# Misuse of antibiotics puts you and others at risk

Our bodies are made up of more bacterial cells than human cells! Most of the bacteria are pretty friendly and help us keep healthy in part by protecting from harmful bacteria. When harmful bacteria enter our bodies they make us feel pretty sick and if left untreated they can be even deadly. Antibiotics are wonderful because they help us treat bacterial infections and prevent the spread of disease. However, antibiotics can also be a problem. When antibiotics enter our bloodstream and travel through our body they kill the harmful bacteria that make us feel sick, but they also kill the resident friendly bacteria. This is one reason for not taking antibiotics when they are not needed.

Another big problem with antibiotics is that they have become ineffective in treating many bacterial infections; they are no longer able to kill the bacteria they used to. Bacteria that are resistant to the effect of a certain antibiotic are said to be antibiotic resistant.

**Question 1:** Using the model of species change you developed and the figure below, can you explain how the misuse or overuse of antibiotics are key factors contributing to antibiotic resistance? Please use the ideas of your model and give a **very detailed** explanation.



**Question 2:** You have a population of harmful bacteria that is making you feel awful, and your doctor recommends you take antibiotics for 10 days, one tablet per day. From your **natural selection model** you know that there is variation within populations. Individuals from the harmful bacteria population that are making you sick are not all the same with respect to antibiotic tolerance. Some individuals when exposed to antibiotic will die quickly; some will need a higher dose to be killed. As you take more antibiotics the dose increases killing those tough ones also. By the end of the treatment you hope all of the individuals of the harmful bacteria population are dead. You are now free of infection and feel great again (see figure).

Let’s say that on day 4 of your treatment, when you are feeling much better you decide to stop the treatment. **Why do you think this is not a good idea?** Please explain in detail.