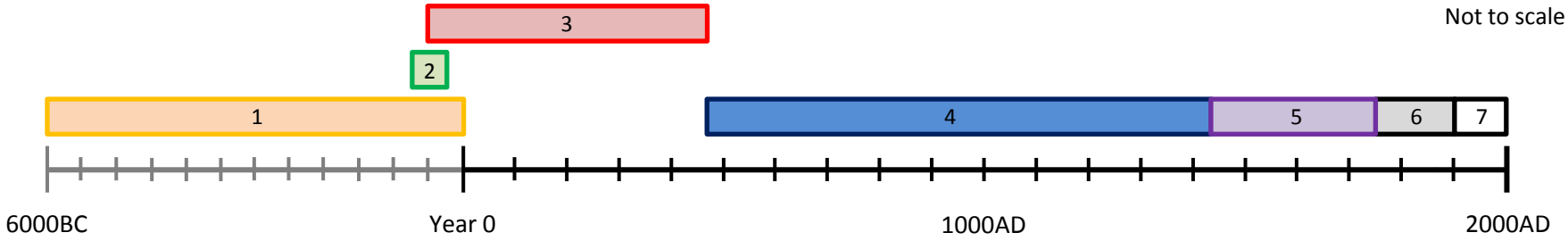
History Knowledge Organiser: Britain: Health and its People (c.1000-present day) Overview



Period	Beliefs	Key developments and events		Individuals		
1. Ancient Egypt 6000-30BC	An extremely religious but well organised society which was centred around the river Nile.	The written word Early farming		Imhotep		
2. Ancient Greece 800-338BC	A religious series of city states which focused on **education**, **philosophy** and **beauty**.	Science Philosophy Dissection	The Library of Alexandria The Olympics Hippocratic medicine	Aristotle Hippocrates		
3. Ancient Rome 510BC-476AD	A vast empire which focused on **strength** and **warfare**. Tolerant and accepting of other beliefs.	Hospitals (army) Buildings/ engineering	Continuation of Hippocratic medicine Early Christianity	Galen (also Greece)		
4. The Middle Ages 476-1445AD	A period of **turmoil and recovery** after the Fall of Rome. The rise of the Catholic Church.	Fall of the Roman Empire The Black Death	Islamic/Christian medicine	Bacon Rhazes Ibn-Sina	Ibn Nafis	
5. The Renaissance 1492-1750AD	An age of **discovery**, where people refocused on **education**, **philosophy** and **beauty**.	The Printing Press The Great Plague Challenging Galen	The 'New World' The Reformation Renaissance Art	Vesalius Harvey Paré	Paracelsus Gutenberg	
6. The Enlightment/ Industrial Revolution 1750-1900AD	A period with a huge boom in **population**, a focus on **science** and **eventual government help**.	Dissection Cholera outbreaks Germ theory	Public Health Acts Antiseptic/aseptic surgery Anaesthetics	Jenner Hunter Pasteur	Koch Simpson Lister	Halsted Snow Chadwick
7. Modern Day 1900AD-Today	A period of **governmental involvement** in public health and **science and technology**.	Magic Bullets World War One World War Two	The welfare state The NHS Antibiotics	Ehrlich Lloyd George Beveridge	Bevan Gillies McIndoe	Fleming Florey & Chain

History Knowledge Organiser: Prehistoric and the Ancient World

Prehistoric medicine:

- As most prehistoric people were nomadic, there were no governments and no public health systems. They were hunter-gatherers. They had little time to consider how their bodies worked.
- People would live in small groups and would move on to a new location before waste could build up and become dangerous.
- The nomadic lifestyle would have encouraged physical fitness and although in some areas starvation would have been a problem, in some areas people may have had a good diet.
- It is possible that prehistoric people would have developed a basic knowledge of herbal remedies which they could pass down generations.
- There is evidence that prehistoric people performed some successful operations: skulls have been found with evidence of trephinations (the removal of a section of skull) and bone growth. This suggests that the patient survived for some time after the surgery.

Ancient Egypt

- Ancient Egyptians did not have sewers, public baths or piped water.
- The majority of Egyptians had toilets in their homes, although these were not connected to any sewers.
- Despite the lack of public health facilities, they placed huge religious importance on cleanliness and appearance: most ancient Egyptians wore eye makeup which protected their eyes and many slept under mosquito nets.
- Priests in particular focused on keeping themselves and their religious instruments clean.
- Ancient Egyptians had no anaesthetics and only had access to herbal anti-septics, such as binding wounds with willow leaves. As a result, they did not conduct internal or invasive surgery
- The Ancient Egyptians mummified their dead. The process of embalming meant that they gained knowledge about the different internal organs. However, a lot of this knowledge was inaccurate. For example, they thought the brain was only a mechanism for cooling the body.
- Egyptian doctors believed that the gods and spirits caused disease by disturbing the normal operation of the body. As a result, natural and supernatural cures were used. Often a charm would be used to make a natural remedy stronger.
- The Ancient Egyptians watched the Nile and believed the body worked in the same way: channels leading from the heart which could be blocked. They believed people could be cured by "unblocking channels" in the body through purging or bleeding. This is similar to the four humours.

