BARBARA: Hello everybody good morning and thank you for coming to this really important event and pleased that you also think it's a really you know interesting and important issue to discuss and today we have 3 fantastic speakers to help us with that, but first for those of you who don't know Making Music, we're the UK association for leisure time music groups and we have 4,000 groups in membership all around the UK and they include around 220,000 hobby musicians. Of our groups 54 per cent at the moment are choirs, 36 per cent are instrumental groups and 10 per cent are amateur promoters. And what does Making Music do?

We support members with practical resources including an affordable insurance scheme, hundreds of resources and tools on our web-site and a fantastic knowledgeable team to email and talk to. We also connect members to each other in meeting such as this one and many others throughout the year and we are the voice of leisure time music and help to protect it from threats and improve the conditions in which it operates. So that's a brief introduction and my colleague Alison who is also here today, Alison give us a wave, will put links to our web-site in the chat.

So it is now my great pleasure to introduce you to our 3 speakers. So we have Andy Shiac who is the Managing Director of ACS and he will talk to us about preventing hearing loss. We have a medical expert Fiona Butterworth is an audiologist and will tell us about how the ear works and therefore what can go wrong with it. And finally we have the splendid Paul Whittaker who is a deaf musician and has been his entire career and he is going to tell us lots about how to make music even when you are facing hearing loss. And thank you also to the interpreter and captioner who are helping with this event. So I think without further ado I will hand over to Andy to tell us more.

ANDY: Morning everyone. Thank you Barbara. I'm very encouraged to see so many people interested in how to prevent damaging what is your most important instrument when it comes to music. I always say if you damage your guitar or break something it's easy to go out and buy a new one, but when you damage your ears you really are not able to get them back to where they used to be and I talk from personal experience. I used to be a professional musician and when I was 19 years old my ears got blown up in a studio which left me with 2 conditions

which stopped me from playing music and I realised then what a life changing event that was for me, not being able to do something that I really wanted to do.

Long time ago there was no information or advice about how you could protect your hearing, as a musician, and I set about on a course to try and find products, develop products that would allow us to play music up until a point where we chose to stop playing it rather than a trauma that would stop you straight away. So it's a very, very important subject. I think one of the big issues that we find is that in the workplace legislation protects you. You have to wear hearing protection if you work in a noise level above a certain point and outside in the workplace or outside of the workplace there is no legislation. It is really up to the individual to look after themselves, to inform themselves to have some education and for a long, long time trying to build up that education and awareness has been very challenging, so it's very good to see all you guys coming on to listen to me and the other speakers.

I think the first thing that I would like to say is that there is a very difficult misunderstanding about sound and how we measure it so I'm sure everybody knows that sound is measured in decibels and the decibel is a convenient measurement to squash millions and millions of points into an understandable format. So decibel, 2 decibels, 3 decibels, people will think 3 decibels is just a bit louder than 1 decibel but thee decibels is the point where the sound intensity will double so if you have a noise of 80 decibels, you are able to listen to that sound for 8 hours. If you go up to 83 decibels, you are doubling the sound intensity so it is twice as loud so you can only listen to it for half as long. So very soon you see that if we went from 80 to 83, to 86, that would be twice as loud, twice as loud, twice as loud, half as safe, half as safe, half as safe, and the upshot is if you get to a level of 100 decibels which is fairly typical for amplified music, for orchestra music, you are safe for about 15 minutes and then you really have to not listen to any more sound for another 8 hours. So that legislation is embedded in law and in the workplace you have to have appropriate hearing protection.

I'm sure everyone has worn ear plugs at some point, put them in ears, taken them out and said I can't hear anything and the problem with conventional hearing protection, earmuffs or foam ear plugs is when you insert them into your ears or have got them over your ears you are destroying a lot of the high frequency

sound, so for a musician who needs to rely upon the fidelity of their instrument, their music, choir, whatever, it is very important that they can hear without any of the sound being degraded and that's where the challenge, the big big challenge comes in you need to protect your hearing but you also need to be very astute on the sounds that you want to produce or you are listening to and if you put an ear plugin you don't hear the high frequencies. In fact, you create a hearing loss where you are killing all the high frequency sounds. So it's very, very important to try and find the least compromising solution to be able to continue to play music, enjoy the music, but also be safe.

We, many years ago, we introduced a custom made ear plug that had a special filter that allowed us to tune the ear piece to replace all the resonances that you lose when you do that, and when you do that, your own voice is very strange, it's a very unpleasant situation, so we've constantly tried to reduce that compromise to make it the least compromising solution by providing the flattest reduction in sound so the very low frequencies, very high frequencies, the ones in-between are all turned down in a level way. Now that was such a breakthrough for musicians. At last here was a product that people could use who would be able to protect their hearing, hear everything they wanted to hear, the job done.

