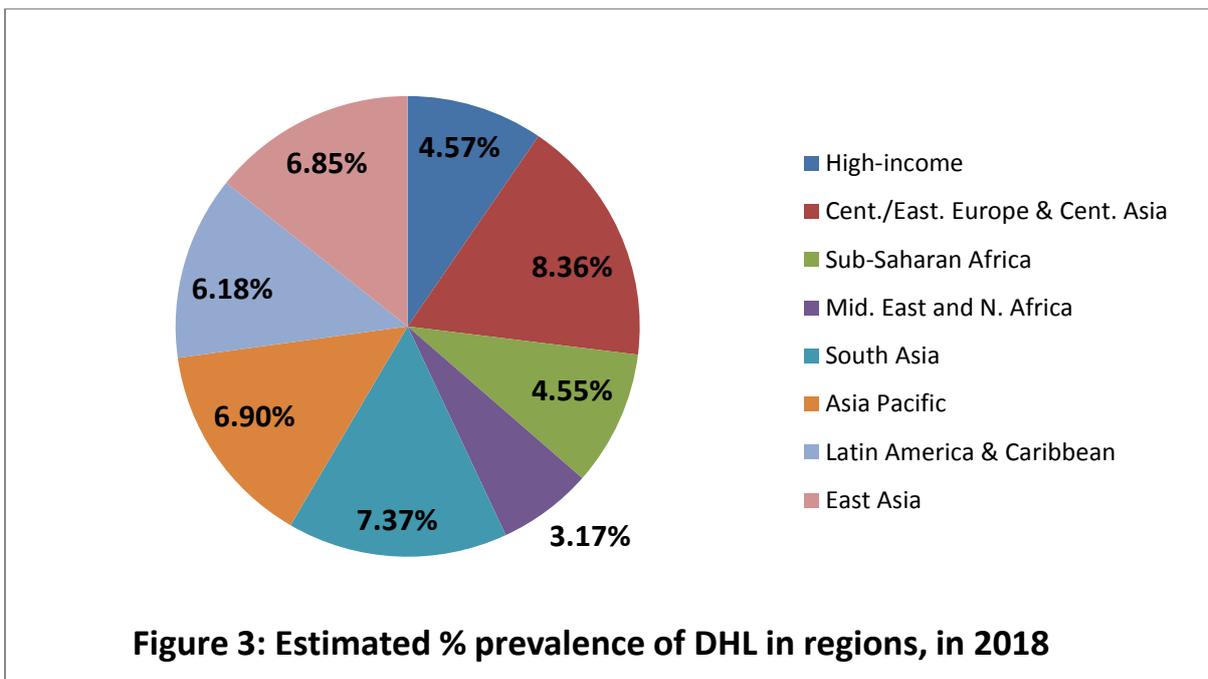
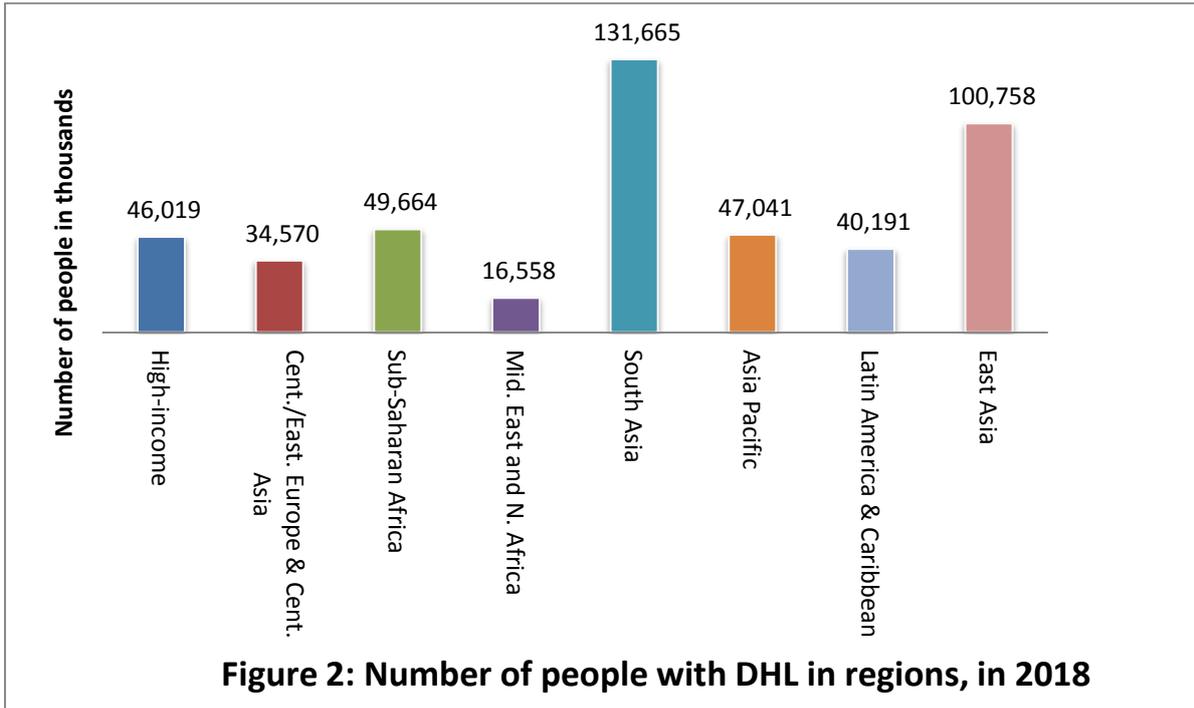
Contrasting with these many studies from high income regions is a lack of data from low- and medium-income countries. One of the few publications supporting a similar trend in these regions originates from the Brazilian census in 2010, which measured a hearing loss prevalence of 5.2%, and estimated an increase of this number over time (Brazilian Institute of Geography and Statistics, 2010).

