

# CDC's Antibiotic Resistance (AR) Solutions Initiative: Microbiome

CDC's applied research on the human microbiome aims to identify effective public health approaches to protect people, their microbiomes, and the effectiveness of antibiotics.

Bacteria, fungi, viruses, and other microbes (germs) live naturally on our skin and in our gut and other places within our body. These microbes make up a community called the microbiome. Antibiotics can destroy your microbiome the way a wildfire can destroy a forest.



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A healthy microbiome helps protect you from infection because your body needs bacteria to function normally.

Infection-causing bacteria, which can be antibiotic resistant.

When drug-resistant bacteria take over, patients can carry these germs and spread them to other people, especially if those people have a disrupted microbiome.

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When you take antibiotics to treat an infection, the antibiotics not only kill the infection-causing bacteria, but the bacteria that keep you healthy can also be destroyed for several months. This can disrupt, or unbalance, a healthy microbiome.

With a disrupted microbiome, the body is less able to defend against infection, putting people at risk for infections from deadly germs like *C. difficile* and MRSA.

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**When antibiotics are needed, the benefits outweigh the risks of side effects or antibiotic resistance. When antibiotics aren't needed, those risks come with no benefits. By only using antibiotics when needed, we can avoid unnecessary microbiome disruption and risk for getting or spreading infections.**

Understanding how the microbiome and infections are connected could protect our health.

In collaboration with investigators, CDC aims to determine:

How much do antibiotics disrupt a healthy microbiome?

How does a disrupted microbiome put our health at risk?

How can tailoring antibiotic use protect our microbiome?



U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention