

# How Antibiotic Resistance Moves Directly Germ to Germ

Any antibiotic use can lead to antibiotic resistance. Antibiotics kill germs like bacteria and fungi, but the resistant survivors remain.

Resistance traits can be inherited generation to generation. They can also pass directly from germ to germ by way of **mobile genetic elements**.

## Mobile Genetic Elements



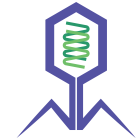
### Plasmids

Circles of DNA that can move between cells.



### Transposons

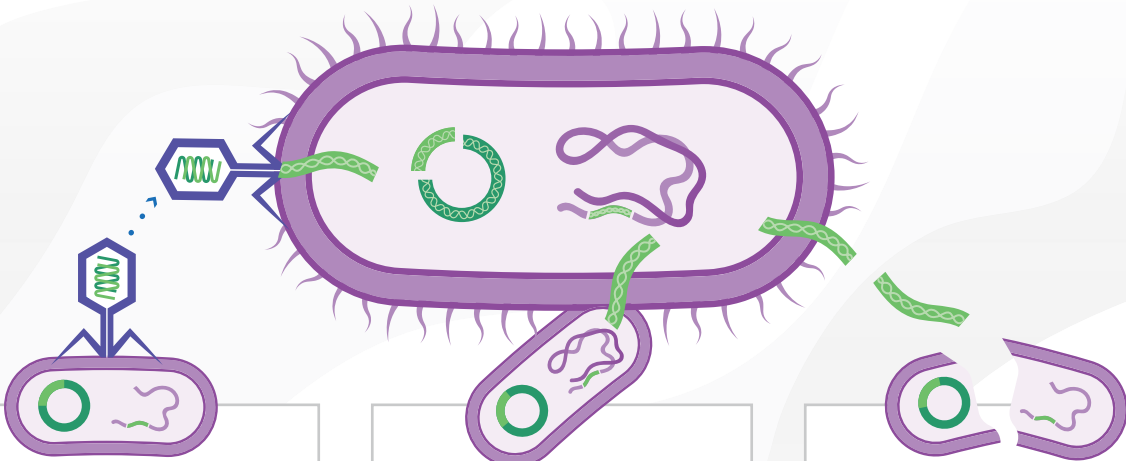
Small pieces of DNA that can go into and change the overall DNA of a cell. These can move from chromosomes (which carry all the genes essential for germ survival) to plasmids and back.



### Phages

Viruses that attack germs and can carry DNA from germ to germ.

## How Mobile Genetic Elements Work



### Transduction

Resistance genes can be transferred from one germ to another via phages.

### Conjugation

Resistance genes can be transferred between germs when they connect.

### Transformation

Resistance genes released from nearby live or dead germs can be picked up directly by another germ.



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