Global and regional trends

The studies presented in the previous section show that in many countries, the rates of hearing loss are increasing, but consistent global and regional data are scarce. Therefore WHO estimated of the number of people with DHL at both global and regional levels and projected these until the year 2050. The projections were calculated based on the WHO 2008 prevalence estimates (Stevens *et al.*, 2013), with the assumption that age, gender and regional prevalence remain constant (refer Appendix 1). The projected global changes are exclusively due to changes in the population profile (ageing population and demographic changes) from 2010 till 2050.

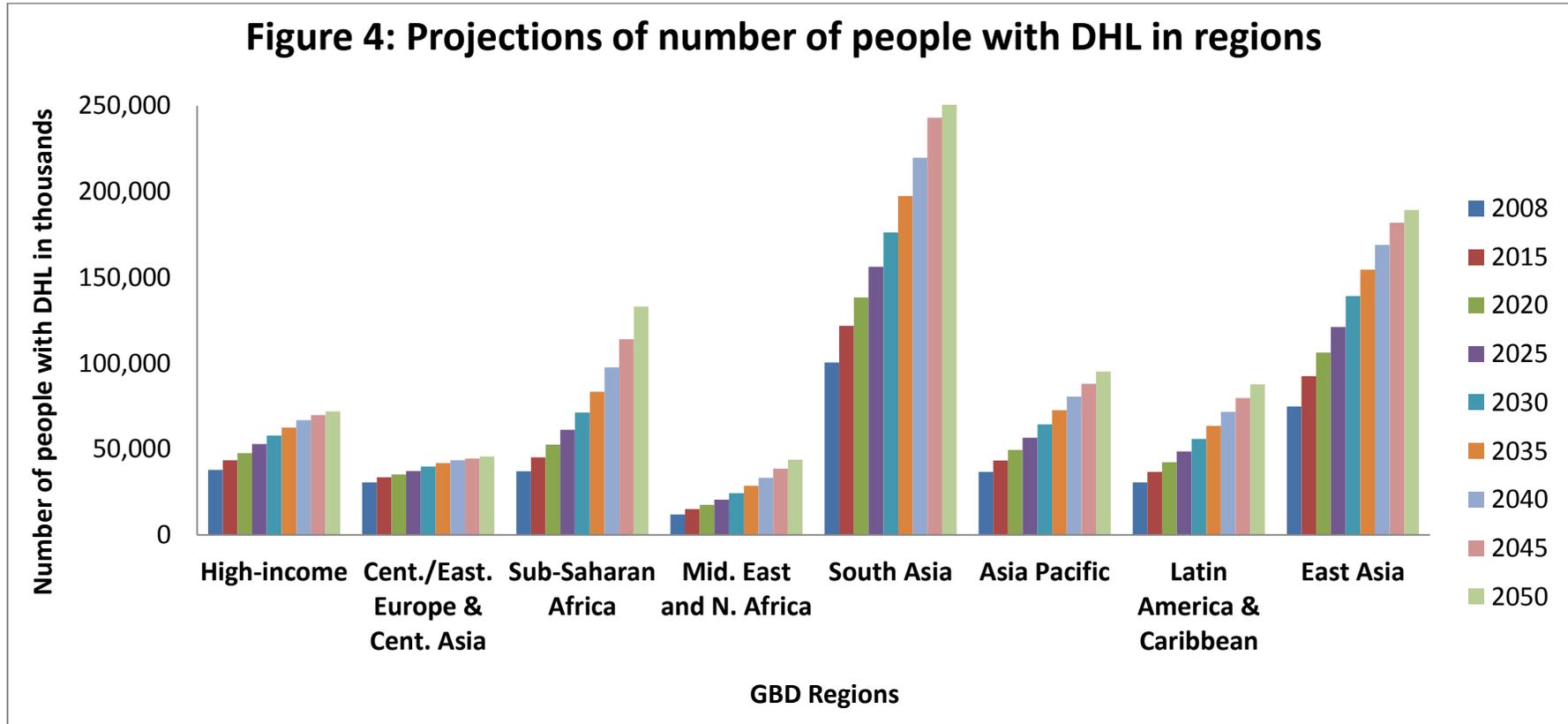


Results (fig 1) show that in 2018, around 466 million people have DHL, corresponding to a global prevalence of 6.12%. The distribution across different regions is shown in figure 2. Around half of them are in the South Asia and East Asia regions. The highest prevalence is observed in the Central/Eastern Europe & Central Asia region (8.36%), followed closely by South Asia (7.37%) and the Asia Pacific (6.90%).



The number of people with DHL across different GBD regions will grow over the years, but at different rates. Projections show that overall the number of people with DHL could rise to 630 million by 2030 and may be over 900 million in 2050 (9.6%). There are likely to be rapid increases for South Asia, East Asia, and Sub-Sahara Africa. Relatively slower but still substantial is the growth in Asia Pacific and Latin America & Caribbean. Slightly slower again

is the High-Income region, Middle East and North Africa, and finally, comparatively slower growth rates for Central/Eastern Europe and Central Asia (fig.4). Distribution of countries in these (GBD) regions is listed in appendix 2.



Demographic shifts

The main demographic shifts that we will see over the next century are population growth and population ageing. These two factors will most affect the changing profile of hearing loss around the world. As seen in Figure 5, the current global population of 7.5 billion people is expected to increase to almost 10 billion people by 2050 (United Nations, 2017). As population numbers increase, the number of people affected by hearing loss will also increase.

