

Hearing Health for Young Musicians

Embracing the Concept Early

The Student Musician Project at the University of Pittsburgh is a program that answers the hearing health hazard call to the National Institutes of Health report that school-age children are the fastest growing population of noise-exposed individuals suffering permanent hearing loss.



Children are increasingly exposed to loud recreational activities including toys and personal stereo systems. These exposures may cause earlier and/or more damage resulting in hearing loss at earlier ages. Loud sounds are the number one cause of permanent hearing loss and this type of hearing loss is 100 percent preventable.

The impact of intense sound on an individual's hearing results from the combination of sound intensity, duration of exposure, and individual susceptibility. Exposure to loud sound (regardless of the type of sound) for a sufficient duration can cause permanent damage to the cochlea (inner ear) which causes permanent hearing loss. The effect of loud sound exposure is cumulative across an individual's lifetime. This type of hearing loss starts in the higher frequencies (3,000, 4,000, or 6,000 Hz) and then broadens across frequencies with continued exposure.

The potential hearing loss from loud sound exposure has been studied extensively in the adult population related to occupational settings and a variety of guidelines exist surrounding this area. Less specific data are available with regard to adults and loud sound exposure from leisure activities. Even less information is available related to loud sound exposure and hearing loss in children. Although this type of hearing loss is most often called "noise-induced hearing loss," it can be caused by any loud sound, not just a sound that an individual would label as "noise."

The sound may be music, toys, etc. If it is loud enough and lasts long enough, sound can damage hearing and this damage can occur in individuals of any age. In addition, the belief that an individual may have that they already have hearing loss so some additional noise-induced hearing loss won't

matter is not accurate. Additional hearing loss may highly impact an individual's ability to successfully use amplification and other technology and may impact the clarity of the speech signal significantly.

School-Age Children: Most at Risk

The National Institutes of Health report that school-age children are the fastest growing population of noise-exposed individuals suffering permanent hearing loss.

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By the time people realize that they have permanent hearing loss, they have significant damage to the inner ear. Hearing loss impacts individuals across life activities—social, school, work, and home.

Several authors have promoted the concept of teaching hearing loss prevention practices in school through a variety of mechanisms including special workshops, the school nurse, health class, and science class (DeConde Johnson and Meinke, 2008; Folmer, 2008). There are several outstanding curricula that can be used for these purposes (e.g., WISE EARS!, Blessing, 2008; Dangerous Decibels, Martin, 2008).

Embracing the Concept Early at the University of Pittsburgh

The Musicians' Hearing Center at the University of Pittsburgh Medical Center decided to promote hearing health in a targeted audience in the schools—instrumental students and their teachers. This audience has a high likelihood of experiencing hearing loss due to loud sounds (group instrumental music) and is easily targeted for this type of education through the school music program.

The hope was that this education would impact other listening decisions these children make and potentially impact their families and friends if they embraced the concept of protecting their hearing. In addition, the goal of educating the instrumental teachers was to ensure that this information would continue to be passed along to future classes.

The Musicians' Hearing Center at the University of Pittsburgh Medical Center was established in 2003 with the purpose of reaching out to the community of musicians and other noise exposed individuals in order to provide education that would empower individuals to make choices related to handling their noise exposure and to provide hearing protection specific to their listening needs as one solution to this problem.

The overall purpose of the center is to encourage healthy hearing habits. Most recently, the Musicians' Center has focused on reaching the teachers of school-age children involved in instrumental instruction and the children themselves.

We would not consider allowing our children to play football without a helmet, work in chemistry lab or shop class without eye protectors. Yet, every day, we allow our children to participate in school-sponsored instrumental music activities without hearing protection. Day in and day out, music students (e.g., band and orchestra members) and their instructors are being exposed to potentially damaging levels of noise during practices and performances (see Table 1 and Figure 1 on page 15). Alone or together, musicians often are exceeding safe limits of noise during practice and performance.

