

History, Medicine through time

Lesson 22 of 30

## **Worksheet:**

**How far did treatment advance in the 20th century?**

Mr Prudden



# Magic bullets

The term '**magic bullet**' is used by scientists to describe a chemical cure that attacks **germs** in the body causing disease, with no after effects.

In the late 19<sup>th</sup> century, more **germs** causing specific diseases were being discovered resulting in scientists starting to search for substances to attack and destroy these **germs**.

Doctors now understood that the body produced antibodies which fight diseases that had previously infected it – this is how **vaccines** work. So scientists started searching for artificial chemical antibodies that would work in the same way, attacking the infection without harming the body.



## The discovery of magic bullets

Since the Renaissance, **syphilis** had been treated with mercury, a poisonous chemical. In the early years of the 20<sup>th</sup> century, mercury was still being used to treat **syphilis**. In the early 20<sup>th</sup> century, a scientist called **Paul Erlich** tested hundreds of arsenic **compounds** to find a cure for **syphilis**. By 1907, he had tested over 600 compounds, but had not found a cure. In 1909, a Japanese scientist re-tested all of the compounds and found that compound 606 cured **syphilis**. The drug was named **Salvarson 606**, and became the first **magic bullet**.

In 1932, **Gerhard Domagk** discovered that a red dye called **Prontosil** killed bacterial infections in mice. He tested **Prontosil** on his daughter who was suffering from blood poisoning and she was cured. In 1938 British scientists developed **M&B 693**. This successfully treated **Winston Churchill** for **pneumonia** during World War Two.



# The development of antibiotics

An antibiotic is any treatment that destroys or limits the growth of bacteria in the body. The first antibiotic was **penicillin**. **Penicillin** was different to **magic bullets** because it was created using **microorganisms**, not chemicals. **Penicillin** was isolated from a mould sample by **Alexander Fleming** in 1928 and developed into a usable treatment by **Florey & Chain** in 1940.

Following the discovery of **penicillin**, scientists investigated moulds and fungi in search for more antibiotics. **Streptomycin** was discovered in 1943 and cures **tuberculosis**. In the 1950s and 1960s even more antibiotics were discovered.

In the 21<sup>st</sup> century, **pharmaceutical companies** still test substances and develop new antibiotics. This is because some bacteria have developed resistance to the antibiotics we already use. Scientists fear that these will become ineffective against the diseases that we think we have beaten.



# High-tech medicine

The advances in science and technology that have taken place since 1900 has made it easier to create and provide drugs to treat disease. For example:

- The mass production of **pills** made it easier to get drugs to people.
- The development of **capsules**, which dissolve in the stomach to release the drug, means taking drugs to treat disease is easier for people.
- **Hypodermic needles** allow the precise dose of a medicine to be given directly into the bloodstream.
- **Insulin pumps** for young people suffering from **diabetes** deliver **insulin** without the need for injections.



# High-tech hospital treatments

Patients in hospitals have also benefited from high-tech treatment. The beginning of the **National Health Service (NHS)** in 1948 meant everybody, rich and poor, had access to the same medical treatment. For example:

- **X-rays** were developed from the 1890s. Doctors now used them to target and shrink tumours inside the body, using a treatment known as **radiotherapy**. Combined with **chemotherapy**, this can effectively treat many types of previously incurable cancer.
- **Dialysis machines** 'wash' the blood of patients with kidney failure and keep kidney patients alive until a transplant becomes available. The first **dialysis machine** was in action in 1943.
- **Heart bypass machines** perform the functions of the heart and have become smaller and more portable.
- Better **prosthetic limbs** are now produced, partly in response to the number of soldiers surviving bomb attacks in recent wars in Iraq and Afghanistan.