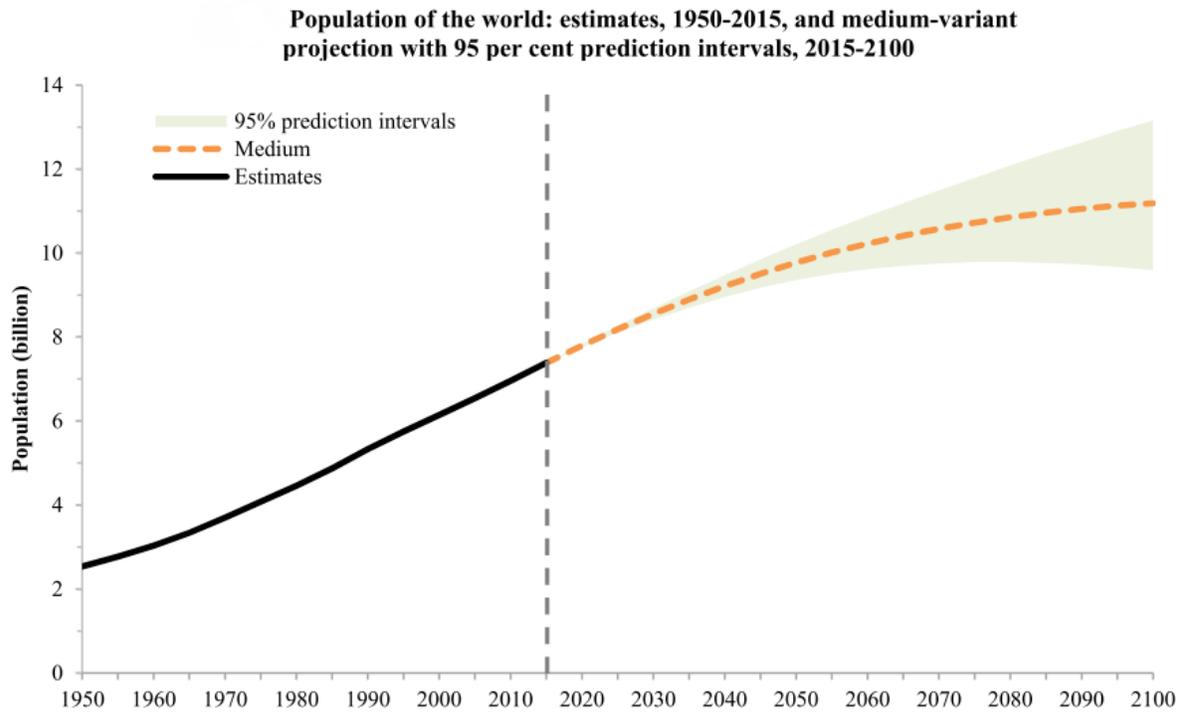


Figure 5: World population projections, including current population of 7.5 billion, increasing to an estimated 10 billion by 2050, and 11 billion by 2100. From *World Population Prospects The 2017 Revision Key Findings and Advance Tables*, by Department of Economic and Social Affairs, ©2017 United Nations. Reprinted with the permission of the United Nations).

Between the years 2015 and 2050, it has been predicted that the number of people aged greater than 60 years worldwide will double, and the number of people aged over 80 years will triple (United Nations, 2015). Hearing loss is the leading cause of disability among men above the age of 60 years, and is the second most common contributor to years lived with disability for women in this age group (World Health Organization, 2008). This translates to almost one

third of all adults over the age of 65 being affected by hearing loss, with 226 million over 65 having disabling hearing loss. As per current estimates, this number is expected to rise to almost 585 million by 2050.

Risk factors for hearing loss

There are many risk factors for hearing loss; these include exposure to loud sounds (both in occupational settings and recreational settings), chronic ear infections, and ototoxicity (particularly iatrogenic ototoxicity). The burden of avoidable causes of hearing loss can be reduced by addressing the risk factors.

a. Noise-induced hearing loss (NIHL)

Occupational noise exposure:

Occupational noise exposure is the second most common risk factor in the workplace, behind workplace injuries (WHO Europe, 2017). Noise exposure contributes to 22% of workplace-related health issues. Many studies show that occupational noise exposure directly results in hearing loss (Safe Work Australia, 2010; Mahboubi *et al.*, 2013). A study from the US National Institute for Occupational Safety and Health examined the worldwide morbidity of occupational noise-induced hearing loss (NIHL) (Nelson *et al.*, 2005). They calculated that over 4 million DALYs globally are a result of occupational noise exposure, with rates varying in the different regions, ranging from 7% to 21%. (Nelson *et al.*, 2005).

There have been measures implemented in many countries in an attempt to decrease the incidence of NIHL in the workplace, with varying levels of success. The trends of occupational NIHL prevalence in Australia between the years 2000 and 2009 showed no significant increase or decrease (Safe Work Australia, 2010). A large multinational European study found some countries with worsening levels of occupational NIHL (Belgium, Spain, Switzerland, Netherlands), and other countries with significant improvements (Finland, France, Italy, Norway, the Czech Republic, UK). As seen in Figure 3, these trends were across a twelve year period between 2000 and 2012 (Stocks *et al.*, 2015). Some countries around the world have not yet

implemented legislation related to occupational NIHL, with research finding 27% of countries in the Americas lacking of any legislation regarding permissible occupational noise levels (Arenas and Suter, 2014).