Key Terms	Definitions
Nomadic	Moving from place to place rather than settling.
Trephination	'Drilling' into the skull of someone to release the spirits that are making them ill.
Hieroglyphics	A form of writing introduced in Ancient Egypt. A series of 'symbols' that form the written word.

Ancient Greece:

- There was little government involvement in public health: there were was no running water and there were no sewers.
- **Hippocrates** accepted that most Greeks would be too poor or too busy to follow a programme of health and so would be less healthy.
- In early Greece, free Asclepions were the focus of healing. These were temples but also acted as health spas and gyms. Despite the emphasis on eating well, resting and bathing, whether you were cured or not was attributed to Asclepius, the god of healing.
- Hippocratic medicine focused on observation and diagnosis. This consisted on balancing the four humours of the patient by:
  - Heating or cooling the patient
  - Treating a fever by keeping the patient cool and dry.
  - Bleeding or purging the patient.
- Unusually, dissection was allowed in Alexandria. Most Greek doctors had to dissect animals such as pigs. This caused inaccuracies. As this city was in Egypt, the Greeks could also gain knowledge about anatomy from the Egyptians and from their practise of mummification.

Ancient Rome:

- The Romans had the first ever centrally organised public health system..
- The Romans initially built hospitals to tend to their soldiers. These later became valeudinaria, which were free hospitals for the public. However, these hospitals focused on first aid and good living.
- There were various theories about the different causes of disease: for example; Galen followed Hippocrates and believed disease was caused by an imbalance of the four humours.
- Many Romans still believed that diseases were punishments from the gods.
- Herbal and other practical cures were popular. The Romans had no anaesthetics and only had access to herbal anti-septics. As a result, they did not conduct invasive surgery.
- However, working with gladiators and the roman army meant that doctors had a lot of experience with first aid and external surgery, such as removing skin tags and draining swellings.
- **Galen** – A Greek doctor who moved to Rome and made the concept of the four humours popular. His ideas were followed well into the Renaissance.

History Knowledge Organiser: The Middle Ages

Public Health

- Many of the public health systems built by the Romans were destroyed or dismantled after the fall of the Roman Empire.
- People lived in close proximity to animals and waste.
- However, some kings /town councils passed laws to clean up cities, although these were often ineffective due to difficulties enforcing them.
- Most towns and cities hired gongfarmers, who cleaned out cesspits as they recognised that living near a cesspit was unhealthy.
- Towns were generally dirty places. Some had paved streets, but in in small towns this was not the case and streets would become muddy after rain. Open drains ran down through the streets and would often overflow, including privies.
- Streets that were lived in by the wealthy had their streets swept by servants, but in poorer areas streets stank and were littered with waste.
- Between 1250 and 1530 the population grew as did the towns which impacted on the health facilities.
- Mayors and councillors knew that in order to make improvements they needed money which meant introducing taxes which would be unpopular. Also, the lack of sanitation came from the fact that there was no knowledge of germs or a link to disease and infection.
- Some monasteries had running water and washrooms. However, most of these were closed to the public.
- This was also a period in which the first hospitals were built since the Roman Empire (explored in more detail in Christian and Islamic medicine).
- Doctors such as Guy de Chauliac and Alderotti emphasised the need for exercise and a good diet.
- Eventually, the increase in trade also introduced diseases such as the bubonic plague (1348).

Where was Public Health better in the Medieval period?

- Monasteries and abbeys were often situated in isolated places, near to rivers. Water was an important resource to monks. They used it for their mills and supplying water to their kitchens, bakeries and brew houses.
- Monasteries had elaborate systems of pipes to deliver their water. They also had filtering systems.
- Most monasteries had excellent facilities for washing where waste could be emptied into a nearby river. They would clean themselves in a room called a lavatorium. They had toilets too.
- Monks had religious routines of cleanliness.
- Baths were rare luxuries for the rich, but monks had to use them. Some monks had a bath once a month.
- Monasteries had infirmaries with a good supply of water and had leeching houses where patients could be bled.
- Monasteries and abbeys were wealthy places as people gave them money, valuables and land in return for prayers.
- In general, their conditions were better because of their health facilities. Their isolation also kept them away from some of the worst plague outbreaks seen in England.

Key Terms	Definitions
Gongfarmers	Cleared out cesspits.
Cesspits	A pit where waste would be put.
Privy	Outside toilet.
Miasma	Bad air.
Bubonic plague	Spread by fleas, buboes on a persons groin, neck, armpit filled with pus. Also had high fever and vomiting.
Pneumonic plague	More deadly and spread by coming into contact with the victims breath (coughing) or blood.

