

PROMOTING HEALTHY ENVIRONMENTS FOR CHILDREN

Noise



KEY POINTS

Excessive noise exposure is an underrecognized individual and public health problem that affects people of all ages.

- Noise can be defined as unwanted or objectionable sound.
- Occupational noise is experienced in the workplace; environmental noise includes noise from outdoor and indoor settings; recreational noise comes from sought-after activities and events such as listening to music on personal listening devices (PLDs), attending parties, dances, concerts, and sports events; fireworks; and recreational firearm use.
- Sensorineural hearing loss, often coming from excessive occupational or recreational noise exposures, is usually irreversible.
- Environmental noise can affect hearing, learning, sleep, and quality of life; result in a physiological stress response; and cause psychological harm.
- Noise exposure can start in infancy and effects are cumulative across the lifespan. Therefore, attention to noise in everyday activities is needed starting early in life.
- Pediatricians should consider “excessive noise” among the list of modifiable environmental exposures to discuss with children and families.

CLINICAL GUIDANCE

- Excessive and/or prolonged exposure to high volumes — generally from occupational or recreational exposures — can result in hearing loss, tinnitus, and/or hyperacusis (a heightened sensitivity to everyday sounds).
- Noise risk is based on both the level and the duration of noise. The louder the sound, the shorter the amount of time it takes for damage to occur. The longer the exposure, the greater the risk for hearing loss. The frequency of noise exposure — ie, how often it occurs — is also important.
- Environmental noise — or “noise pollution” — is common: vehicular traffic, railways, airplanes, video games, toys, and appliances, are part of everyday life.
- Even small amounts of hearing loss can have profound, negative effects on speech acquisition, language comprehension, communication ability, classroom learning, and social development.
- Infants and young children must rely on adults to remove them from noisy situations.
- Children and teenagers often may not recognize hazardous noise exposures, including from headphones, or attending concerts and dances.

Prevention is key!

Preserving hearing is a lifelong endeavor. Pediatricians can potentially lessen harms by raising awareness of children's specific vulnerabilities to noise.

- Include hearing health and preventing hearing loss on the well visit agenda.
- The most prevalent exposure encountered is likely to be from PLDs. Headphones and PLDs are increasingly used, even by small children. Pediatricians can discuss potential hazards and safe use of PLDs with patients and families when taking a history or when examining ears.
- Share suggestions with families:
 - Avoid loud environments and noises. It is especially important to shield children from impulse noise (eg, firearms, explosives).
 - Generally speaking, if an environment sounds too loud for an adult, it probably is too loud for a child. "Too loud" can mean having to raise your voice to speak with someone just an arm's length away.
 - For young children especially, avoid or leave excessively noisy venues, such as concerts, sporting events, or fireworks displays, or use hearing protection such as protective earmuffs. Earplugs can be used but may pose a choking hazard to young children.
 - Reduce the volume on televisions, computers, radios, and PLDs.
 - Take listening breaks.
 - Use headphones and earbuds with caution.
- Several studies show potential benefits in the use of infant sleep machines. One study, however, raised potential concern about sound levels from these devices. Therefore, if these devices are used, it may be safer to locate them as far away as possible from the infant, set the volume as low as possible, and limit duration of use.
- Pay attention to the volume of sound in all environments where you see patients.
- Hearing protection can be made available to families and health care providers in hospital settings when needed. Ear plugs can be provided for patients undergoing an MRI scan.

To identify hearing concerns,

- Pediatricians can consider recommending formal hearing evaluations for children with a history of excessive noise exposure or for children with tinnitus or hyperacusis.
- A child with 1 or more risk factors on a hearing risk assessment should have ongoing developmentally appropriate hearing screening and at least 1 diagnostic audiology assessment by age 24 to 30 months. The Joint Committee on Infant Hearing (JCIH) recommends a 1-3-6 guideline: All infants should be screened by 1 month of age; those who do not pass screening should have a comprehensive audiological evaluation by 3 months of age; infants with confirmed hearing loss should receive appropriate intervention at no later than 6 months of age.
- Parental concern about a child's hearing, speech, or language delay indicates a need for further evaluation.

ADDITIONAL INFORMATION

- Sensorineural hearing loss (SNHL) is caused by damage to the hair cells of the cochlea or to the auditory nerve. Excessive noise exposure is one cause of SNHL. Damage to hair cells is permanent and usually cannot be restored with medical treatment.
- Several studies confirm that hearing loss is common in children, adolescents, and young adults. Recent data suggests that about 1 in 6 middle and high school students have evidence of hearing loss. Noise exposure is a likely contributor to hearing loss in some of these students.

- Hearing loss is the third most common chronic physical condition in US adults. Hearing loss is linked to cognitive decline, Alzheimer’s disease, dementia, and Parkinson’s disease.
- Studies in the United States and internationally demonstrate sociodemographic disparities in noise exposure. Most studies show that exposures are higher in people of lower socioeconomic status and in those belonging to historically marginalized racial and ethnic groups.

FOR MORE INFORMATION

The following resources offer additional information regarding noise:

- [Pediatric Environmental Health, 4th Edition](#) – AAP Policy Manual
- [Loud Noise Can Cause Hearing Loss](#) – CDC National Center for Environmental Health
- [Hearing Loss in Children](#) – CDC
- [Make Listening Safe](#) – WHO
- [Children and Noise Training Module](#) – WHO
- [Noise and Hearing Loss Prevention](#) – National Institute for Occupational Safety and Health