

Piers Dawes – 22nd April 2015

	<p>Well for one thing hearing loss is extremely common in older adults, people aged over 60. One in six people in the UK have a significant hearing problem so it's extremely common and it's a problem because it impacts on communication and this can lead to social isolation, depression, reduced employment opportunities and a reduced quality of life and a couple of years ago people calculated that because hearing loss is so common, it has a really substantial financial impact on society.</p>
00:00:35	<p>So hearing loss is estimated to cost the EU €230 billion per year. And once you lose your hearing that's it, there's currently no drug treatment for hearing loss. Our main treatment option is to provide hearing aids but, although hearing aids are very helpful, they don't restore normal hearing and many people find that they are of limited effectiveness, especially in situations where there's high levels of background noise. And also there's some negative stigma associated with hearing aid use so people are just not very keen of using hearing aids.</p>
00:01:15	<p>So hearing loss is very common, it has a significant impact and we used to think that it was just something that was unavoidable and just naturally happened as you got older but, there's a range of evidence today that suggests that that isn't necessarily the case and that hearing loss may be, at least to some extent, preventable. And the sorts of evidence I'd like to show you is that there is geographical variation in levels of hearing loss. So we've done some geographical analysis with data from UK Biobank and we found that hearing loss tends to be more prevalent in the North of England than in the South - leads us to think that maybe there are lifestyle differences in people in the North of England makes them more susceptible to hearing loss than people in the South. There's some research from the US to suggest that there are differences in the levels of hearing loss between subsequent generations. So, compared to the wartime generation the levels of hearing loss actually seem lower amongst baby boomers. So perhaps there are differences in lifestyle between the two generations that have resulted in low levels of hearing loss. And also we know from our own research studies and clinical practice that not all older people have poor hearing. So, here are two participants from another study, Arthur and Bruce. They both are older men living in Manchester and Arthur on the left there he has pretty much normal hearing so this figure here shows normal sensitivity to sounds across a range of frequencies. Whereas Bruce here has really severe hearing loss that would substantially impact on his quality of life. So you know how come there could be these differences between these people? Could it be that there are differences in their lives that have meant that they have ended up with... they've kept their hearing or they've lost their hearing loss and this is what we're interested in researching.</p>
00:03:15	<p>So hearing loss is not a necessary consequence of age and perhaps it's the case that hearing loss is avoidable and that there are things that we can do to ensure that we keep our hearing as we become older.</p>
00:03:30	<p>So our research is concerned with finding out why do some people tend to lose their hearing as they get older and what can we do to prevent hearing loss.</p>

00:03:42	So in the UK Biobank we had self-report questions about hearing aid use, a history of noise exposure, whether people experienced tinnitus (ringing in the ears). Some people did this hearing test that involves identifying numbers in a background of noise, the Digit Triplet Test and the performance on this test relates to acuity of hearing. And here are the results. So among the UK Biobank data set about 13% of people overall had poor hearing on this Digit Triplet Hearing Test and you can see the prevalence of poor hearing increases with age so amongst... in this age range there's a four-fold increase in the numbers of people who have poor hearing and there's a particular acceleration after about age 50.
00:04:39	This is hearing aid use in the UK Biobank. Numbers of 2.9% overall and this is compared to an estimated 22% of people who have hearing loss severe enough that they could benefit from hearing aids. So it just shows that hearing aids are substantially underused.
00:05:01	And now we get to the interesting part. This is our analysis looking at the correlates of hearing loss. So demographic factors, lifestyles factors like noise exposure, diet, exercise and we used statistical modelling procedures to try and work out what is the unique contribution of each of these things to your likelihood of having poor hearing.
00:05:30	So let's start with socio-economic status. We found that socio-economic status is strongly linked to the risk of having poor hearing. So if you look at the people in the bottom 15% on a socio-economic status compared to the top 15% they are at 200% increased risk of having poor hearing. And not only are people from a low socio-economic background likely to have poorer hearing, they are also much less likely to be hearing aid users than take all the people with poor hearing, hearing aid users tend to be from much more affluent socio-economic backgrounds than non-hearing aid users.
00:06:15	Looking at ethnicity, ethnicity as well is strongly linked to your likelihood of having poor hearing. So non-white ethnic minority people are at 540% increased risk of poor hearing compared to people from a white British background. Although hearing loss is much more likely and people from a non-white ethnic background, hearing aid use was about 50% lower as well and we found that this risk of poor hearing is due to particular ethnic minority groups being at especially high risk of poor hearing and the top five are listed here. The top three are Bangladeshi, Black African and Pakistani ethnic minority groups. And this finding agrees with other research that has indicated that these ethnic minority groups are associated with poor general health outcomes as well. And we have... currently pursuing some follow-up research to, you know, nail down the reasons for this but they are likely to be fairly complex ones centred around culture, lifestyle, socio-economic factors.
00:07:32	So this is our analysis of noise exposure. So a history of working in a noisy environment was associated with a greatly increased risk of poor hearing, 240% increased risk of poor hearing. Also a history of exposure to music was associated with a small increased risk of poor hearing loss as well. So this leads us to conclude that Rock & Roll is potentially harmful to your hearing!
00:08:03	This is our analysis of alcohol consumption. Now many of you might be relieved to find out that people who consume alcohol are actually less likely to have poor hearing