But in fact it's not because music is such a complex - it's a series of of different sounds all linked together - if any of those sounds go out of kilter, the effect can be unpleasant, people can go out of tune, it's an interesting solution but it's not the main answer. However, if you are contemplating playing music for a long, long time, it's really worth looking at making sure you have the correct type of protection in place. Never going to be perfect, but it's going to allow people to enjoy and carry on playing music for as long as they want to. I'd like to touch a little bit - Fiona is probably going to cover more about this - but we don't really think about our hearing until something goes wrong with it and I'm sure many of you have been to loud noisy events where when you've come out your hearing is a little bit dull, you might have a little bit of ringing in your ears, you go to bed and when you wake up next morning the ringing has all subsided and gone and you think nothing of it. Over the years, the cumulative effects are those dull senses of hearing, the ringing in your ears, will take their toll, and eventually the ringing doesn't go away and the dull hearing stays where it is.

All this is avoidable and it's avoidable with the correct education, making people aware, looking at different types of tactics to protect yourself and if you are taking the music seriously then you should take your hearing seriously and I think we have over the years we've changed to some extent people's attitudes. When Istarted it was namby-pamby to wear ear plugs, it was not really the thing you should do, and now kind of 35 years later it's stupid not to. So we're getting there, but I think everybody really needs to pay a bit more attention to this whole subject. As I said before, this is your most important instrument. Look after it and you'll be able to enjoy your music for as long as you want to.

BARBARA: Brilliant, thank you very much Andy, and I've already put some links in the chat to ACS because people are asking about that and now I'd like to invite Fiona to tell us how does the ear work and what can go wrong?

FIONA: So I've got a few slides that I will share to allow you to understand what I'm talking through as we go. So just bring that through. Okay so essentially when we are talking about the ear, this is a really good diagram to talk us through what's happening. Any sound, any noise is a vibration of air and when that comes in through the outer ear to the ear canal that is still a vibration of air. It reaches the eardrum and the eardrum and the middle ear bones are what helps to essentially translate that vibration of air into a vibration of fluid. That fluid is housed in the cochlea and in the cochlea there are several hair cells, I say several. It's several thousand. Essentially when that fluid vibrates the their cells react to the fluid vibration and that sends information to the brain to tell you you've heard something.

Now when there are issues with hearing there can be various ways in which that will be manifested as a problem. For some people it will be related to the outer ear and it will be where perhaps there is a blockage of wax, there is an ear infection or there is a perforation of the eardrum and then when we're looking at the middle ear which is the eardrum and those little bones sometimes it can be that when you've got a cold there is congestion that's taking up space there, for some people those bones essentially get dislocated and it means that that information then isn't being passed across and then when we're talking about the hair cells we're actually seeing that the damage is to those hair cells.

So on the left hand side we have the healthy hair cells you'll see that they're standing up nice and tall and we're seeing that there is nothing there that we're concerned about so when that fluid vibrates those hair cells will easily detect that. On the right hand side we've got the unhealthy hair cells or damaged hair cells. Now that can happen through age related changes to the hearing. It can happen because there was an illness or viral infection or it can happen as Andy has already explained with noise related exposure and those essentially get damaged. You see there is actually a few rows completely missing and there are a lot that are bent over, so it means those remaining healthy hair cells on the right hand side of that right picture will need a much louder vibration of fluid to actually respond to that.

Now if there is an issue with the outer or middle ear, that's something that your GP or an ENT consultant would be able to help manage. With the hair cells and it being an issue with the inner ear in the cochlea, that's actually something that is a permanent change and it's something that we're more looking at hearing-aids or other kind of technologies or assistive devices to actually support people with that style of hearing loss.

Things that you might notice or that you might notice in other people when they've got an issue with their hearing and this is by all means not an exhaustive list but these are some of the popular things that we see in clinic. Essentially if you are noticing any of these in yourself or in people that you're working with or that are in your ensembles then it's something to gently discuss with them. It can be difficult for people to understand and appreciate that they are experiencing a difference sometimes. A lot of times people are a little bit in denial. But it's something that if you do notice this particularly with yourself, you should go and see the relevant people to help manage that.

Some of the other things which Andy touched a little bit upon. It's not just that you might notice a change in your hearing in terms of the clarity of sound, but there are things like tinnitus which is essentially something that your body, your brain and your ears are creating, that you are hearing as a sound, but that sound is not in the environment around you, so it's not something that anyone else can hear and there is a whole variety of different ways that this can present or the ways that it can essentially affect people and with all of these things we'll discuss I think the first thing to realise is you need to make sure you're having regular

check-ups the same way that I hope everyone is aware you should have regular eye tests. We'd want people to be doing the same for their ears.

Some other things people experience is hyperacusis as well which is essentially a change in your sensitivity to sound. It means that people who present with this will find that everyday sounds are feeling a lot more uncomfortable and they are feeling like they want to protect themselves from that this is a tricky thing to manage because in that situation you just want to remove yourself from that. But what you actually need to do is make sure that you're not just isolating yourselves from those situations because the more that you do that the more you're going to feed into that sensitivity and make that sensitivity become worse.

