In 1940 there were 400 000 cases of measles in the UK and 860 people died.

In 2015 there were 1 200 cases of measles in the UK and 0 people died.

(In 1998 a fraudulent doctor (Andrew Wakefield) made a false claim that the MMR vaccination is harmful. As a result of the hoax, many parents refused to immunise their babies – and for a few years there was in increase in cases of measles. The doctor was later 'struck off' and not allowed to practice as a doctor)

ANTIBIOTICS AND PAINKILLERS

Antibiotics are a very important group of medicines which kill bacteria. They have no effect on viruses. They are specific: Specific bacteria are treated by specific antibiotics. Penicillin was the first antibiotic to be discovered in 1928. Since then, scientists have developed a large number of other antibiotics.

Antibiotics destroy bacteria in different ways: Some weaken the cell wall of bacteria – so that they burst; some stop bacteria from reproducing.

Tuberculosis – TB for short – is a disease caused by bacteria. Up until the mid 19th century it was the commonest cause of early death in Great Britain. It killed 20% of the people it infected.

The bacterium usually infects the lungs. It breeds and coreads slowly in the lungs and other parts of the body. It is a chronic (long-team) illuess. An infected parton will feel weak because their lungs are damaged and sugas-ous exchange can to take place properly. They will begin to cough a lot and eventually cough an block. They may have chest pains and high temperature. They will get weak event veaker until they die.

TB is spread through the air. When an infected person coughs or sneezes, tiny droplets spread in the air. These will contain the TB bacteria. Other people may breathe them in. People seem most likely to get infected if they live in crowded conditions.



In 1913 there were 36 000 deaths from TB in the UK. Since then antibiotics have been developed which can cure it. In 2013 there were 280 deaths.

The antibiotics which cure TB take a long time to work. You have to go on taking them for a long time – usually several months. Many people are bad at doing this and stop taking them when they feel better. Then the disease can come back again. And this can also increase the

If someone goes to the doctor with a bad cold, the doctor cannot cure it. Colds are a viral disease – and antibiotics only work on diseases caused by bacteria.

Also, because pathogenic viruses live inside body cells, it is difficult to kill the virus without damaging the cell.

The doctor might prescribe **painkillers** like paracetamol – or other medicines. These will treat the symptoms of a disease – but not destroy the pathogen.

DISCOVERY AND DEVELOPMENT OF DRUGS

Traditionally drugs were extracted from plants and microorganisms.

- The heart drug **digitalis** originates from **foxgloves**.
- The painkiller **aspirin** originates from **willow**.
- Penicillin was discovered by Alexander Fleming from the Penicillium mould.

Most new drugs are synthesised by chemists in the pharmacevice incostry. However, the starting point may still be a chemical extracted from the pharmacevice incostry.

Any new drugs have to got brough many tests and rials before they become available to the public to make sure that they are a final effective.

1. First they are tested in a laboratory on live cells grown in a Petri dish, then on tissue and then on animals. These first tests are mainly finding out if the drug works – that it does what it is supposed to do - testing the **efficacy** of the drug.

This first stage is called Preclinical testing

If a drug passes the preclinical testing then clinical testing takes place – this means using humans

- 2. Very low doses of the drug are given to healthy volunteers or some patients. Here we are finding out whether the drug is **toxic** or if there are any harmful **side effects**.
- 3. If the drug is found to be safe, further clinical trials are carried out on a small number of sick patients to find how well it works (the **efficacy**) and to find the safe dosing volume (the **optimum dose**) for the drug