

## Children exposed to HIV in the womb at increased risk for hearing loss

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Children exposed to HIV in the womb may be more likely to experience hearing loss by age 16 than are their unexposed peers, according to scientists in a National Institutes of Health research network.

The researchers estimated that hearing loss affects 9 to 15 percent of HIV-infected [children](#) and 5 to 8 percent of children who did not have HIV at birth but whose mothers had [HIV infection](#) during pregnancy. [Study participants](#) ranged from 7 to 16 years old.

The researchers defined hearing loss as the level at which sounds could be detected, when averaged over four frequencies important for speech understanding (500, 1000, 2000, and 4000 Hertz), that was 20 [decibels](#) or higher than the normal hearing level for [adolescents](#) or [young adults](#) in either ear.

"Children exposed to HIV before birth are at higher risk for hearing difficulty, and it's important for them—and the health providers who care for them—to be aware of this," said George K. Siberry, M.D., of the Pediatric, Adolescent, and Maternal AIDS Branch of the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), the NIH institute that leads the research network.

The study was published online in *The Pediatric Infectious Disease Journal*.

Compared to national averages for other children their age, children with HIV infection were about 200 to 300 percent more likely to have a hearing loss. Children whose mothers had HIV during pregnancy but who themselves were born without HIV were 20 percent more likely than to have hearing loss.

"If parents and teachers know the child has a hearing problem, then they may take measures to compensate in various communication settings, such as placement in the front of the classroom or avoiding noisy settings," explained Howard Hoffman, M.A., director of the Epidemiology and Statistics Program at the National Institute on Deafness and Other Communication Disorders (NIDCD), which provides funding to the network for studies related to hearing and language.

Even a mild hearing loss in children can delay the acquisition of language skills. More severe hearing loss may require the use of assistive devices, such as a hearing aid. Information on hearing and deafness is available from NIDCD.

To determine the types of hearing loss the children experienced, the researchers conducted these evaluations :

- Physical examination of the ear canal
- Evaluation of the middle ear function, how sound vibrations are transmitted through the middle ear bones
- Responses to tones presented over earphones

Hearing loss may occur from damage to the bones and structures in the ear canal and inner ear, or from damage to the nerves leading to the brain.

First author Peter Torre III, Ph.D., of San Diego State University, led the study with Hoffman, Siberry and six other coauthors. Collaborators were from the Harvard School of Public Health, Boston; the University of Kansas, Lawrence; and Tulane University School of Medicine, New Orleans.

The research was conducted as part of the Pediatric HIV/AIDS Cohort Study network, led by NICHD in cooperation with and with cofounding from NIDCD and several other NIH institutes, including: the National Institute on Drug Abuse, the National Institute of Allergy and Infectious Diseases, the National Institute of Mental Health, the National Institute of Neurological Disorders and Stroke, the National Heart Lung and Blood Institute, and the National Institute on Alcohol Abuse and Alcoholism.

More than 200 children and teenagers participated. All had been exposed to HIV before birth, and about 60 percent were HIV-positive at the time of the study. Researchers conducted hearing tests on the children if their parents or caregivers had reported hearing problems, they had low scores on a standard test of language or their health care providers detected hearing problems during standard hearing screenings.

The researchers classified participants who could not hear tones below a certain volume as having hearing loss with difficulties in quiet and noisy settings. The researchers documented a greater proportion of hearing loss cases among HIV-positive children and found that those who had developed AIDS at any point were even more likely to have hearing loss—even if the disease was under control at the time of the study.

Earlier studies have found that children with HIV are susceptible to middle ear infections. Repeated middle ear infections can cause hearing loss. However, in 60 percent of cases in the study, [hearing loss](#) was the result of problems with the transmission of sound from the nerves of the

ear to the brain, rather than to damage in the [middle ear](#) resulting from ear infections.

"Although ear infections are more common among children with [HIV](#), these do not appear to be the reason their hearing is more likely to be compromised," said Torre.

Provided by NIH/National Institute of Child Health and Human Development

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