

# Influence of C-section, formula feeding and antibiotics on infant gut microbiome

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A new analytical approach, described in open-access journal *Frontiers in Pediatrics*, shows how different interventions - cesarean section, formula feeding, and antibiotics - can alter an infant's developing gut

microbiome.

The first year of an infant's life is a critical time for the development of his or her gut microbiome - the over one thousand types of [bacteria](#) that live in the intestines. These bacteria not only help infants digest food, but they also "train" their developing immune system.

An infant's environment is the biggest factor in determining which bacteria are present, and so changes such as the type of birth and food, as well as early use of antibiotics, can have a big impact on the infant's growing gut microbiome. But, researchers are still working to understand exactly what these differences are, and what they could mean for an infant's [future health](#).

"Our goal was to characterize the combined influence of cesarean delivery, antibiotic treatment, and formula-feeding on the development of gut microbiota in infants," says Anita Kozyrskyj, a researcher at the University of Alberta, Canada, and the group leader of the study. "We found that, compared to vaginally-born and breastfed infants, formula-fed or cesarean-delivered infants had different trajectories of bacterial colonization in later infancy, which could have implications for their future health."

Kozyrskyj and her collaborators used a method - called Significance Analysis of Microarrays - to quantify changes to gut bacteria in 166 infants through the first year of their lives. Other researchers have already shown that there are typical patterns in the types of bacteria that inhabit a growing infant, but Kozyrskyj's work is among the first to study the rates of colonization for each type of bacteria with infant age - highlighting which bacteria dominate as the [gut microbiome](#) evolves over time.

Kozyrskyj's group found that, compared to the normal progression of [gut](#)

[bacteria](#) with infant age, formula-fed or cesarean-delivered [infants](#) showed altered trajectories of colonization among the bacterial families that have been linked to food allergies, as well as rapid weight gain.

Future research and larger studies will be needed to fully understand the consequences of these changes, but numerous other studies have suggested potential links between these bacteria and the future health of the child -particularly in the development of food allergies.

"We hope this research will help clinicians and parents understand that [cesarean section](#) increases the chance of [antibiotic treatment](#) or formula-feeding of newborns, which can affect the development of [gut microbiota](#) in later infancy," says Kozyrskyj.

**More information:** *Frontiers in Pediatrics*, [DOI: 10.3389/fped.2017.00200](#)

Provided by Frontiers

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