



## PERSONAL STEREO SYSTEMS AND THE RISK OF HEARING LOSS

### The Issue

Personal stereo systems offer a convenient way to listen to music in public without disturbing others. A typical system combines a portable cassette, compact disc player, or radio, with headphones or earphones. Scientific studies suggest that these devices may cause hearing loss if they are not used with a degree of caution.

### Background

How Sound Levels and Duration are Linked to Hearing Loss

Scientists measure the levels of different sounds with a unit called the A-weighted decibel (dBA).

Sounds with levels below 70 dBA pose no known risk of hearing loss, no matter how long they last. If you listen to music at 70 dBA, the sound level is about the same as what you experience while driving a four-door family car on the highway with the windows closed.

For sound levels higher than 70 dBA, the duration of daily exposure becomes an important risk factor. For example, sounds with levels of 85 dBA pose no known risk of hearing loss if you are exposed for no longer than 45 minutes per day. However, sound levels of 85 dBA or higher can pose a significant risk of permanent hearing loss, if you are exposed for eight hours per day.

This threshold, exposure to 85 dBA for eight hours daily, has been adopted by several Canadian provinces as the limit for occupational noise.

### Health Canada's Role

Health Canada can provide information, or required regulations, to help prevent hearing loss from exposure to excessive noise at work, at home, or at play. Officials have reviewed scientific literature on personal stereo systems, and have conducted tests to assess their potential to cause hearing loss. These tests measured the sound levels generated at maximum volume settings using a variety of headphones/earphones, and portable compact disc (CD) players. The music selected for the tests included pop songs from the "top ten" charts, and heavy metal tracks.

### The findings:

- All combinations of headphones/earphones and CD players could generate potentially harmful sound levels
- Pop music sound levels ranged from 86 to 102 dBA when researchers used the headphones that came packaged with the CD player. When researchers combined CD players with headphones purchased separately, the sound levels reached 114 dBA - test results also suggested that this was not necessarily the limit

If you played the pre-packaged systems at maximum volume, it would take from 12 minutes (at 102 dBA) to seven hours (at 86 dBA) to exceed the occupational noise limit noted above.

Furthermore, you would exceed the limit in just one minute if you played heavy metal or pop music at full volume on the combination CD / headphone system that produced sound levels of 114 dBA.

At this sound level, exposure for longer durations can pose a risk of immediate, serious and permanent hearing loss.

Another key finding was that sound levels from earbuds vary significantly from person to person, because the level depends on how well the “buds” fit into your ears. Tight-fitting earbuds tend to produce higher sound levels than other commercially available headphones.

Personal stereo systems have the capability to cause permanent hearing loss when used to play the kind of music that is most popular with teenagers and young adults. European and Japanese studies indicate that actual listening habits appear to have kept the risk low. However, the risk should not be ignored as so many young people use these devices.

## To Reduce Your Risks

## Protect Your Hearing

Here are some tips to reduce the risk of noise-induced hearing loss from personal stereo systems:

- Keep the sound at enjoyable, but safe levels. If someone a metre away must shout to be understood, the sound level of the music is probably higher than 85 dBA, and may be hazardous
- Use various system controls to increase enjoyment while decreasing your risks. For example, you could turn down the volume and increase the bass boost
- Limit the amount of time you spend listening to loud music

## Other Safety Issues

There is more at stake than your hearing. Excessive sound levels can also create dangerous situations. If your personal stereo system is so loud that you cannot hear sounds around you, such as traffic, your personal safety may be at risk.

## Know the Early Signs of Hearing Loss

If you experience the early signs of hearing loss, you should contact your doctor's office to discuss the need for a test or examination. The early signs include:

- Difficulty when trying to follow a conversation in the midst of background sounds. For example, at a social gathering or in a cafeteria
- The perception that people around you are mumbling
- Hearing a ringing, buzzing, roaring, or rushing sound in your ear when there is nothing making these sounds - this condition is called tinnitus

## Need More Info?

For more information, including references for the studies mentioned in this fact sheet, contact:

The Consumer and Clinical Radiation Protection Bureau

Health Canada  
775 Brookfield Road  
Ottawa, ON K1A 1C1  
Tel: (613) 954-6699

For more information about noise-induced hearing loss, see the Wise Ears Website: [www.nidcd.nih.gov/health/wise/index.htm](http://www.nidcd.nih.gov/health/wise/index.htm)

See also: Guidelines for Community Noise, World Health Organization 1999, at [www.who.int/environmental\\_information/Noise/ComnoiseExec.htm](http://www.who.int/environmental_information/Noise/ComnoiseExec.htm)