

# Frequent use of antimicrobial drugs in the first decade of life shifts bacterial profiles in saliva

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The strongest associations were presented with azithromycin that is used for example to middle ear infections, strep throat and pneumonia.

The [human microbiota](#) plays an important role in [health](#) and well-being by assisting in digestion, producing nutrients, resisting invading pathogens and regulating metabolism and the immune system.

We use antimicrobial (AM) drugs to treat common infections even though they have an [immediate effect](#) on microbial diversity and composition.

Most of the studies have earlier focused on fecal (gut) microbiota, but microbes in other niches of the body have also showed importance for [human health](#) and well-being.

The Finnish Health in Teens study (Fin-HIT) is a [cohort study](#) including over 11000 Finnish adolescents. In the most recent Fin-HIT study researchers tried to find the associations of lifelong AMs use with saliva microbiota diversity and composition in preadolescents. They used data from 808 randomly selected children in the Fin-HIT cohort with objective register data on AM purchases from the Social Insurance Institution of Finland (KELA).

On average, the children had 7.4 AM purchases during their lifespan until on average 12 years. The four most commonly used AMs were amoxicillin (43.7%), [azithromycin](#) (24.9%), amoxicillin-clavulanate (18.7%) and phenoxymethylpenicillin (6.8%).

Researchers showed in the study that frequent use of antimicrobial drugs shifted bacterial profiles in saliva. The frequent use of any AMs affected saliva microbiota.

"Microbial composition differed between high, medium and low users of AMs. These effects are also gender- and AM-dependent," says Sajan Raju, Post Doctoral Researcher at University of Helsinki.

## **The strongest effect with azithromycin, especially in girls**

Azithromycin is used for example to middle ear infections, strep throat and pneumonia. According to the study, azithromycin had the strongest associations to shifts in bacterial profiles: each course decreased the microbiota diversity. This was more strongly observed in girls than in boys.

"Our findings emphasize a concern for high azithromycin use, which substantially impaired the bacterial diversity and affected composition as well," says Raju.

In boys, amoxicillin affected the microbial composition more than in girls. As well as azithromycin, amoxicillin is also widely used to middle ear infections and strep throat. The use of amoxicillin and amoxicillin-clavulanate was associated with the largest decrease in abundance of Rikenellaceae family.

AM use in general was associated with a decrease of Paludibacter and pathways related to amino acid degradations.

## **Unforeseen health impacts in the future?**

The contribution of lifelong AM use on saliva [microbiota](#) is unknown and AM use might have unforeseen health impacts in the future.

"It can have health impacts such as inducing obesity or antibiotic resistant bacteria," says Raju.

The majority of children (85%) in the study were exposed to AMs during the first three years of life. In the study the researchers could not confirm that the purchased AMs were taken. Neither the dental status of the adolescents was not assessed in the study.

**More information:** Sajan C. Raju et al. Antimicrobial drug use in the first decade of life influences saliva microbiota diversity and composition, *Microbiome* (2020). [DOI: 10.1186/s40168-020-00893-y](https://doi.org/10.1186/s40168-020-00893-y)

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