

WAR

- **Alexander Fleming** was a bacteriologist who studied the terrible impact of the **staphylococcus germ** on wounded soldiers during the **First World War**. Many soldiers were dying as a result of the infections they were receiving from their wounds.
- In June 1941 **Howard Florey and Ernst Chain** visited the US government to secure funding in order to continue mass producing **Penicillin** (the **antibiotic** that was able to kill the staphylococcus infection) As the USA had just joined the **Second World War** they agreed to fund several drug companies millions of dollars in order to produce millions of gallons of Penicillin.
- The **First World War** led to huge developments in: **plastic surgery** as a result of **Harold Gillies** who set up plastic surgery units that toured the battlefields performing skin grafts for men with appalling injuries, the **X-Ray machine** was also used for the first time during WW1 to locate bullets and shrapnel



The mass production of penicillin led to **2.3 million doses** being available to treat the wounded allied soldiers during D-Day in WW2 (1944) It has gone on save an estimated **200 million lives** in 70 years!



The Labour government began providing free treatment via the National Health Service in 1948. The **8 million people** who could not afford to see a doctor in Britain now had the chance to do so.

GOVERNMENT

- The British government donated **Florey and Chain £25** in 1939 in order to continue their research into the healing properties of **Penicillin**. Although not a huge amount it allowed them to continue their research by making enough of the drug to successfully test it on both mice and the first human patient of the drug, Albert Alexander.
- The British **Liberal Government** of the early 20th century introduced the first series of **social reforms** that had an impact on improving the health of the nation, these included: **free school meals**, **free medical inspections for children**, **old age pensions**, **labour exchanges** to help people find work and the **National Insurance Act** (1911) that protected people if they were too ill to work.
- In **1948** the **Labour Government** listened to **William Beveridge's** suggestion of providing **free healthcare for all** by introducing the **National Health Service (NHS)**. Hospitals became nationalised (under the

The Impact of the Medical Factors on Medicine in the 20th

INDIVIDUAL GENIUS

- With a little bit of help from 'chance' **Alexander Fleming** was able to make the discovery of Penicillin when the bacterium itself blew in through an open window and settled on a petri dish in his lab, killing the sample of staphylococcus bacteria he was studying, he was clever enough to realise that there was something in this and went on to publish his findings in a medical report. This was read by **Florey and Chain** who trialled the Penicillin drug by mass producing it in milk bottles, bed pans and a bath in order to grow enough of it to test (successfully) on the first human patient.
- **Charles Booth and Seebohm Rowntree** both wrote reports that made a clear link between poor living conditions and ill health. Rowntree's report (1901) showed that 28% of people in York couldn't afford basic food and housing, this led to the Liberal government introducing the first major social reforms of the time.
- **William Beveridge** published a report in 1942 (the **Beveridge Report**) suggesting that the government had a duty to care for all of its citizens. He suggested that a **welfare state** was created to provide for those in need for a series of grants and loans. He also suggested a **National Health Service** was available providing free



Archibald McIndoe was a plastic surgeon who carried out over 4000 operations on airmen who had suffered terrible burns from their aeroplanes crashing during WW2. He used skin grafts to reconstruct faces and hands destroyed by fire.



2000 litres of penicillin were needed to treat one patient. By 1943, 425 **million units** were being produced in tanks like those pictured—enough for 75 patients.

SCIENCE & TECHNOLOGY

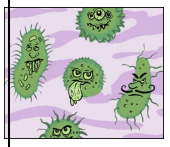
- **X-Rays** were discovered by **Wilhelm Rontgen in 1895** when he realised that they pass easily through soft flesh, but less through bone. By **1914** the Polish Scientist **Marie Curie** developed **mobile X-ray units (called 'petite curie's')** that were able to be transported around the battlefields to treat injured soldiers.
- **Skin grafts** were improved for patients with terrible facial injuries by the introduction of the '**pedicle tube**' idea by **Harold Gillies**. This is a technique where skin is partially cut from the healthy part of a patient's body, grown in the tube and then attached to the damaged area of the patient to cover any scarring.
- **Francis Crick and James Watson** were able to use the strongest microscopes available at the time to identify the **double helix DNA structure** which maps a person's genetic code. As a result of this many **hereditary illnesses** (diseases people are born with) can be better understood and treated before leading to more serious issues.