	<p>than lifetime teetotaler's and we found a similar association across all levels of alcohol consumption so at least for hearing, even at levels that are really high and likely to be damaging to your general health, there still seems to be a protective effect against hearing loss. But for your general health it's inadvisable to go beyond moderate consumption!</p>
00:08:44	<p>For... this is our analysis of smoking and we found that passive smoke exposure was associated with increased risk of hearing loss by about 30% and this risk is dose dependent so the more you are exposed to tobacco smoke, passively, the higher your risk of having poor hearing. Smoking is also associated with having poor hearing by about 30% for current smokers versus non-smokers with no smoke exposure. This is also a dose dependent risk so the longer you've smoked and the more cigarettes you've smoked, the higher your risk of poor hearing. The good news is that the ex-smokers are at no extra risk of having poor hearing so probably quitting smoking and reducing the amount of smoking can reduce your risk of having poor hearing.</p>
00:09:42	<p>Okay we are currently analysing the 24 hour dietary recall data. We are interested to see if particular dietary patterns are associated with either risk of poor hearing or dietary patterns that might be protective against hearing loss and in the future we're keen to analyse the activity data and cardiovascular fitness data. Is there anyone wearing an accelerometer at the minute? Nobody wearing one of those? Okay... anyone worn one in the past? Okay, right, right quite a few people.</p>
00:10:24	<p>Okay, lastly I'm just going to mention briefly the genetics of hearing loss. So we know that susceptibility to hearing loss is strongly heritable. So if you have a first degree family member who has hearing loss you are much more likely to lose your hearing yourself but so far there have been very few genes identified that seem to be associated with increased susceptibility of hearing loss and a reason might be is that there are probably lots of genes that have a small effect in increasing susceptibility and hearing loss and some of these genes might interact with the environmental factors that I've mentioned so far.</p>
00:11:09	<p>So what we really need is a really powerful study of the sort UK Biobank can give us looking at genetics at susceptibility to hearing loss and maybe also exploring interactions between environmental factors and genetic risks on hearing loss and we're looking forward to receiving the genetic data, first batch of which may be next month? Okay, right. So our ultimate aim is to understand environmental and genetic influences on hearing.</p>
00:11:44	<p>Okay so going back to Arthur and Bruce, I think we are starting to be able to piece together an idea of what might have been some of the differences between the lifestyle between Arthur and Bruce that have resulted in the very different levels of hearing acuity that they've ended up with and this research has been possible thanks to this amazing resource in the form of UK Biobank. And I think this has helped us understand the kinds of things that we might need to do to ensure that we retain good hearing and have better quality of life as we become older.</p>
00:12:20	<p>So lastly I'd just like to thank the collaborators on this research and I think there's time for some questions.</p>

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