The Black Death

- Historians believe that the Black Death was a combination of the bubonic and the pneumonic plague.
  - People during the Middle Ages believed it was caused by a number of things:
  - Position of the star and planets
  - The Jews
  - God was punishing them for their sins
  - Bad air (miasma).
- The real cause of the Black Death was a bacteria called *yersinia pestis* which thrived in the stomachs of fleas that lived on the blood of rats. When the rats dies of the plague, the fleas would move on to humans.
- The Black Death spread quickly for a number of reasons: crowded ports and towns (people lived close together) and authorities had no idea how to deal with the outbreak. They may have had simple laws on how to keep the streets clean, but not everyone practiced cleanliness!
  - To try and deal with the plague people tried anything:
  - Shaving a chickens bottom and attaching it to the buboes.
  - Drinking mercury.
  - Flagellation (although not that common in England) – whipping themselves to show penance to God.
  - Popping buboes.
  - Rubbing toads/frogs on the buboes to draw out the poison.
  - Some fled and put themselves into quarantine (isolate themselves)

History Knowledge Organiser: The Middle Ages

Consequences of the Black Death

- Had a huge impact on society – economically and socially.
- Food shortages – towns and cities faced these shortages as nearby villages could not provide enough food. Medieval lords moved to sheep farming since this required fewer workers, this in turn impacted on the production of food overall.
- Inflation occurred – the price of food went up creating hardship for the poor.
- Peasant wages – laws at the time stated that a peasant could not leave the village unless they had permission from the Lord. After the Black Death they encouraged people to leave the village where they lived to work for them. This allowed peasants to start to demand higher wages. This led to the Statute of Labourers being drafted in 1351 which said what a peasant should earn.
- The opinions of the Catholic Church changed – some churchmen were accused of cowardice as they left their parishes to deal with the plague. It also lost a lot of clergymen due to the plague.

What did a Medieval doctor know?

- Followed the ancient Greek method of observation to produce a diagnosis.
- Tended to focus on two indicators – the pulse and the colour, smell and taste of urine. From this, the doctors might prescribe natural medicines made from plants, animal products, spices, oils, wines, and rocks.
- Used bloodletting. The cure often didn't work as the blood needed to be taken from the right part of the body.
- Other treatments also included making your vomit or got to the toilet.
- Remedies often contained both natural and supernatural elements.
- Still a belief in the four humours.
- To qualify as a doctor you could train for seven years listening to lectures and debating what they had read in books. It was possible to qualify without seeing a patient.
- Doctors learned from Hippocrates and Galen, along with Muslim, Indian and Chinese knowledge. They studied British medical textbooks which were based on Greek knowledge.
- Ordinary people turned to barber-surgeons as they couldn't afford to see a 'trained' doctor. They might also see a wise woman/man as well as turn to the church.

Key Terms	Definitions
Barber-Surgeon	Someone who could cut your hair and provide minor treatment.
Blood-letting (purging)	Blood removed by opening a vein or using leeches.
Leeches	Worm-like insect which sucks blood.
Leprosy	Contagious disease that eats away at a persons body.

- **Impact of Christianity:**

Help	Hinder
Education – medicine the second subject after religion to be taught.	Controlled the universities
Cleanliness – in monasteries, although this was not passed onto the wider population.	Training was to make the old ideas clear, not discover new ideas.
Lazar houses – hospitals which dealt with people's leprosy.	Continued the belief in Galen.
Hospitals – calm and clean surroundings. Dealing in different illnesses.	Role of the doctor was to predict symptoms and provide reasons why God might inflict the illness of a person.
Infirmaries in monasteries providing free treatment to the poor and needy.	

History Knowledge Organiser: The Middle Ages

Islam and medicine:

- Whilst Western Europe was experiencing a 'dark age', Islamic doctors made great contributions to medical knowledge.
- The Islamic empire was ruled by one man known as the Caliph. Caliph's provided peace and order needed for medical progress. Many Caliph's were interested in science and supported Islamic medicine.
- Caliph Harun al-Rashid (786-809) – the capital city of Baghdad became centre for translation of Greek manuscripts into the language of Islam: Arabic.
- The Caliph's library preserved hundreds of ancient Greek medical books by Hippocrates and Galen.
- Islam encouraged medical learning.
- In the Islamic Empire the first hospitals were set up for people with mental illnesses. These people were treated with compassion. This was different compared to Christian doctors who thought it was a punishment from God.
- Hospitals were built in many Islamic cities to provide medical care for everyone – whether they were rich or poor, Muslim or non-Muslim. Doctors were permanently present and medical students trained alongside them.
- **Al-Razi (Rhazes)** – stressed the need for careful observation. He distinguished the differences between measles and smallpox. He also wrote over 150 books. He did follow Galen, he thought that students should improve on the work of their teacher.
- **Ibn Sina (Avicenna)** – he wrote a great encyclopaedia of medicine called 'Canon of Medicine'. It was a summary (of a million words!) of the whole of Greek and Islamic medical knowledge. It listed the medical properties of 760 drugs and contained chapters on medical problems such as anorexia and obesity. It became the standard European textbook used to teach doctors in the West until the 17th century.
- Universities in Padua and Bologna in Italy became the best places to study medicine in Europe. Medical ideas taught here reached England through trade, as merchants brought new equipment, drugs and books.
- Islamic medicine did not allow dissection. However, a 13th century doctor called **Ibn al-Nafis** concluded that Galen was wrong about how the heart worked. He said that blood circulated round the body via the lungs. Unfortunately his books were not read in the West, so this meant that Europeans continued to accept Galen's mistake into the 17th century.