This one is a really interesting one for musicians. It's called diplacusis and it is where people might experience multiple tones, pitches or times for the same sound coming in so I've had it before where a couple of people have presented with it happening just in one ear where they know that it's a singular note that they're hearing it at 2 different pitches almost like there is a different resonance. Thankfully for the people that I've seen it's been a case where it's been wax blocking the ears and when you've removed the wax that's helped to reduce and remove the diplacusis so it's resolved the issue but there are people who will experience this and it's not something we can resolve by doing wax removal or removing any blockages and it's something we have to manage through things like hearing therapy or using hearing-aids to help reduce the impact this has on your day to day life.

Andy also mentioned some things you might experience when you've been in a noisy situation and he said sometimes it can be temporary and what we call that is the temporary threshold shift. Your ears have a self-repairing mechanism and in the 16 to 18 hours after you've been in that situation where it's too noisy, your ears will try to repair themselves. The more you are in that noisy situation, the more you are going to damage that self-repair mechanism and not allow it to do its job so that is why it's really important that if you notice a change in your hearing at any point or you are noticing that after noisy situations like concerts or anything where you experience loud levels of sound, if you are getting that change in your hearing after that situation, that is a warning sign that that situation has

the potential to permanently damage your hearing and then you need to be doing something to manage that.

Now for the majority of people the easiest thing to do is to make sure you go and get hearing protection in whatever form is accessible to you but I do have to say that the difference that the custom hearing protection makes is incredible. It's not to say that the other options on the market aren't doing the right thing, but the difference in the ability to play with them in at the same time is incredible. When we're looking at changes in hearing because of noise, these are some graphs that they take a little bit more explanation to understand fully but essentially they are denoting the change in hearing that we see with different levels of noise exposure and you'll see on the left hand side with the number of years increasing, we're seeing a bigger change in the hearing. Now what I've done for the graph on the right hand side is taken the 35 to 39 years of noise exposure without hearing protection and put on something that we are all familiar with and it's the speech sounds and you'll see how many of those sounds are sitting above the red lines and that means that those sounds aren't accessible to that person because they've got a hearing loss that is essentially cutting them out.

So it's something again that we can help to manage the noise exposure and manage the potential change in hearing by using hearing protection and there are other ways of managing noise exposure that essentially relate to the environment so making sure you are distanced or appropriate acoustic materials but today we're focusing on ears and hearing so the conversation is about plugs or things we can use In terms of managing a hearing loss essentially it's really important that you actually go and speak to the right people, that you see your GP, get to see an ENT consultant or speak to an audiologist. They will be able to start the conversation and get you to the right person that can help you for what you're experiencing. Make sure that you have routine hearing tests and the minimum every 3 years actually comes from the health and safety England recommendation for people who are exposed to noise through their job so if you can do it at least every 3 years that's great, but we in clinic we see our hearing-aid patients every year and we recommend an annual hearing test.

At the point where the professional recommends or starts talking about hearing-aids I would really suggest that you do carefully consider this and take that advice

on board because what hearing-aids can do is support you so much with your hearing and make sure that you're getting access to the sounds in the environment around you and make sure that you've got that environmental awareness as well as getting a greater clarity of sound. Again making sure that you're protecting your ears in all situations where you're exposed to loud sounds, whether that's at work, so if you do something different for work that's not musical but you're still exposed to sound then make sure you are using appropriate hearing protection there.

And then again as Andy said, it's really important that we're sharing our experiences and talking about what you're experiencing because it has been a taboo subject talking about hearing loss and talking about using hearing-aids not just in the music industry, but it's particularly important for musicians to be open about that. In terms of supporting people with hearing loss, it's going to be good if you can offer to attend appointments with them. That's not necessarily just their hearing related appointments but if they've got anything elsewhere they just need another pair of ears to make sure that they're retaining information and actually it's not just people with hearing loss that might benefit from this. It's something that support for friends and family with that. Again encouraging people to be open about their experiences is going to be great for actually understanding the issues that people are having and making sure that we're doing as much to support and help them.

Utilizing good communication tactics is a really interesting one because we see a lot of people who come in and, for example, if it's a couple that have come in you get one half of the couple saying the other person is mumbling and you get the other half of the couple saying they've got a hearing loss. I think the majority of the time it's a good mixture of the 2 where someone does have a hearing loss, but the other person that's trying to communicate with them isn't necessarily utilizing all the good communication tactics that they can and actually I will share a link that will have our recommended communication tactics that you can have a read through and try and make sure that you're implementing in all situations because it's not just people with a hearing loss that will benefit from that.