Recreational noise exposure:

Another source of noise-induced hearing loss is from recreational listening. In 2015, WHO estimated that over a billion young people are at risk of developing hearing loss due to their habit of listening to music at loud levels and for prolonged periods of time (WHO, 2015). Entertainment venues contribute to the risk of recreational NIHL, with a three-fold increase in those exposed to loud sounds in social settings over the past twenty years (Sliwinska-Kowalska and Davis, 2012). The widespread uptake of portable music devices such as smartphones and MP3 players has added to this risk. Smartphone use has grown from 45% in 2013 to 54% in 2015 in developing countries, and currently sits at 87% of the population in developed countries (Poushter *et al.*, 2016). In addition to the increased uptake of this technology, almost 50% of all portable music device users are listening to music in an unsafe manner, which is putting their hearing at risk (WHO, 2015). All of these facts are likely to contribute to an increased risk of recreational NIHL in the near future. Unsafe listening practices have been identified as major contributors to hearing loss by the Scientific Committee on Emerging and Newly Identified Health Risks in 2008. They indicated that 5-10% of listeners are likely to develop hearing loss in the future due to their personal preferences of volume levels and duration of listening (SCENIHR, 2008). Another study found that more than 40 million adult Americans between the ages of 20 and 69 are affected by non-occupational NIHL (Centre for Disease Control and Prevention, 2017).

b. Ear infections

Otitis media is a very common condition, affecting approximately 11% of the globe's population each year – over 700 million people (DeAntonio *et al.*, 2016). The majority of these are children, accounting for more than half of all cases (Global Burden of Disease Study 2013 Collaborators, 2015). 31 million patients affected by acute otitis media will go on to develop chronic

suppurative otitis media, including more than 7 million children each year (Monasta *et al.*, 2012). Alarming, more than 50% of those people affected by chronic suppurative otitis media may develop hearing loss (Avnstorp *et al.*, 2016), a figure close to 0.3% of the global population (Monasta *et al.*, 2012). All of these figures emphasise the importance of early recognition and treatment for those affected, especially given the conversion rate of acute otitis media to chronic suppurative otitis media.

c. Ototoxic hearing loss

Although substantial evidence is lacking to accurately forecast the future trends of hearing loss caused by ototoxicity, it is undeniably a risk factor that contributes to the current prevalence of hearing loss worldwide. Some common precipitants of ototoxic hearing loss are medications such as aminoglycosides, used in the treatment of infections, and chemotherapeutic agents such as cisplatin (Mukherjea *et al.*, 2011). Aminoglycoside antibiotics are powerful tools in the fight against multi-drug resistant diseases – an issue that is becoming more concerning as time passes (Seddon *et al.*, 2012). With more than 600,000 new cases of drug-resistant tuberculosis globally each year, as well as those with established drug-resistant tuberculosis requiring ongoing treatment, the potential side effect of ototoxic hearing loss must be addressed (WHO, 2017b). Some figures suggest hearing loss rates between 10-50% as a direct result of ototoxicity from aminoglycosides for treatment of drug-resistant tuberculosis (Seddon *et al.*, 2012). Even more alarming are the rates of hearing loss caused by cisplatin as a therapeutic agent against cancer, with some figures stating damage to hearing occurs in 75-100% of cases (McKeage, 1995).

d. Other risk factors

There are some risk factors of hearing loss which have shown improving trends in recent times. Congenital rubella infections are well known to cause severe hearing loss in newborns (Wild *et al.*, 1989). Similarly, there is evidence that hearing loss can be a direct result of bacterial meningitis infections in children (Fortnum and Davis, 1993). Both of these infections have had decreasing rates in many parts of the world due to newer, more effective vaccines, with higher

uptake rates of immunisation and wider geographical coverage (McIntyre *et al.*, 2012; Papania *et al.*, 2014; Dumre *et al.*, 2018).