Was the preservation of the writings of the ancient Greeks and Romans the most important contribution that Islam made to medical progress?
16 marks
[4 SPaG]

Key Terms	Definitions
Caliph	Ruler of the Islamic Empire.
Bimaristan	Hospital in the Islamic cities
Barber-Surgeons	Combined hair cutting with small operations such as blood letting/tooth extraction.
Amputation	Cutting off painful parts of the body e.g. the leg.

Medieval Surgery

- Many surgeons were not as we would see a surgeon in the Middle Ages. Many were Barber-Surgeons.
- Compared with doctors the barber-surgeon were lower class medical tradesmen, who would treat the poorer classes.
- Surgeons learned their skills by being apprenticed to another surgeon. They would watch and copy, and often learned on the battlefield.
- Bloodletting – this was done to restore the balance of the humours. Blood was allowed to run out of a small incision in the arm.
- Amputation was a common treatment.
- There were also successful cases of treating breast cancer, bladder stones and haemorrhoids.
- Much surgery took place on the battlefield. In everyday life, surgery would be a last resort.
- Patients faced problems of pain, shock and blood loss.
- There were some attempts to put the patients to sleep, but there was no form of anaesthetics as we know today. Often opium would be used.
- Cauterisation was a common method during this time where the wound would be burnt to seal it.
- Tools – saws, arrow pullers, cautery irons and blood letting knives.

History Knowledge Organiser: The Middle Ages

Medieval Surgery:

- Science of surgery in Western Europe and in the Islamic Empire was advanced during this period by surgical pioneers who tried new methods.
- Their books were read in Latin by educated and religious men in Europe and they were translated into English in England.
- By the end of the 14th century, English doctors and surgeons could read the ideas of many surgeons.

Abulcasis

A Muslim surgeon considered the 'father of modern surgery'. He wrote a 30 volume medical book (*Al Tasrif*), in 1000. he invented 26 new surgical instruments and described many new procedures including the use of ligatures for tying off blood vessels.

Frugardi

He wrote a textbook on surgery called *The Practice of Surgery* in 1180. it was widely used in Europe and he warned against the use of trepanning which was a common procedure during this time. He tried ambitious operations on the chest and attempted to remove bladder stones.

Hugh of Lucca and son Theodric

Famous surgeons at Bologna University, Italy. They wrote a book in 1267 criticising the view that pus was needed for a wound to heal. They used wine on wounds to reduce the changes of infection and had new methods of removing arrows. Despite the fact they were ahead of their time, their ideas about preventing infraction went against Hippocratic advice which was not popular.

Mondino

In 1315, a public dissection was allowed in Bologna supervised by Mondino. In 1316, Mondino wrote a book called *Anathomia* which became the standard dissection manual for 200 years. Dissections were introduced in most European universities to train doctors and to show them that Galen was correct. Even if the body did not fit Galen's description, they did not doubt Galen.

De Chauliac

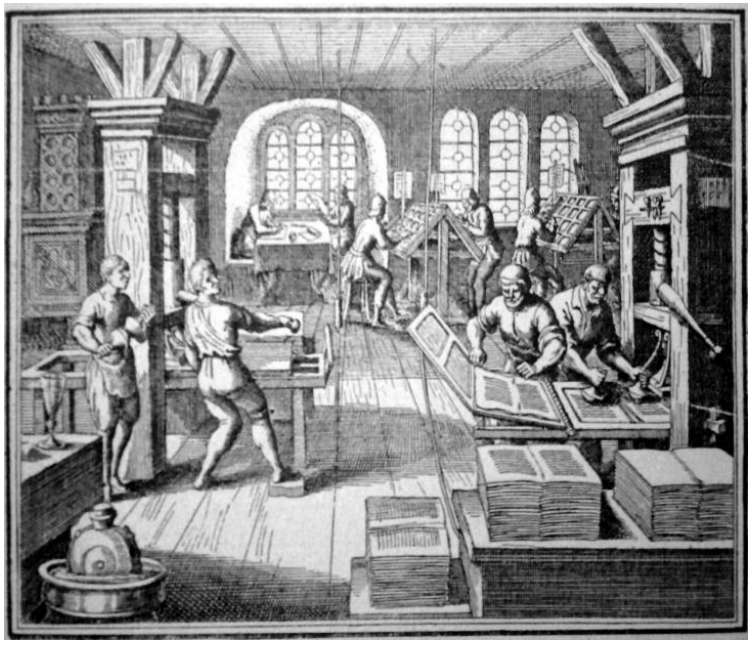
One of the most famous surgeons. He wrote a famous textbook called *Great Surgery* (1363) which dominated English and French knowledge for 200 years. Contains references to Greek and Islamic writes such as Avicenna, and he quotes Galen about 890 times! He did not like Theodoric of Lucca's ideas about preventing infection.