And the next 3 on the slide that I've put are actually things that I've noticed from rehearsals that I've been in that I realise having prepared this presentation that

they're actually really useful for people with a hearing loss and essentially one of - the choir that I'm in sends out a message before the rehearsal to say this is what we're expecting and planning to do so you can focus your personal practice. After the rehearsal we then reiterate what was gone through and what to expect for the next week so it just I think helps to reinforce what was happening and also what to expect. Using visual references so making sure that it's not just relying on speech in those rehearsals, using hand signals and things to try and direct people to the right sections and again if there is someone that is struggling with their hearing it would be beneficial for them to find someone that they feel comfortable with that can be their rehearsal buddy to just help support them if there are any moments where they need to have things repeated or kind of just clarify what was going on and again that's not anything, that's not to say that's only what you can do, it's just some of the thing I've noticed have been beneficial in the spaces that I'm performing and rehearsing as well.

And then here I can also share the link in the chat but if you've got a phone or anything to hand you can scan the QR code and you'll be able to see a couple of different links to our web-site. A little bit of information about myself and then the communication tactics kind of key sheet and then you'll also find a link to our hearing, our musicians hearing health scheme, which is essentially a scheme for professional musicians who are looking to get hearing protection. I appreciate that this might not necessarily for the kind of members of the ensembles that you're in because for this scheme you have to be earning the majority of your income through music, but it's something that we want to make people aware of as something to access and I'm sure a lot of people here are doing lots of music in their life so it may be something that you're able to access. And that is everything from me.

BARBARA: Amazing thank you so much Fiona, and obviously if you are in a choir yourself you understand exactly the issues so thank you for that. So we'll have questions at the end but we're going to quickly move to Paul before our live BSL interpreter has to leave us, so, Paul, over to you.

PAUL: Thank you hello and good morning to everybody a special thank you to Simon because I know you will be disappearing. Going last I feel I've kind of got the short straw in some ways because it's a case of picking up what Andy and

Fiona have said and also adding some of my own thoughts, experience and how things can be solved. One with Andy one of the things that's fabulous he has kind of enforced the fact that even if you lose your hearing you can still keep on making music and with Fiona she has already said quite a lot of the things that I was going to say, but there is never any harm in reinforcing the fact that people regularly go and get their eyes tested, they will regularly go to the dentist, but you never think about going to get your ears tested, and that is why in my view and my experience of meeting so many people that when you start to lose your hearing you find yourself in a kind of panic situation. Once you lose your hearing, as Andy made clear, you don't get it back. So being able to prevent it is so important.

But what I think is equally if not more important is we need to create this environment where people are much more open and willing to talk about the fact they have a hearing problem. You get far more embarrassed about hearing loss than most other sensory losses. And people get nervous and normally it's that person with the hearing loss who is the last one to acknowledge that they have a problem. Your family and your friends will always be far more aware. And I think in some ways that's why I have, not an advantage because that's the wrong word, but I was born deaf and so I've never heard a full piano keyboard, I have never heard birds sing and I have never bird bagpipes, something for which I'm incredibly grateful even though I have some Scottish ancestry, so I have never had the trauma or losing one of my senses. But because I am a musician, and because I talk well, and because I don't sign all the time, people often think I can hear quite a lot.

Deaf people are as random and as varied as hearing people are. There is no one particular type and there is definitely no one size fits all when it comes to hearing losses, hearing-aids, communication needs and all the rest of it. So trying to change society's view of deafness is something that is fundamentally important. And I know from my own experience in choirs and ensembles and working in orchestras and so on over the years that a rehearsal environment is often very strict, you will sit there, you will keep quiet, the conductor is in charge and if you as much as make a single noise you are not supposed to you get the Paddington stare. And you are made to feel small. Again, it's where the people in charge of the choirs and ensembles and orchestras need to acknowledge that people have got issues.

Last year I chatted to several people about how they cope in leisure music environments and several of them said they had to be brave, they actually had to admit they had a problem, they needed to make sure that they sat in a position where they could see, which I suppose if you are, I don't know, you are a brass player or a second violinist and you are stuck further back, communication can be more of an issue, but trying to get that balance between sitting where you are comfortable and confidence without messing up the whole situation. And it's not an easy thing to do. But it goes back again to people being aware of your issues. You cannot have successful community music making if that entire community doesn't acknowledge that you do have a problem. We have to try and find solutions all the way through.

When it comes to hearing-aids as Fiona has explained there have been massive advances in hearing-aid technology over the years, over the decades, and when I talk to other deaf musicians that I have known, most of them would give anything to have their own analogue hearing-aids back. It's always worth remembering that no matter how good the hearing-aid is, how supportive your audiologist is, it takes a lot of time to get used to a hearing-aid and things will never, ever sound the same as they did before. Hearing-aids are not a miracle solution. I wish they were, but they're not.

For me I have tried different hearing-aids over the years and none of the music programmes have worked for me. That's partly because as someone born deaf being involved in music all my life and now being a very youthful 58, I know what I like. I like what I know, if that makes sense? And I know better than anybody else what I actually want to hear. I've had lots of debates with different audiologists who will say oh you need this, you need that. Actually no I don't. I know better than anybody else what I need and what I want to hear. And for some it's about volume and about getting as much sound as I possibly can into my head and into my ears. But I also spend quite a lot of time not actually bothering with my hearing-aids at all. But that again is because I have all these years, decades of experience as a deaf musician. And I would always say to anyone that it is far easier to cope with a hearing loss if you can read music than someone who has always learned by ear.

