

Public health study explores how vaccines may help prevent hearing loss in children

by [University of Montreal](#)



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Over 1.5 billion people worldwide are affected by some degree of hearing loss. While it is often linked to aging, a lesser-known but significant cause is infections contracted during childhood and adolescence, many of which are preventable.

This is particularly true in low- and middle-income countries, where access to hearing care is often limited. According to the World Health Organization (WHO), nearly 60% of childhood hearing loss could be prevented through public health measures such as vaccination against rubella and certain forms of meningitis.

Statistics like these led a team of researchers, including several from Université de Montréal's School of Public Health (EPSUM), to conduct an in-depth review of the scientific literature exploring the role vaccination could play in preventing hearing loss in children and adolescents. Their work is published in *Communications Medicine*.

The team included Mira Johri, a professor in the Department of Health Management, Evaluation and Policy at ESPUM; Shoghig Téhinian, a professional doctorate candidate at ESPUM; Myriam Cielo Pérez Osorio, a public health researcher at Quebec's Integrated Health and Social Services Center for Montréal-Ouest; Enis Barış, a professor at the University of Washington; and Brian Wahl, a professor at the Yale School of Public Health.

26 pathogens

The researchers conducted an extensive review of the literature to map existing knowledge of the relationship between vaccination and hearing loss prevention.

"It was an extremely detailed review because we looked at the pathogens one by one," explained Téhinian. "We identified the available vaccines, their mechanisms of action, and what is known about their impact on hearing."

The research team identified 26 infectious agents that can potentially cause hearing loss, including the virus responsible for common diseases such as measles as well as rubella, which is especially dangerous if contracted during pregnancy because it can harm the developing auditory system and cause congenital deafness.

Also on the list are the virus that causes mumps, which can lead to sensorineural hearing loss by damaging the inner ear or auditory nerve, and the bacteria *Haemophilus influenzae*, *Streptococcus*

pneumoniae and *Neisseria meningitidis*, which cause meningitis and result in permanent hearing damage.

Gaps in the research

The researchers found a glaring lack of empirical data on the protective effects of vaccines against hearing loss. Of the thousands of scientific articles identified as relevant, only nine published over the past 40 years met the criteria for inclusion in the new analysis.

Moreover, these nine studies covered just three infectious agents—rubella, mumps and pneumococcus—and were conducted exclusively in high-income countries, such as Sweden, Finland, the Netherlands, the United States, Australia and Japan.

"If a vaccine is shown to save lives, it's reasonable for policy decisions to be made on that basis," said Johri. "But vaccines can also offer significant benefits in preventing other harms, such as hearing loss, and these benefits deserve greater attention."

The design of clinical trials can obscure these additional benefits. Since their primary goal is to demonstrate effectiveness against the target disease, the prevention of side effects such as hearing loss is rarely evaluated systematically.

Some clear evidence

The nine empirical studies that did examine linkages between vaccines and hearing loss prevention had mixed results. Some found that vaccination can provide protection while others showed no effect. Additionally, the methods used to measure hearing loss varied considerably, making direct comparisons difficult.

Population-level studies show that rubella and mumps vaccination significantly reduces rates of deafness associated with these diseases. In Australia, for instance, the introduction of a rubella vaccination program led to a marked decline in cases of congenital deafness.

In Sweden, the implementation of an MMR (measles, mumps, and rubella) vaccination program was associated with a significant reduction in hearing problems among children. Studies on mumps in Japan and the United States also highlight the importance of vaccination in preventing hearing loss caused by this infection.

On the other hand, three clinical trials evaluating the efficacy of pneumococcal vaccines in preventing middle ear infections (serous otitis media) found no significant reduction in infection rates. The authors point out, however, that serous otitis media is not a direct indicator of permanent hearing loss.

Expanding vaccine access

The researchers believe that raising awareness of the hearing-related benefits of vaccination could help strengthen existing immunization programs—especially in low- and middle-income countries, where vaccination coverage is still inadequate.

"If vaccination against measles, for example, is already recommended to reduce mortality, the fact that it can also prevent hearing loss could be highlighted as an additional benefit," explained Johri. "This could bolster the case for adopting a universal vaccination program."

The study recommends including the effect on hearing loss in vaccine evaluations, both during development and for products already on the market. This factor could also help inform research priorities for new vaccine formulations.

"These indirect benefits of vaccination need to be better documented and communicated to the public," said T  hinian. "It could help reduce [vaccine](#) hesitancy."

"Our School of Public Health is located very close to the former Montreal Institute for the Deaf and Mute," Johri pointed out. "Only a few decades ago, there were so many children with hearing loss that we needed a dedicated facility for them. Now, thanks to antibiotics and vaccines, fewer people in Canada are affected by [hearing](#) loss. This is a success story that could be replicated around the world."

More information: Mira Johri et al, Vaccination for prevention of hearing loss: a scoping review, *Communications Medicine* (2025). [DOI: 10.1038/s43856-025-00795-w](https://doi.org/10.1038/s43856-025-00795-w)

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