John of Arderne

The most famous surgeon in Medieval England. His surgical manual was called *Practica* (1376) and contained illustrations of his operations and instruments. Based on Greek and Arab knowledge and his experience in the Hundred Years War. He used opium to dull pain. He charged a large fee for an operation he developed to treat anal abscesses – a common complaint of knights! In 1368, he tired to separate surgeons from lower-class barbers by forming a work association canned the Guild of Surgeons within the City of London.

History Knowledge Organiser: The Renaissance

- Renaissance means ‘re-birth’. In this case of ‘old’ ideas but with the scope to build on and possibly improve. There was a thirst for learning. People began to ask questions, find evidence themselves and experiment with new ideas.
- For centuries, people had believed what the church had told them therefore believing the church had all the answers. Amongst the educated people, there was a belief that they could find the answers.
- Scientist experimented, traders explored and more accurate maps were made, doctors tried different treatments, and artists used new methods to make their drawings/paintings more life like.
- Before this period, books were rare and expensive. Knowledge was therefore restricted to people who could afford an education or had access to these books.
- As more people read about the Ancient World they wanted to share their discoveries and this is where the printing press becomes particularly important during the Renaissance.
- The printing press was invented in 1451 – this allowed them to print pages more quickly than ever before (as books were copied out by hand). As a result, more books were printed meaning more people had access to them.



Key Terms	Definitions
Renaissance	‘re-birth’ of old ideas.
Hypothesis	A suggested idea usually given on limited evidence as a starting point for further investigation.

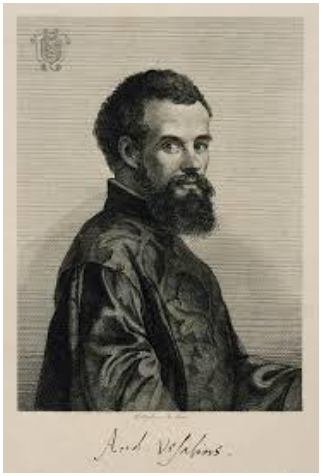
Consequences of the Renaissance:

New lands	Explorers, sailors and merchants used more accurate maps. Columbus founded America in 1492. this showed the value of finding new things and making discoveries. New foods and medicines were also brought back from this ‘new world’.
New ideas spreading quickly	Printing press allowed ideas to be communicated much quicker around Europe. Old and new books could be studied.
New style of art	A desire to show the human form as realistic as possible became apparent and allowed a more detailed study of the body to happen.
New learning	Scientific method of learning was adopted such as observation, hypothesis and experimentation. This was started very much from the works of the Greeks and Romans leading then to questioning of these old ideas.
New inventions	New technology such as gunpowder meant soldiers experienced new types of wounds. Doctors had to find out a way in which they could treat these wounds.

Due to the belief in questioning old ideas, the Renaissance sees some significant individuals who worked on specific areas within medicine.

History Knowledge Organiser: The Renaissance – Andreas Vesalius

Biography:



- 1516-1564, born in Belgium.
- Studied at the University of Paris where he was taught Galen's work.
- Became Professor of Surgery at the University of Padua in Italy.
- Dissected human bodies himself and carried out his own research to locate the best places for bloodletting.
- From his dissections, he began to identify the mistakes that Galen had made.

Vesalius and anatomy:

- Vesalius began to realise that Galen was wrong through his observations. One reason was that Galen dissected on animal bodies rather than human.
- Vesalius dissected on animals too to show where Galen had obtained his knowledge from. Galen had said that the breastbone was made up of seven parts (animal), rather than three (human).
- His lectures were popular and promoted dissection as a way to question the old ideas.
- He produced textbooks that were illustrated as accurately as possible. His most famous book is The Fabric of the Human Body (1543).
- The textbook not only had accurate drawings in it, it was also set out to explain how the different systems in the body worked, such as the skeleton and muscles.
- Vesalius faced heavy criticism over the fact he had proved Galen wrong.
- He had to leave his job in Padua and later became the doctor for Emperor Charles V of Spain.