When I was growing up I realised quite early on that there were things that I will miss and therefore I learned how to read score, I read a lot about music theory, about music history and performance practice because there are lots of gaps that I need to fill in myself. And for 27 years running a charity helping deaf people to make music but there was one group of people who would regularly come to me, ask for support and help and I really struggle to support and that is people like you who are keen musicians who start to lose their hearing and it's because every single one of you has got your own different needs and your own experiences. When I'm working with groups of younger deaf children or even a group of teenagers who are born deaf who communicate with sign language they're a lot more similar. It's an awful lot harder when you have people who have gone through life making music quite happily and suddenly things start to change.

There are as we've already talked about various things we can do and Fiona's comment on her slide about thinking of how we communicate, whether it's writing things down, having a rehearsal {inaudible} is one of the most important, but when it comes to performances I still feel there is an awful lot that can and should be done to make hearing loss more acceptable and more visible because it's quite likely that nearly all of you have got other family or friends who have hearing problems and therefore I would always encourage you to try and provide some kind of interpretation, captioning possibly, that can also be expensive, at a performance I was chatting to someone in Scotland the other day about this. There is an organisation that runs 13 youth choirs but they don't have any performances that are accessible.

Now you might think oh hang on, we don't understand British Sign Language or other forms of sign language. No. Maybe you don't. But if you find the right person for the job, they can convey a lot of that musicality and it reinforces that thought that even though I am deaf or my family, my friends may becoming deaf, we can still somehow access this music. It won't necessarily be to the same level as before so there will have to be adjustments from each of you, from the organisations, the choirs orchestras that you'd work with but I would never want anybody to give up making music simply because they start losing their hearing. Probably the worst example on the planet, Beethoven never gave up when he was losing his hearing but he knew what he was doing. There is a deaf viola player in the royal philharmonic orchestra. There is a deaf brass player in York called Sean who plays with various professional groups. There are thousands and thousands

of people who have a hearing loss inquires and ensembles all over the UK and all over the world.

So whatever happens I would encourage you to keep going. It won't necessarily be easy. But music is not about your hearing. Music above all is an emotional force and it's something that comes from there, that heart, that emotion is something that we all have. And as long as we can keep sharing, making, encouraging and inspiring people that is the best thing that we can do. So I'm going to leave it there now and hand back to whoever it is at Making Music who is responsible for the next bit. Thank you.

BARBARA: Thank you so much, Paul, that was so inspiring. Yes so let's all give Paul a thank you.

[5 minute break]

BARBARA: Right. Okay so thank you very much everybody for accommodating this break and we have lots of questions already in the chat. I'm going to pick up on the very first one which is about conducting a choir of you know now mostly old men and about half of them had hearing-aids. What are the consequences for them hearing me themselves and each other? And are there any ways for the choir to improve things? I think possibly this is a Paul question?

PAUL: Thank you. It's very difficult with a choir of old men. Try and encourage them to be aware of what each other is doing. If they've been singing for a long time and they are reading music then I would say a lot of them can rely on their experience and their knowledge. I personally wouldn't be bothered about them being able to hear each other. It's more an awareness, feeling what everybody else around you is doing. But I would say that that's important in any choir or any ensemble any way. Whether that helps you in any way, my saying don't actually worry about it, just let them get on with it and be quite precise in the amount of detail and feedback that you give them. That sounds slightly like a cop out. I'm trying to think if there are any sort of visual cues or activities that I have developed or seen people do that can help with that awareness, but nothing

comes to mind. I'll keep thinking because I know that a lot of these questions that have come up today are going to take days to answer but there is a real willingness to answer all of them as much as we possibly can. So I'll hand back now and keep thinking thank you.

BARBARA: Great, thank you Paul, that's encouraging. Keep conducting the choirs of mostly old men. Alison, you've probably been following the chat better than me.

ALISON: Yes, I'm trying to group together some of the topics so let's start with hearing-aids and there is quite a lot of questions about using hearing-aids. So maybe just ask a couple of things and then Fiona and perhaps Paul could answer? So some people are talking about if they want to protect their hearing but they wear hearing-aids, should they take their hearing-aids out and wear ear plugs? That's a question. And also about people are interested in this idea of setting up the hearing-aids for music, what's the best way of doing that? Now, Martin said that he has different programmes on his NHS hearing-aids so I wonder if someone would like to talk about that? Fiona?

FIONA: Yes, so essentially with the hearing-aids versus hearing protection in those noisy situations, that is a big old question that I think the group as a whole, and when I say the group as a whole I mean audiology and the medical recommendation is still finding exactly the recommendation that it would give in that situation because you want to be hearing more clearly what's going on, but you also want to protect your hearing. Now hearing-aids do have safety features built into them to make sure that they're not increasing a sound too loud. And Paul obviously said that he, from his experience and from the experience of my patients as well likes to have a very wide range of dynamic, so that's something that is built into the devices, that the audiologist or the professional that you are seeing will help to tailor the settings to suit the environments that you're in.

I have a couple of patients where we've created a dedicated music programme that actually we can't classify it as hearing protection because the hearing-aid is still providing sound, but we are helping to isolate the ear from sound other than what is coming in through the hearing-aid. I could talk for hours just on that topic

so that's maybe a good starting point for people to consider. I appreciate it's not really an answer to what you could do. It's a way to understand that there is kind of schools for why you go for hearing-aids or hearing protection in that situation.

In regards to the music settings, I absolutely with any patient that I see that has an interest in music and actually I'm starting to try and implement it even with the people who don't say they're interested in music because everyone listens to music in some capacity, absolutely, no matter what hearing-aid you have, I would say be saying you want educated music programme because the way that the hearing-aids manage speech does not fair well with music. You will still hear the music but it might not sound as natural or is normal as you're expecting and just to kind of reiterate what Paul said in that when you're using hearing-aids to listen to music, it unlikely to kind of ever reach your favourite memory of how it might sound and that we're looking to find a new level of normal that trying to reduce as many of the issues that you're experiencing as possible.

ALISON: A follow on question from that Fiona is a couple of people were asking about specific hearing-aids or about the cost of hearing-aids. Is it the case the more you spend the better a solution you find? Or –

FIONA: So obviously I know that we are speaking to people from all across the country so there will be regional differences in costs when you're talking about private hearing-aids. That's just something that we have to expect a little bit with any service that's provided. In terms of the cost of hearing-aids. There is a wide range. I saw a couple of questions as whether you should buy the ones from Amazon. I would say please don't. While they might help. The real important thing with hearing-aids is you have a professional who is supporting you through that. Because as an audiologist we have taken the appropriate training to make sure we are keeping the hearing-aid at an appropriate level, that we're testing your hearing and just checking your general hearing health to make sure that that hearing-aid is set up appropriately so wherever you get your hearing-aid from it needs to be where there is a physical person to help you with that.

In terms of prices, yes, you will see that there is a wide range. In terms of London prices from what I understand, obviously I know my clinic that I'm working at, I'm

familiar with some of the other local ones people report to us that for a pair of hearing-aids so one for each ear you are looking at between 2,000 to 5,000 pounds. The difference in prices when the audiologist is talking you through them is essentially there are different technology levels so what that means is that all the manufacturers create best of the best and to be able to provide devices that are accessible to different financial situations they will switch off certain features and create slightly different devices that will fit into those different price ranges. So it's not to say that the lower cost devices won't work for you. It's just that some of the features that you might benefit from might not be accessible and therefore it might take a bit more work or you might be managing the hearing-aid more, like you are changing the settings more in certain situations than you would do with the top of the range options.

PAUL: To reiterate what Fiona says and what some people have been saying in the chat trying to find hearing-aids that work for music and for speech is an almost impossible job. It really is. You probably need to think do I want it for music mainly or do I want it for speech mainly? I don't know of any audiologist that are specifically interested or have more experience in music and you always have to remember that it depends on what type of music, what environment you are making that music in will also be different if you are singing with a small chamber choir as opposed to being in a large symphony orchestra then the needs and setting of your hearing-aids change an awful lot. It's like I said earlier it isn't one size fits all. And as someone put in the chat, patience is so important. It's so important because you want to hear and keep on playing music but patience tweaking and playing is the only solution and I have immense admiration for people who learn to cope with an acquired hearing loss. I've already said it but it's an incredibly traumatic thing to deal with.

ALISON: Thank you Fiona and Paul I think we could talk about hearing-aids all day but maybe we'll move on because there were some number of questions as well about setting up the environment to protect people's hearing, so maybe Andy would like to answer first. So particularly the questions are about acoustic screens and also platform arrangements in orchestral performance and someone was asking about brass situations as well.

ANDY: Okay well the poor brass players when they have to stand in front of screens everything that they're playing is bouncing back at them. So they can be very useful for certain part of the orchestra, but the big creators of the noise are as you say brass, woodwind. I don't know if you know but the most dangerous instrument for damaging your hearing is the piccolo. A useful piece of information to do with what you want. Yes, the way that conventional music is presented is the problem with trying to protect your hearing. In the workplace the legislation says that you have to deal with the noise at source before you even consider wearing any type of hearing protection. The big problem we've got here is that the noise at source is the actual music, the creation of what the group of musicians is producing, so it's very difficult to try and understand how you get all this noise level down.

We were many years ago pioneers of in-ear monitoring. The way that music is presented more and more these days is by, instead of feeding the sound that the musician wants to hear through a speaker, it's presented through ear pieces that can reduce the ambient background levels enough to allow for a much safer lower level of performance to be fed into the musicians ears. Lots and lots of problems with every aspect of trying to solve this problem. In-ear monitoring is very very popular, very effective for amplified music. One of the problems in trying to only hear what you want to hear at the level that is safe is trying to deal with all these other outside noises.