The Musicians' Center's outreach to school children was motivated by the NIH data indicating the growth of noise-induced hearing loss in children, the potential to impact life-long hearing health habits through education, and the availability of an affordable earplug adequate for musicians. In order to protect hearing, children are often taught EARS (E=earplugs/earmuffs, A=avoid loud sounds,

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R=reduce the volume, S=shorten the time in noise).

These are all viable methods of reducing noise-induced hearing loss, but the performing musician cannot always avoid loud sounds or reduce the volume (because of proximity and need to project to a large hall) and the time in the loud environment will be dictated by the practice and performance hours.

Earplugs are the Solution

Earplugs are the solution that applies to the practice and performing musical environment. These other three methods may be useful in other areas of the musician's life.

In past years, many musicians did not wear hearing protection because the available earplugs attenuated some frequencies of sounds more than others leaving speech and music muffled. In recent years, a special Musicians Custom Earplug was introduced. These earplugs reduced the overall sound evenly across all frequencies. Speech and music stay clear, just quieter. It is just like turning down the volume.

These custom earplugs were a great solution for the professional musician, but would be cost prohibitive for large school programs. A few years ago, a manufacturer was able to provide an instant fit (non-custom) Musicians earplug (Etymotic Research, Inc., www.etymotic.com). Most recently, these non-custom earplugs (ER-20s) have been produced in various sizes in order to meet the needs of children and young adults. In addition, they can be purchased in a variety of colors so school colors can be matched making wearing the earplugs more fun for school-age children.

Goals of the Student Musician Project at the University of Pittsburgh

- educate instrumental instructors about dangerous levels of sounds and the need for hearing health
- provide instrumental instructors with professional, custom hearing

protection or non-custom hearing protection (depending on individual choices and costs) that can be used throughout the day

- provide children and youth who participate in instrumental music with easy-to-use, non-custom hearing protection through the instrumental instructors
- increase awareness of hearing loss prevention in children, youth, and their families through use of hearing protection during school activities
- create an ongoing program of education and prevention of hearing loss within the school districts

The goal is to educate the instrumental instructors about hearing health. These are key individuals who teach children and youth about music and should also be teaching about how to take care of their sense of hearing which is critical to the creation, production, and enjoyment of music.

These teachers are exposed to loud sounds as they teach individual and group instrumental lessons and use of these plugs will be a model for the children. These same teachers are supplied with sets of non-custom musician earplugs to supply to their students. It is surprising to find that most music instructors did not receive education related to hearing health and hearing protection in their music education programs.

Organizations such as the National Association of Music Education, the National Association of Schools of Music, and the Performing Arts Medicine Association recently have started to work on guidelines to establish hearing as a part of the music education curriculum (Chesky 2008).

There are six school districts in the greater Pittsburgh area (including Pittsburgh Public Schools) implementing forms of this program. The most successful programs require the use of the ER-20 High-Fidelity Ear Plugs as opposed to making hearing protection optional (just as wearing goggles would not be optional in chemistry class). Some schools have implemented the program in K-12 and some have chosen to implement the program in middle and high school only. We have several

schools that have implemented the program in the youngest grades where they have extensive drumming programs. Some schools have the students keep the hearing protection with them as they travel with their instrument from school to home (the pouch attaches to the music case) and some schools have chosen to keep the hearing protection in the classroom (pouches are labeled with student names).

Many lunch personnel and physical education teachers who are using the ER-20 ear plugs to lower the sound they are exposed to each day (in some cases it is not that the sound is harmful to their inner ears, but it is annoying or very tiring). We have had requests from students and parents for extra pairs of ER-20s for the rest of the family. These requests indicate that the goals of reaching entire families through these instrumental students and impacting attitudes about hearing health beyond just the school instrumental activity are reasonable.

Interested in This Program?

Please contact us and we would be happy to provide you with PowerPoint slides for educational purposes or we would be happy to work with the school district directly. Instrumental music students are an at-risk population when it comes to noise-induced hearing loss and a population who can be reached in order to promote hearing health. When these students adopt good hearing health habits, it impacts their friends and families, thereby impacting an even greater population.

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