Vesalius' contribution:

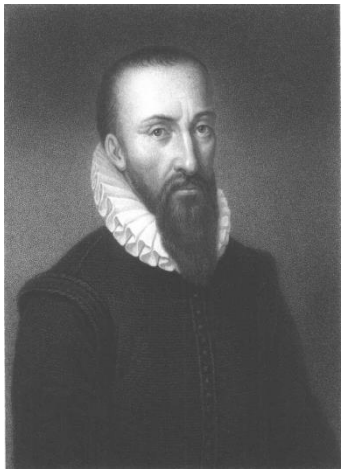
- Vesalius' work finally found an appreciative audience in England.
- In the latter half of the 16th century, many copies of Vesalius' book came to England where they influenced and inspired English surgeons.
- Vesalius' work finally overturned the work of Galen.
- He used the Renaissance approach of questioning and writing his findings down, as well as working on the actual body.
- Through dissection and his book, Vesalius introduced new ideas to the world.
- His work may not have led to any medical cures, it was the basis for better treatments in the future.
- Vesalius showed how to conduct proper dissections, and other anatomists followed his work in the 16th century such as Fabricius and Fallopius.

Compare medieval anatomy with Renaissance anatomy. In what ways are they different?

8 marks

History Knowledge Organiser: The Renaissance – Ambroise Pare

Biography:



- 1510-1590
- Surgeon for four French kings and he became the most famous surgeon in Europe.
- Published several books about his work.
- Pare had first learned surgery as an apprentice to his brother, who worked at a hospital in Paris.
- Then became a French army surgeon.

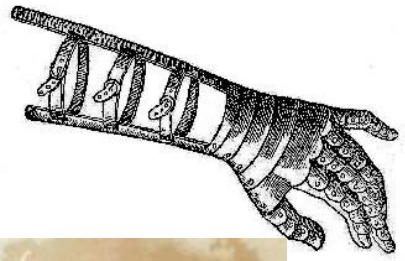
Treating gunshot wounds and bleeding:

- During this time, guns were fairly new inventions so treating gunshot wounds was something new. At first, surgeons thought gunshot wounds were poisonous.
- The traditional way of treating wounds was to burn them out using boiling oil. On top of the pain for the patient, this was agonising too!
- Pare initially used this method, but in 1537 he ran out of boiling oil. He therefore had to improvise and come up with his own solution.
- He used rose oil, turpentine, egg white to smear over the wounds (like a cream). Pare worried about the effects this would have on his patients, so decided to go and check on them later in the evening. When he arrived he found that those that had been treated with his cream were sleeping well and the wounds were healing quickly. This was in complete contrast to the other patients who had been cauterised. By **chance**, Pare had stumbled across a new method of treating wounds.
- Another methods that Pare promoted was the use of ligatures in amputations.
- The usual way to stop bleeding was to put a red hot iron on the wound (cautery).
- Instead, Pare used ligatures to tie around individual blood vessels, recommended by Galen.
- This was effective compared to cauterisation.
- He also designed the *bec de corbin* (crow's beak cap) to halt bleeding while the blood vessel was being tied off with a ligature.
- However, the problem with using ligatures was the risk of infection and the speed of using them was much slower than cauterisation.
- Pare also moved into the field of producing false limbs for wounded soldiers.

Key Terms	Definitions
Ligatures	String/threads to tie a wound up.
Cauterisation	Red hot iron placed on the wound to seal it.

Pare's contribution:

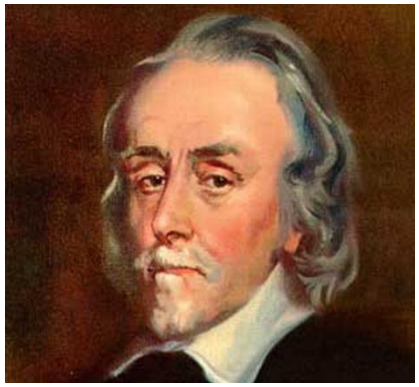
- Admired, read and learned from Vesalius' work.
- Pare's book *Works on Surgery* (1575) included large sections of Vesalius' work on anatomy.
- Pare greatly increased surgeons understanding of anatomy.
- His books circulate in Europe.
- English hand written translation of Pare's work was given to the library of the Barber-Surgeons of London in 1591. This was long before it was printed in English in 1634.
- In England there were a number of surgeons who followed Pare's approach to surgery: these surgeons observed, questioned and experimented new ideas.
- Pare influenced the work of an English surgeon called William Clowes who admired Pare's work and agreed with him that gunshot wounds were not poisonous.



History Knowledge Organiser: The Renaissance – William Harvey

Biography:

- 1578-1657
- English doctor who studied medicine at Cambridge and Padua.
- Worked at St Bartholomew's Hospital in 1609.
- Doctor to Charles I in 1632.
- Famous book *Motion of the Heart.* This was published in 1628.
- *"The blood must move in a constant circle and is driven by the heart's power".*



Galen's ideas under attack:

- Galen believed that blood was constantly made in the liver and used as a fuel that was burned up in the body.
- Galen also said that blood was passed from one side of the heart to the other through invisible pores.
- Although this had been challenged by the likes of Ibn al-Nafis and Avicenna, they were not believed.
- In the 16th century there were important discoveries about the circulation of the blood: Realdo Columbus said that blood moved along veins and arteries and Fabricius proved there were valves in the veins.
- William Harvey read what anatomists had said and decided to build up his own theory.

