

Antibiotic role play

Introduction

In this role play students have to explain the uses and limitations of antibiotics in their own words for a popular audience. It provides a good opportunity to clarify their understanding of antibiotics and to practice talking about what they know. It is best done at the end of the topic to reinforce the ideas.

The activity

Divide the group into pairs. One member of each pair is the doctor, the other the patient's parent. The doctor needs the role sheet and information sheet. The parent needs only the parent role sheet.

Give each a few minutes to think about the role and for the doctor to study the information. It is worth spending this preparatory time rather than starting without thought. The information sheet is intended as support and should not be read out by the doctor. This would undermine the whole point of the exercise. The role play itself only takes 5 - 10 minutes. Some pairs will need to ask you questions as they go, some doctors will be better than others at explaining.

Take quick evaluations of the doctor's skills and then swap roles. Most students like being the doctor and this is the role that actually gives them the practice they need. At the end find out whether they have any questions.

References

Specification 3.1.2

Science Explanations

Aa Many diseases (of humans, other animals, and plants) are caused by small organisms (microbes) such as bacteria, fungi and viruses which are present in the environment and can be passed on from already infected individuals.

Ab Bacteria or fungi may enter the body and reproduce to form colonies in certain organs or tissues. Viruses are not independent organisms but are packets of genetic information which cannot survive on their own but can invade healthy cells and make them produce copies of the virus, usually killing the cell in the process. The symptoms of a disease are caused by damage to the tissues, by the toxins produced by the microbes or sometimes by the immune system itself.

Af Antibiotics are chemicals which kill or inhibit the growth of certain bacteria or fungi. They can be used to treat infections by these organisms. They have no effect on viruses. However, over a period of time the bacteria or fungi become resistant to an antibiotic. Random mutations in the genes sometimes lead to individuals which are less affected by the antibiotics. These have a better chance of surviving a course of antibiotic treatment. These resistant individuals then reproduce, resulting in resistant strains of microbes.

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A blue rectangular graphic with a pattern of vertical bars of varying heights and shades of blue at the top. Below the pattern, the text 'Antibiotic role play' is written in white, sans-serif font.

Antibiotic role play

Parental role

You have come in to the surgery with your 10 year-old child suffering from a bad sore throat. You are worried and want some antibiotics to make your child better. The doctor is unwilling to prescribe. In this role you have to act as if you are very convinced that your child needs a prescription for antibiotics. You can pretend to be fairly ignorant but worried about your child. Challenge the 'doctor' by asking questions which force her/him to explain the difference between a virus and a bacterium and the dangers of misuse of antibiotics.

Here are some suggestions for questions to ask the 'doctor'. You might think of others as the interview progresses.

- What is wrong?
- What is a virus?
- You will give a prescription for antibiotics won't you?
- He is ill, he should get antibiotics, why won't you give them to me?
- Just give him a few antibiotic pills. I only needed to take them for three days last year before I was quite cured. I'm sure this would be the same.
- You have pills for everything, even cancer. How is this different?
- Even if antibiotics might not work you could at least try. You haven't lost anything have you?
- Could he have an injection like they give to stop measles so that he doesn't get a sore throat again?

At the end rate the doctor's explanations. Would you choose this person as your doctor?

The doctor role

In this role you have to use your knowledge of infectious diseases, of the difference between bacteria and viruses and of the uses and problems of antibiotics. You have to answer the parent's questions to:

- reassure him/her
- explain that the child is suffering from a sore throat caused by a virus which will get better within a few days
- explain the differences between viruses and bacteria
- explain why antibiotics do not have any effect against viruses
- explain how overuse and misuse of antibiotics leads to the development of resistance in bacteria
- explain the serious consequences for everyone of antibiotic resistance
- explain the difference between a preventive measure like vaccination for measles and a cure like antibiotics

Before you start the role you need to make sure you know the answers to the points above. You can read the information sheet and have it with you in case you get stuck but don't just read it out - explain in your own words. The patient won't rate you very highly if you have to look everything up and you are unlikely to persuade them. The parent will judge you on how well you explain the facts as well as on your "bedside manner".

Doctor's information sheet on antibiotics

- *explain that the child is suffering from a sore throat caused by a virus which will get better within a few days*
Experienced doctors can see the difference between a throat infection caused by a virus and one caused by a bacterium from the appearance of the throat.
- *explain the differences between viruses and bacteria*
Viruses consist only of genetic material with a coat of protein surrounding it. They do not have any of the mechanisms of a cell to enable them to reproduce. Viruses reproduce by invading the living cell of another organism and using the mechanisms of that cell to make more viruses. Bacteria on the other hand are complete cells and can reproduce by themselves.
- *explain why antibiotics do not have any effect against viruses*
Antibiotics damage the bacterial cells so that they cannot reproduce. They do not have any effect on human cells because these are different from bacterial cells in some important ways. This is why antibiotics are so useful against bacterial infection and have so few side effects. Any medicine which kills viruses is likely to also harm the human cells in which they have to live.
- *explain how overuse and misuse of antibiotics leads to the development of resistance*
Bacteria reproduce very rapidly and so can evolve very rapidly. Every time antibiotics are used, a few bacteria which are more resistant survive while the others are all killed. These resistant bacteria are the ones which then reproduce and go on to infect someone else. Gradually more and more bacteria becomes resistant as this keeps happening.
- *explain the serious consequences for everyone of antibiotic resistance*
You may think it makes no difference if you take unnecessary antibiotics just once but if everyone does this and bacteria become resistant to all the known antibiotics, then when someone is seriously ill doctors will be unable to treat them and they will die. This has already happened a few times in some hospitals.
- *explain the difference between a preventive measure like vaccination for measles and a cure like antibiotics*
Because it is so hard to treat viral diseases it is much better to prevent them. There are vaccines against many common diseases, but not unfortunately against the common sore throat. A vaccine contains a small part of a microorganism, or a weaker strain that will not cause disease. Once vaccinated, your immune system will quickly recognise the same virus or bacterium as soon as you are infected. Your immune system will kill the microorganism before it makes you ill. Vaccine will have no benefit once the virus is already growing inside your cells and making you ill, but white blood cells of the immune system will fight the virus by producing antibodies that destroy the microorganism. This is why you get better after a few days.