Contrasting with these improvements are the increased rates of other infections worldwide. Congenital cytomegalovirus infection is a known risk factor for neonatal hearing loss (Dollard, Grosse and Ross, 2007). With continued population growth, and the infection rate in newborns remaining consistent at 1%, the incidence of hearing loss caused by this infection will increase (Fowler *et al.*, 1997). The incidence of new epidemics around the world has had widespread health repercussions, including for hearing loss. The side effects of Ebola infections are still being explored, with some neurological complications being identified, including a reported 24% incidence of hearing loss after infection (Billieux, Smith and Nath, 2016). Another relatively new entity is the Zika virus, a mosquito-borne infection which burst into the public eye in Brazil 2015. In addition to the well-known side effect of microcephaly, it poses the risk of hearing loss in surviving infants (Glantz, 2016).

Barriers to action

Some of the barriers that have impeded public health action in this field include:

- A lack of national policies that promote access to ear and hearing care within countries: in 2014, only thirty-two countries, mostly belonging to the high- and upper-middle-income categories, reported the existence of government-initiated policies or plans to address hearing loss (WHO, 2013).
http://www.who.int/pbd/publications/WHOReportHearingCare_Englishweb.pdf?ua=1
- A lack of awareness regarding hearing loss, its impact and management among policymakers and the general public (Mackenzie and Smith, 2009; Wilson *et al.*, 2017). As a result, hearing care commonly fails to gain the attention and resource allocation that it deserves. This is reflected at the level of the community, where poor awareness propagates numerous myths and stigmas surrounding the condition, often resulting in people not seeking attention for this health issue (Olusanya, Neumann and Saunders, 2014).
- Poor access to ear and hearing care professionals who would provide the required services for those with hearing loss (WHO, 2013). Service providers and educational facilities are often deficient in low- and middle-income countries, where most of those with hearing loss reside (Mulwafu *et al.*, 2017).
- Poor access to assistive hearing devices and technologies for rehabilitation of people with hearing loss. Despite the importance of modern technology for hearing rehabilitation, only a fraction of those with hearing loss have access to these devices and the required services for their effective use (WHO, 2011; Carroll *et al.*, 2017).

Measures to address the growing prevalence of hearing loss

Given the ongoing and predicted trends in hearing loss, it is important that preventative actions are implemented effectively and widely, so that all people across the world can benefit from them. Simultaneously, we must address the existing barriers preventing adequate hearing care in order to provide services for those with hearing loss and cater to the growing demand for rehabilitation services.

Actions required for prevention of:

Infections in mothers and babies

- Implementing an improved vaccination program with widespread coverage will reduce some of the easily preventable infections that can cause hearing loss. Antenatal rubella and meningitis are two such infections that commonly lead to deafness. Vaccine programs have already been successful in reducing their occurrence in some regions, with subsequent prevention of a portion of hearing loss (Cheffins *et al.*, 1998; McIntyre *et al.*, 2012).
- Improving health education amongst mothers and those in their communities will also result in improved outcomes. By teaching improved hygiene and prevention of mosquito bites, the incidence of hearing loss caused by cytomegalovirus infections and Zika virus infections will reduce (Plourde and Bloch, 2016; Wilson *et al.*, 2017).

Success story: rubella in Australia

A programme for rubella vaccination of schoolgirls was started in Western Australia in 1971. As a result of this policy and with improved vaccine coverage, the rate of Congenital Rubella Syndrome decreased by 90% from 0.60 per 1000 live births in 1971 to 0.06 per 1000 live births in 1988 (Gao *et al.*, 2013), resulting in less rubella-induced hearing loss.

Chronic ear infections

- Chronic ear infections are a frequent complication of untreated acute ear infections. By identifying and treating acute otitis media in its early stages, hearing loss caused by chronic otitis media can be avoided (Bluestone, 1998). Improved sanitation and personal hygiene will also reduce the occurrence of chronic ear infections (WHO, 2004).
- For those who have contracted a chronic ear infection, timely and effective treatment can decrease the risk of hearing loss development. Adequate provision of both surgical and medical management options will improve the outcomes in those affected (WHO, 2004).