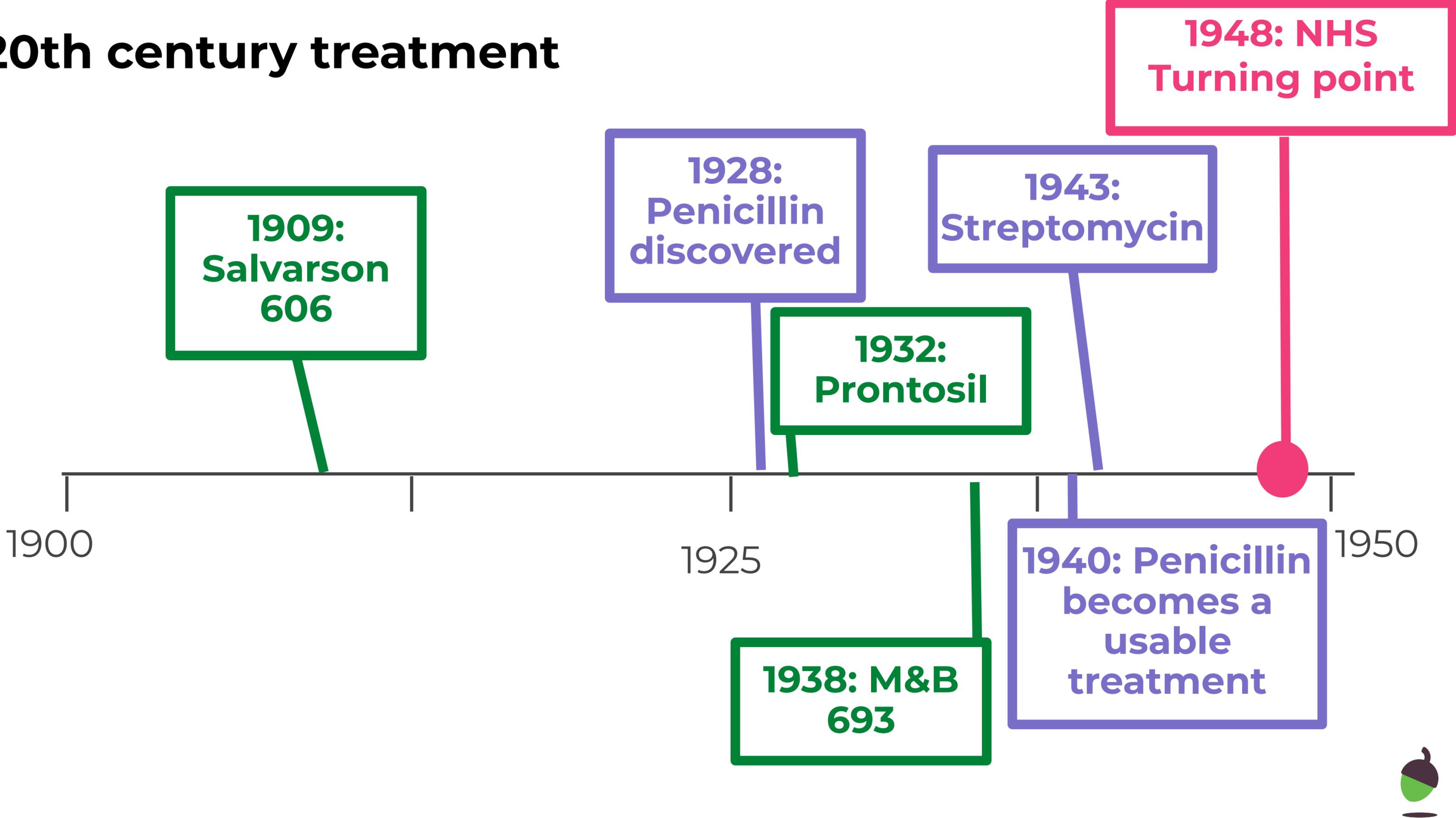


# High-tech surgical treatments

- **Organ surgery:** The first successful kidney transplant was performed in 1956, lungs from 1963, and livers and hearts from 1967. The first successful heart transplant was carried out in South Africa by **Christian Barnard**. Organ surgery was made possible by improved surgical techniques, including the use of **microsurgery** to reattach tiny nerve endings and blood vessels.
- Since the 1980s, **keyhole surgery** uses tiny cameras and narrow surgical instruments so surgeons can operate inside the body through tiny incisions, which results in quicker healing and less trauma to the body.
- Surgeons can now use computers to control instruments inside the body, allowing for more precise surgery and smaller cuts. This is particularly useful when precision is of vital importance like in brain surgery.



# 20th century treatment



# 20th century treatment

**1948: NHS**  
**Turning point**

**1953: Heart  
bypass  
machine**

**1963: Lung  
transplant**

**1972: Hip  
replacements**

**1985: Computer  
assisted surgery**

1950

**1956:  
Kidney  
transplant**

**1967: Liver  
& heart  
transplant**

1975

**1980s:  
Key-hole  
surgery**

2000



# Glossary

- **Compound** A mixture of two or more different elements.
- **Diabetes** A disease in which the body's ability to produce or respond to the hormone insulin is weakened, resulting in high levels of sugar in the blood.
- **Germs** A **microorganism** that causes disease.
- **Insulin** A simple sugar which is an important energy source in living organisms.
- **Pharmaceutical companies** These test substances and develop new antibiotics.



# Glossary

- **Pneumonia** The inflammation of the lungs due to an infection.
- **Syphilis** A sexually transmitted disease.
- **Tuberculosis** An infectious bacterial disease characterized by the growth of nodules (tubercles) in the tissues, especially the lungs.
- **Vaccine** An injection into the body of killed or weakened organisms to give the body resistance against disease.



# Comprehension Questions

1. What was the first magic bullet?
2. What is the difference between a magic bullet and an antibiotic?
3. Describe three ways improved technology has made it easier to provide people with medicine.
4. Describe three ways improved technology has improved surgery since 1900.
5. Challenge question: How far do you agree that science and technology has made the biggest difference to the development of treatments since 1900?

**You may want to use the following sentence starters to help you.**

*In some ways science and technology has made the biggest difference to the development of treatments since 1900. For example...*

*However, in some ways... [Hint: Paul Erlich, Alexander Fleming and Christian Barnard]*

*Overall, I mostly agree that...*