Harvey's theory of the blood:

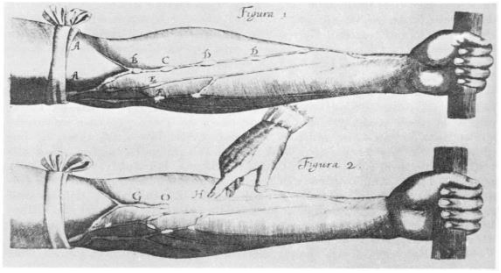
- From 1616, Harvey set about exploring ideas about blood circulation.
- He studied human hearts and also observed the slow-beating hearts of cold blooded animals to understand how the muscles worked.
- He pumped liquid the wrong way through valves in veins, proving that blood could only circulate one way round.
- Took him 12 years to publish his work because of his careful observations, experiments and note taking.
- Because his idea was so revolutionary there were aspects that he couldn't explain about blood and its circulation.
- Even with published work, Harvey did not know why blood in arteries was a different colour to the blood in veins. He could also not explain how blood moved from arteries to veins.

Key Terms	Definitions
Quack	Unqualified and often useless doctor.
Vein	Carries mainly oxygen-depleted blood towards the heart.
Artery	Carries oxygenated blood is pumped from the heart around the body.

Reactions to Harvey's discovery:

- Initially, reactions to his work were not positive. Critics said that blood couldn't be circulated and others simply ignored his ideas. Some rejected his ideas simply because they had questioned Galen. Some were even hostile who called Harvey a 'circulator', slang for a travelling quack.
- Despite all the criticism that Harvey received his theory was accepted by some in his lifetime, but it took another 50 years until the University of Paris taught his theories to medical students.
- His discovery was not immediately useful as further scientific discovery was needed.
- Blood could not be replaced or transfused until 1901 when blood groups was discovered by Landsteiner.

- **However, understanding of the circulatory system was vital at this point in time for surgery and the diagnosis of illness. Many modern treatments would not work unless this element was understood such as blood tests, blood transfusions and heart transplants.**



Explain the significance of the work of William Harvey for the development of surgery.
8 marks

History Knowledge Organiser: How scientific was 17th and 18th century medicine?

What treatments were available for ordinary people?

- Treatment still depended on what you could afford. Medical advice could come from different people:
  - **Barber surgeons** – poorly trained people who could give you a hair cut and perform minor surgery such as blood letting and tooth pulling.
  - **Apothecaries –** little or no medical training but sold medicines and potions.
  - **Wise women –** treatments often relied on superstition. They did have knowledge of plants and herbs.
  - **Quacks –** travelling salesmen who sold all sorts of medicines and 'cure-alls'.
- Bloodletting was the prevailing treatment and it was done regularly to prevent illness.
- People still had faith in the royal touch to cure the disease scrofula (disease that made glands swell).
- Herbal remedies were also important, usually passed down from generation to generation. Some worked, for example honey can kill bacteria and willow contains aspirin which can dull the pain.
- The printing press enabled ideas to be recorded in terms of herbal remedies and this is shown in Culpepper's work where he was highly critical of blood letting and purging.
- Explorers on voyages also brought back new natural medicines such as:
  - The bark of the Cinchona tree from South America which contained quinine. This helped treat malaria.
  - Opium from Turkey was used as an anaesthetic.
  - John Woodall was a military surgeon and used lemons and limes to treat scurvy in 1617.
  - Tobacco from North America was wrongly said to cure many conditions such as toothache and the plague.

Thomas Sydenham (1624-1689)

English doctor famous for recognising the symptoms of epidemic diseases such as scarlet fever, and for classifying illnesses and medicines correctly. He was critical of quack medicine and stressed for careful observation of symptoms. However, he dismissed the value of dissections and ignored Harvey's discovery. He used the usual bleeding methods in his work but he often advocated doing nothing and letting nature run its course when ill. His book *Medical Observations* (1676) became a standard textbook.

Key Terms	Definitions
Emetic	Substance that makes a patient vomit.
Purgative	Something that makes you go to the toilet.
Enema	Fluid that is injected into the bowel to clean it.
Scurvy	disease caused by a deficiency of vitamin C, characterized by swollen bleeding gums and the opening of previously healed wounds,

Charles II and treatments:

- In 1685, Charles II health failed him and one of his doctors, Sir Charles Scarburgh, recorded that the king had collapsed with a 'disturbance to the brain'.
- The king received 58 drugs, and he was purged, bled, blistered and cauterised.
- None of these treatments were helping the chronic kidney disease that killed him.
- It is also said that the treatments he was giving may have brought about kidney failure, for example the poisonous mercury treatments he was given for 'curing' syphilis.