Noise exposure

- The risk of hearing loss due to occupational exposure is substantial. Implementation of hearing conservation programmes in occupational settings will decrease this risk. Reduction in noise levels, improved regulations and use of protective equipment are effective strategies to mitigate the occurrence of occupational hearing loss (Jh *et al.*, 2012; Lie *et al.*, 2016).
- Regulation of sound exposure from recreational sources will decrease its risk of hearing loss. This could possibly be achieved by:

Success story: pneumococcal meningitis in Brazil

Hearing loss is the most frequent long-term complication of pneumococcal meningitis, affecting up to 40% of survivors (Klein *et al.*, 2003). It causes profound hearing loss that is mostly permanent. In 2010, the Ministry of Health in Brazil introduced a new vaccine (PCV-10) into the childhood vaccination schedule. Following the implementation of PCV-10, the incidence of meningitis halved over the next five years, with a resultant decline in hearing loss associated with meningitis infections (Grando *et al.*, 2015).

- i. Implementing global standards for safe listening levels in personal audio devices
- ii. Putting in place a regulatory framework for the noise levels at recreational venues, such as restaurants, bars, concerts and sporting events

Success story: NIHL in Europe

Hearing conservation programmes were implemented in many countries in Europe at the turn of the millennium. France, Italy, the United Kingdom and the Czech Republic have all reported a decline in the incidence of NIHL in recent years. An example of this is in France, where the occurrence of physician-reported NIHL dropped by 17% between 2007 and 2012 (Stocks et al., 2015).

- Raising awareness of the impact of loud sounds on hearing and health will change people's behaviour. By being informed of the risks involved, they will be empowered to protect their hearing.

Ototoxic hearing loss

- Ototoxic medications are frequently used in the treatment of drug-resistant infections and as therapeutic agents for the treatment of cancer. Implementation of a proper surveillance regimen for ototoxicity will decrease the risk of patients developing hearing loss as a side effect. Ensuring that health professionals are well informed about the ototoxic effects of these medications and instituting audiological assessment for early identification of hearing loss will reduce the risk of hearing loss development and progression (WHO, 2014).

Measures to promote public health action

Develop policies

- Hearing loss can be prevented by integrating ear and hearing care into a country's health system. Comprehensive evidence-based strategies that improve access to ear

and hearing care at the community level have to be carefully developed to fulfil the needs of each country and region (WHO, 2017c). These policies will help clinicians provide screening and intervention services to populations at high risk of hearing loss, including infants, schoolchildren and older adults. They can also reduce the financial burden posed by unaddressed hearing loss on the system.

Raise awareness

- Advocacy initiatives should be promoted at global, regional and national levels in order to sensitize policymakers for prioritization of hearing care resource allocation. It is also important to raise awareness among the general public to inform them about prevention by facilitating early identification of and reducing the stigma attached to hearing loss and the use of hearing devices.

Success story: cost savings in Philippines

A cost analysis was performed in the Philippines to examine the cost-benefit ratio of implementing a newborn screening program for hearing loss. It estimated that the annual cost of a country-wide screening program would amount to PHP\$540 million. However, the total annual savings would equal almost PHP\$2.5 billion. This equates to a saving of approximately PHP\$140 billion over 60 years, which equates to USD\$2.7 billion (Santos-Cortez and Chiong, 2014).

Build human resource capacity for service provision

- Special efforts have to be made to ensure that relevant education programmes are put in place that can improve the availability of well-trained human resources for service provision (WHO, 2016). This includes training of specialists in the fields of otology and audiology, as well as rehabilitation professionals, such as sign language interpreters.

- By training health workers, nurses and other non-specialist cadres of health professionals, they will be able to serve the community and provide much needed ear and hearing care at this level (Olusanya, Okolo and Ijaluola, 2000; WHO, 2016).

Improve access to hearing technologies and services

- The assistance provided by hearing devices can substantially enhance the lives of those affected by hearing loss. It must be a priority that high quality, affordable hearing devices are made available to all those who need them. The high

Success story: early diagnosis in France

The earlier that hearing loss is identified, the sooner interventions can be implemented to minimise its impact. Infants who are diagnosed and receive intervention before the age of six months will score 20 to 40 percentile points higher on early education-related assessments, compared to those with delayed intervention. Universal neonatal hearing screening (UNHS) can ensure that all infants with detectable hearing loss are identified. With UNHS implementation in France, the median age of diagnosis of hearing impairment improved from 17 months old to 10 weeks old (Lévêque et al., 2007; Patel and Feldman, 2011).