Year 11 History Mock Exam—Core



1847—Ignaz Semmelweis told the doctors working in his hospital to wash their hands in chlorinated water before delivering babies in the maternity wards after they'd been dissecting corpses in the post mortem room. **He was mocked and made fun of and eventually declared insane!**

1864—Louis Pasteur makes the discovery that disease isn't caused by miasma or an imbalance of the humours by proving that **germs cause illness!** He proves that if bacteria can cause liquids to turn sour and animals to become sick then they must have the same impact on humans. Cleanliness starts to be taken more seriously in medicine.



1867—Joseph Lister reads about Pasteur's Germ Theory and becomes convinced that **bacteria is the cause of infection** in operating theatres. After experimenting with carbolic acid to prove that it's successful in killing the bacteria in raw sewage he applies the theory to surgery by wrapping wounds in bandages soaked in carbolic acid. Very soon the infected wounds start to show rapid signs of healing!

Reasons for its success:

- Carbolic acid did work and reduced the amount of people dying from infections to **15% from 45%!**
- It proved that Pasteur's germ theory was correct in that infections did lead to death if not treated.
- It led to aseptic surgery which saw every part of an operating theatre

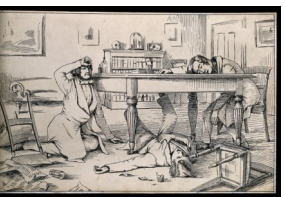
Joseph Lister's Carbolic Spray Gun

(the first antiseptic germ killer!)



Other notable 19th century surgical developments

James Simpson accidentally discovered the anaesthetic properties of chloroform after accidentally knocking over a bottle of the stuff whilst researching chemicals to use as anaesthetics with his surgeon friends. All of the men became unconscious! **The first effective chemical anaesthetic had been discovered!**



Reasons for opposition:

- The carbolic spray gun soaked everything causing surgeons to suffer from sore hands due to the acid.
- The machine itself was costly and frequently broke down, many could not be bothered with the hassle!
- Some doctors and surgeons still refused to believe that bacteria could cause disease so chose to ignore the spray entirely!

The problem of stopping patients dying from heavy blood loss was solved by Lister's carbolic acid idea! Ligatures used to tie up veins and arteries were now soaked in carbolic acid to stop the spread of infection into a wound. The use of ligatures in operations now became common.

Medical Development	Edward Jenner's Smallpox Vaccination
Impact	Proved that vaccination was safer than inoculation. By the 1800's doctors were using his technique in America and Europe. In 1853 the British government made smallpox vaccination compulsory.
How was it developed?	Experimented on human subjects by giving them cowpox then smallpox. Patients did not die from smallpox. Repeated this 23 more times, the results were positive every time.
Who supported it?	British government donated Jenner funds to make more of his vaccine and to create smallpox clinics across the country where people could be vaccinated for free.

What was the impact of the medieval church on medicine?

Medical Development	Alexander Fleming's discovery / Howard Florey & Ernst Chain's mass production of Penicillin
Impact	Proved to be the world's first antibiotic—it could kill the staphylococcus germ that caused death by blood poisoning. Its use reduced the numbers of Second World War soldiers dying from infections to just 15%.
How was it developed?	Fleming discovered it by chance but Florey and Chain developed ways to produce more of it by mass producing more of it in their lab. This led to the first successful use on a human patient to cure a serious infection.
Who supported it?	The British government could only afford to fund Florey and Chain £25 as they were more interested in funding the war effort in 1939 but the US government saw that Penicillin worked and so funded them millions of dollars to make millions of gallons of it.

Positive impacts of the church on medicine in the Middle Ages	Negative impacts of the church on medicine in the Middle Ages
<ul style="list-style-type: none"> • The first hospitals were built in monasteries in the 12th/13th centuries as places to tend to the sick. • Medical books were hand copied by Monks and kept in monastery libraries. This helped to save and spread medical knowledge. • The first medical universities were set up by the church in order to train doctors using Galen's age old methods. 	<ul style="list-style-type: none"> • The church taught that illness was a punishment from God, they did not approve of anyone trying to find new cures apart from prayer and worship. • They taught that the Roman Doctor Claudius Galen should never be questioned. Galen believed in one God creating humanity, questioning Galen was also questioning the church. • The church banned dissection of human corpses meaning that nobody could investigate human anatomy for themselves to correct Galen.