# What Causes Hearing Loss

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Noise, not age is the leading cause of hearing loss. Unless you take steps now to protect to your ears, sooner or later many of you — and your children — will have difficulty understanding even ordinary speech.

Tens of millions of Americans, including 12 percent to 15 percent of school-age children, already have permanent hearing loss caused by the everyday noise that we take for granted as a fact of life.

“The sad truth is that many of us are responsible for our own hearing loss,” writes Katherine Bouton in her new book, “Shouting Won’t Help: Why I — and 50 Million Other Americans — Can’t Hear You.” The cause, she explains, is “the noise we blithely subject ourselves to day after day.”

While there are myriad regulations to protect people who work in noisy environments, there are relatively few governing repeated exposure to noise outside the workplace: portable music devices, rock concerts, hair dryers, sirens, lawn mowers, leaf blowers, vacuum cleaners, car alarms and countless other sources.

We live in a noisy world, and every year it seems to get noisier. Ms. Bouton notes that the noise level inside Allen Fieldhouse at the University of Kansas often exceeds that of a chain saw.

After poor service, noise is the second leading complaint about restaurants. Proprietors believe that people spend more on food and drink in bustling eateries, and many have created new venues or retrofitted old ones to maximize sound levels.

When I’m told about a new restaurant, my first question is, “Is it noisy?” My friends and I will never return to one in which the racket makes it impossible to converse with tablemates. Perhaps the young diners the restaurateurs covet “talk” by texting.

The ears are fragile instruments. When sound waves enter the ear, they cause the eardrum to vibrate. The vibrations are transmitted to the cochlea, in the inner ear, where fluid carries them to neatly organized rows of hair cells. These in turn stimulate auditory nerve fibers, each attuned to a different frequency. These impulses travel via the auditory nerve to the brain, where they are interpreted as, say, words, music or an approaching vehicle.

Damage to this delicate apparatus results from both volume and length of exposure to sound. Very loud noises, or chronic exposure to sound even when it is not particularly loud, can wreak havoc on hair cells, causing them to become disarranged and to degenerate.

We are born with a fixed number of hair cells; once they are dead, they cannot be replaced, and auditory sensitivity is permanently lost. Usually, sensitivity to high-frequency sounds is first to go, followed by an inability to hear the frequencies of speech.

Furthermore, the effects of noise exposure are cumulative, as Robert V. Harrison, an auditory specialist at the University of Toronto, noted recently in The International Journal of Pediatrics. Although we start out with a redundancy of hair cells, with repeated noisy insults, enough are destroyed to impair hearing. Thus, damage to hair cells incurred early in life, as has happened to many rock musicians and rock concert aficionados, can show up in midlife as difficulty understanding speech.

Sound volume is measured in decibels (dB), and the level at which noise can cause permanent hearing loss begins at about 85 dB, typical of a hair dryer, food processor or kitchen blender.

Dr. Michael D. Seidman, the director of otolaryngology at Henry Ford West Bloomfield Hospital in Michigan, told me to use ear plugs when I dry my hair or mow my lawn with a gas-powered mower, and to cover my ears when an emergency vehicle passes with siren blasting. Ear protection is a must for people who shoot guns as well as those who ride motorcycles or use snow blowers, leaf blowers, hand or pneumatic drills or chain saws.

But even noisier than many of these is the maximum output of some portable music players, which can exceed occupational safety levels and produce sound levels in the ear on a par with that of a jet taking off. If you listen to music with earbuds or headphones at levels that block out normal discourse, you are in effect dealing lethal blows to the hair cells in your ears, Dr. Seidman said.

A national study in 2006 by the American Speech-Language-Hearing Association found that among users of portable music devices, 35 percent of adults and up to 59 percent of teenagers reported listening at loud volumes.

Dr. Harrison urges purchasers of such “personal entertainment devices” to read and heed the warnings and practical advice on package inserts. Too often people turn up the volume to overcome surrounding noise. A better plan is to set a maximum volume while in a quiet environment and never go above that.

In general, if other people can hear what you’re listening to, the volume is turned up too high. Many times I’ve had to change my seat on the subway or bus because the rider next to me was using a music player as if it were a boombox.

Some portable listening devices come with the ability to set a maximum volume, which may be worth the added cost to parents concerned about protecting their children’s ears.

At a given volume level, earbuds deliver higher noise levels than over-the-ear headphones. If earbuds are used, Dr. Harrison suggests selecting ones that fit loosely and never inserting them tightly into the ear canal. Alternatively, when you are alone and not at risk of missing important environmental cues, like an approaching vehicle,

consider using noise-canceling over-the-ear headphones that block out background noise and enable you to listen at a lower volume.

Even toys meant for young children can generate ear-damaging levels of noise. The American Speech-Language-Hearing Association lists as potential hazards cap guns, talking dolls, vehicles with horns and sirens, walkie-talkies, rubber squeaky toys, musical instruments and toys with cranks. According to the association, some toy sirens and squeaky rubber toys can emit sounds of 90 dB, as loud as a lawn mower.

It suggests that parents with normal hearing test new toys before giving them to a child. “If the toy sounds loud, don’t buy it,” is the recommendation. For noisy toys already bought, consider removing the batteries or taping over the speaker.

Additional protective information can be found online. Check out It’s a Noisy Planet; Keep It Hear; Listen to Your Buds; Hear-It Youth; and Dangerous Decibels.

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