- The high cost of devices and their limited availability poses a challenge that must be addressed through innovative designs and delivery models (Wilson *et al.*, 2017).
- It is also essential that all related services such as auditory rehabilitation and maintenance of hearing devices are available and easily accessible, to ensure that people can maximise the benefit of their use (Carroll *et al.*, 2017).
- There are a vast range of assistive technology products available to facilitate access to communication. These products aid those with hearing loss to communicate with others, and include loop systems, captioning services and other warning systems such as vibrating alarms (WHO, 2016). It is once again imperative that access to these items not be restricted for anyone and that they remain affordable.

Conclusion

Examining the current trends of hearing loss highlights the importance of using clear policy recommendations and raising awareness of hearing loss in order to prevent it and to decrease its impact in the future. Implementation of strong public health strategies to address this issue will result in improved quality of life for people with hearing loss and reduce the financial impact of unaddressed hearing loss. By working together with focus and determination, we can prevent a new crisis in hearing health and establish a solid foundation of public policy for future generations.

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Appendix 1: Key methodological considerations

- The objective of the analyses is to present the DHL prevalence estimates projected until 2050 using data on projected changes in population size and age structure.
- The WHO 2008 DHL prevalence estimates (Stevens et al. 2010) for DHL<40dB, and the World Population Prospects (WPP) 2017. Revision medium population estimates (United Nations, Department of Economic and Social Affairs, Population Division WPP, 2017) were used to project the 2008 prevalence estimates for all populations, sexes, and 5-year period 2010-2050, including 2018 estimates.
- The current projections are based on the assumption that age-, gender- and region-specific prevalence of disabling hearing loss does not vary over time.
- The distribution of countries is based on the Global burden of disease study. Details of regions, sub-regions and countries can be found in appendix 2.

Appendix 2: Countries contained in each region

Subregion	Region	Countries
Asia Pacific Region	Oceania	Cook Islands, Fiji, French Polynesia, Kiribati, Marshall Islands, Micronesia (Federated States of), Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanuatu, Tuvalu and Niue
	Southeast Asia	Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Maldives, Myanmar, Philippines, Sri Lanka, Thailand, Timor-Leste, Vietnam
Central / Eastern Europe and Central Asia Region	Central Asia	Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Mongolia, Tajikistan, Turkmenistan, Uzbekistan
	Central Europe	Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia, Macedonia (Former Yugoslav Republic of)
	Eastern Europe	Belarus, Estonia, Latvia, Lithuania, Moldova, Russian Federation, Ukraine
East Asia Region	East Asia	China, Hong Kong SAR (China), Macau SAR (China), Democratic People's Republic of Korea, Taiwan
Latin America and Caribbean Region	Andean Latin America	Bolivia, Ecuador, Peru
	Caribbean	Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cuba, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, Netherlands Antilles, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago
	Central Latin America	Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Venezuela (Bolivarian Republic of)
	Southern Latin America	Argentina, Chile, Uruguay
	Tropical Latin America	Brazil, Paraguay
Middle East and North Africa Region	North Africa and Middle East	Algeria, Bahrain, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Morocco, Occupied Palestinian Territory, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, Turkey, United Arab Emirates, Yemen
South Asia Region	South Asia	Afghanistan, Bangladesh, Bhutan, India, Nepal,

		Pakistan
Sub-Saharan Africa Region	Central Africa	Angola, Central African Republic, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon
	East Africa	Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, Sudan, Uganda, United Republic of Tanzania, Zambia
	Southern Africa	Botswana, Lesotho, Namibia, South Africa, Swaziland, Zimbabwe
	West Africa	Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, São Tomé and Príncipe, Togo
High-income Region	Asia-Pacific	Brunei Darussalam, Japan, Republic of Korea, Singapore
	Australasia	Australia, New Zealand
	North America	Canada, United States of America
	Western Europe	Andorra, Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Greenland, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, Monaco and San Marino

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