So - I'm going to go back to this again. When you put your fingers in your ears, you create what we call occlusion so your own voice resonating inside your head. The same can happen with hearing protection with ear plugs passive ear plugs unless you have a special filter built in that will alleviate that blocked up sensation and the other issue that those, wearing those products can cause is a real difficulty to pitch either an instrument or a voice and we constantly are trying to find ways to again reduce the compromise to a level where it is safe, every section of an orchestra has got their chosen way of protecting - it could be screens. Screens are very good to protect people from the noise that's being generated let's say by the brass section. But then again the brass guys because that sound is bouncing back at them need to protect themselves against the noise they're making.

It's a very difficult problem to solve. And you'll find - when we noticed it dramatically in 2005 when the new Noise at Work legislation came in, so all musicians who were employed, that was their job, fell under the health and safety regulation and at that point because it's now the law that you have to protect the hearing we had to go and see all the orchestral musicians who are engaged in their living is making music and the interesting thing was at the time the resistance to people, musicians wearing ear plugs was enormous. And it became quite evident that a lot of musicians who would not come into work, they would call in sick, they weren't calling in sick for the intended reason they said they might have flu or a bad night - the real reason was the tinnitus, the noise, the ringing in the ears, Fiona alluded to a condition called hyperacusis, that's quite common too where it an abnormal growth of sound, so the sound (clapping) that's moderately loud. Someone with hyperacusis would not be able to stand that level of sound. It would be painful. That's what stopped me from playing music, hyperacusis, and it's an awful condition.

So the point about this is that a lot of employed musicians would not complain about hearing problems. They would say they had the flu because they couldn't come in and they couldn't play because tinnitus was too bad or hyperacusis was too much for them. And when the law was passed, that then changed the attitude dramatically that people, musicians in particular, would start to say, I can't come in today because my tinnitus is really bad. Prior to the legislation they'd never do that because they were putting themselves at risk if a violinst can't come in and play the violin, there is another violinst who doesn't have tinnitus they can come and fulfil the job so the legislation has made a very big difference and that's made a very big difference to the way that certainly orchestras approach their noise strategies. Nothing is perfect unfortunately.

ALISON: Thank you, Andy. There are so many questions in here that I'm trying to group them. But a couple of interesting questions I think about types of hearing damage or hearing loss so there are a couple of questions about tinnitus in particular and the use of hearing-aids in helping with tinnitus but there were also a couple of questions about types of hearing loss that were affecting music making particularly so someone who had lost a sense of intonation in lower registers - I'll see if I can find the other question. Here we go. Is there a cause for music sounding out of tune and distorted? Fiona, maybe you can come back? I've maybe lumped the wrong 3 things.

FIONA: That's all right, they make sense together and they could be 3 individual topics on their own. So the question about lower frequencies sounding distorted, one of the things that's going to be really difficult in this forum is understanding the particular situation that that individual is in whether it's with or without hearing-aids. Essentially these sorts of questions while I can give a vague kind of response or possible guess at what is causing it, I don't have the information that I need to give the answer to that question because I would need to know the level of your hearing, I would need to know your medical history and go through essentially our standard assessment to be able to provide you with an explanation of what your hearing is doing and what might be causing that change. Like I said, with some of the experiences of diplacusis which is that change in sensation of pitch or hearing things in 2 different pitches, for some people if that's a new experience it could be as simple as needing to have something removed from the ear that shouldn't be there, for example, wax or is there an infection or is there something blocking the ear from working efficiently? In terms of the other questions you're going to have to remind me of the last one you said. I'm trying to retain all of them.

ALISON: Now I'm trying to find it again.

FIONA: I think it was tinnitus and hearing-aids. People, the majority of people that experience tinnitus, if a hearing-aid is recommended we will see that a good percentage of people that use the hearing-aids will notice a reduction or a change in their tinnitus for better. Now we can't predict out of the individuals that we see who will and won't experience that change. For some people it won't change at all and using the hearing-aids is just helping to support the hearing loss that is present. But as a said for the majority of people that have tinnitus that then use hearing-aids they do see that the hearing-aids provide a level of relief from the tinnitus.

BARBARA: Alison as we are with Fiona do you think we might also ask about - some people have wondered whether there is some sort of link to post covid with hearing loss, whether you've become aware of that?

FIONA: Yes, so my experience is anecdotal in the sense of it's what we're seeing in clinic. There are studies coming through as to people's experiences with changes in hearing after covid. A lot of them at the moment are singular case studies so it's the medical professionals reporting a particular case that they kind of managed. With covid, it is an infection and with any form of infection that's attacking the body there is the possibility that your sensory systems will have a reaction. So at this stage I'm not sure that we're able to say that the risk of a hearing loss after covid is any different from after a different viral infection, but we are seeing that people have experienced it, just not got all of the information yet. No official statistics.

BARBARA: Thank you. Alison I've got one more here. Does starting to wear hearing-aids actually then speed up your hearing loss? So that's one of those myths like starting to wear glasses will make your eyesight worse. Is it one of those?

FIONA: An easy one. Yes.

ALISON: Thanks there are a few questions that are linked to what groups can then do both to protect their members but also with their behaviour around people with hearing loss so maybe we should cover those as we're coming up to the end? So if we start first with the questions on - there is a couple of questions on whether it's worth measuring the sound levels in the hall that you're working in and what might be the best way to do that? Is there a reasonably cheap way of measuring sound levels in a hall?

ANDY: Do you want me to answer that one? Yes okay. Yes, there are various pieces of equipment you can get, sound level metres, those badges which are basically things you can wear on your clothing that will measure the sound levels but equate those into meaningful results. So the main interesting piece of information that has to come out is what is the average sound level that you are exposed to? There are various measurements that you can take. The first one is the peak sound level. Now this is the absolute maximum pressure, sound pressure from the whole range of sound that you are exposed to. Then we have a maximum sound pressure level and a minimum sound pressure level then all these measurements

are equated and they produce a single number which is called an LEQ. Now that LEQ is very important.

So the LEQ is over the period of time that the sound is being measured, it correlates all the sound levels across that period of time and then averages them out. So let's say for example a choir I would say would probably run at around 90 DB, that's the exposure, and if you go back to the noise time exposure measurements I talked about, 80 DB, 3 DB going up to - your 90 DB you are probably only safe for well, 91 DB would be safe for 2 hours. And then no more sound. So understanding and knowing what the sound levels are that you are exposed to is very important.

With musicians I think it is slightly different because we need to know actually what's being measured here, not what's being measured here, or from a sound level metre which you would hold in the room or would place it somewhere else, so individual sound doses are very important and in terms of costs a noise survey depending on who you employ to do that could cost you nothing or it could cost you several hundred pounds but it is very important to understand how much sound you are exposing yourself to and you could put the appropriate protection in place.

So if we relate that to in practical terms to our products. Our products have a range of different filters that are designed to reduce the sound level in a particular way so if we go back to me talking about having to have everything reduced in a level way, a flat filter that's turning everything down at the same level is the most desirable option for anybody who wants to hear fidelity of music. And relative to that, on the hearing-aid side, you need to remember hearing-aids are designed to improve speech. So they are targeted at a specific frequency range which is us smaller range than the full range of music. So sometimes it would sound a bit dated if you wanted to get that full response you'd have to have a much wider frequency band to be able to hear the low frequencies and the high frequencies all in balance. But those noise levels, we also use a probe system so we can insert a probe into the person's ear and take all those noise measurements so we know specifically what's happening at that eardrum rather than here or in the room.

ALISON: Well, we have a couple of minutes left, so I wonder whether Paul might answer this last question. Well, it's more of a point, which I think it would be brilliant to address at the end, which is about what we need to ask our leaders to do in a space to support the people with hearing loss so in the chat it said can we ask our conductors and leaders to give broken directions clearly in rehearsal sessions? What else do we need them to be - what else do we need to be asking them to do?

PAUL: We all appreciate when someone has just said something very clear and very simple. Simplicity is best. Coming from me is a bit ironic because I know I can sometimes waffle for ages. But, yes, some conductors do use very bizarre analogies whereas sometimes let's just keep it simple. We'll get through a lot more if people didn't talk quite so much in rehearsals. I don't mean choir members and players, I mean the people at the front. Keep it simple. I've said that 4 times now. Yes. Simple is best. Yes.

BARBARA: Thank you, Paul, and I mean I agree that conductors may be need to be made more aware of this issue so we sometimes have this issue in our band that the conductor tells us off for chatting, but actually I do have some hearing loss and the reason is because I'm going to my neighbour "what figure are we going from?" I didn't hear where - so it's - you know what I mean? - It's a combination of things.

PAUL: I had a really really bad experience with a conductor just 3 weeks ago I was asked to be involved in an accessible concert somewhere. The conductor had to be replaced. To cut a long story short I turned up and replacement conductor said oh hello it's very nice to see you again, and I couldn't remember I'd met him before. I'd been thinking very very carefully about what should be signed in this concert because as far as I'm concerned this piece of music is so beautiful that I don't want anybody spoiling it. Basically he's telling me to clear off and not provide any access at all. He said well deaf people will just read the words in the programme. It's one of the 2 occasions in my life I've just wanted to walk out, but I didn't. But it's that ah!

ANDY: More education.

BARBARA: Yes more education. Thank you very much and there is some really amazing stuff that everybody has put in the chat which will be saved by Sharon and sent out to everybody whose email address she's been able to track down because you've given her your full name. So I think as it's 11.31 I would like to say thank you so much to Andy Shiac, Paul Whittaker, and Fiona Butterworth for their expertise. This is clearly a really interesting subject and, yes, so thank you very much indeed and also thank you very much to Hilary for you know typing away madly and making this hopefully more accessible for everybody. So thank you very much again and I'll see you all very soon. Bye.