We opened a vein in his right arm and drew off 16 ounces (425 ml) of blood, then another 8 ounces (212 ml). To free his stomach of all impurities we gave him an **emetic** and then a **purgative** to drain away the humours; to accelerate the purgative we gave him an **enema** and applied blistering agents to his shaved head. (2 February)

We gave him a purgative and drew off 10 ounces (300 ml) of blood from both jugular veins. (3 February)

Alas his Majesty's strength seemed exhausted: he was seized by a mortal distress in breathing, and died. (6 February)

This was taken from Charles Scarburgh work in 1685.

History Knowledge Organiser: The Great Plague 1665

What did people think caused the Great Plague?

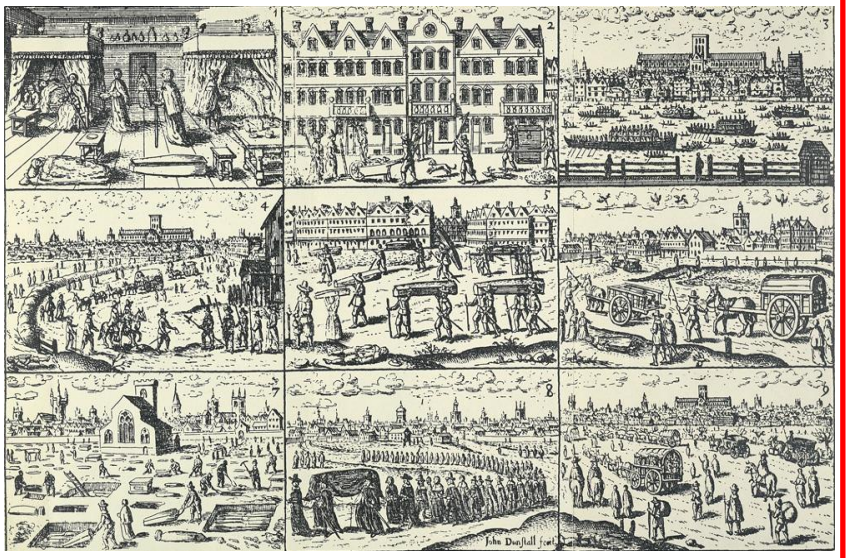
- Many people still believed that the plague was sent as a punishment from God, movement of the planets or 'poisonous' air (miasma). As you should know the plague was caused by fleas that lived on rats.
- Remedies and treatments at the time had no effect. Some patients still tried bleeding with leeches, others set fires in the streets to keep away the bad air, some even smoked sponges with vinegar on them so they didn't breath the bad air.
- Animals were also used to try and prevent the plague from taking lives. Chickens, frogs, snakes and scorpions were used to draw out the poison.
- Treatments that didn't work were being shared as sound medical advice. For example, apothecary William Boghurst suggested that if you were close to death from the plague the remedy was to 'cut up a puppy dog alive and apply in warm to the sores'.
- You should be able to link ideas between the Great Plague of 1665 and the Black Death of 1348. little had changed between these years.

How did people try and cure the Great Plague?

- Still no cure for the plague.
- If you were rich enough you could move into the countryside to try and avoid it, King Charles II did that and moved to Oxford.
- There seems to be some evidence that some people were making a connection between dirt and disease.
- **Bills of Mortality** – people realised that most deaths occurred in the poorest and dirtiest parts of the city.
- However, there was more organised approach to dealing with the plague this time. Mayors and councillors issued orders to halt the spread of disease.
- Women searchers were paid to examine and take note of people with plague symptoms.
- Plague victims were quarantined and watchmen would stand on guard to make sure that they did not leave and spread disease.
- Red crosses were painted on doors to highlight there were plague victims inside.
- Bodies were brought out at night when there were fewer people and were thrown into mass plague pits.
- Fires were lit to try and remove the poisons that were thought to be in the air.
- Homeowners were told they had to sweep the streets in front of their houses, and pigs, dogs and cats were not allowed in the streets when there was a plague.
- Plays and games were banned in order not to attract large gatherings.
- Trade between towns with infection was stopped and the border to Scotland was closed.
- Therefore, if comparing to the Black Death in 1348 there were similarities but some differences too.

How did the Great Plague end?

- Often connected with the Great Fire of London, 1666.
- The Great Fire however, did destroy large parts of the city, but the poorest areas were outside the city walls where the plague had largely infected.
- The plague declined because the rats developed further resistance to the disease, and so the fleas did not need to move to their human hosts!!
- After 1666, quarantine laws prevented epidemic diseases coming into the country aboard ships.



Compare the Black Death in the 14th century with the Great Plague in the 17th century. In what ways were they similar?
8 marks

History Knowledge Organiser: Changing hospitals in the 18th century

Who built hospitals?

- It was during this century that we see modern hospitals using modern methods to cure patients begin.
- These hospitals were different compared to before as they were founded and supported by charitable gifts of private people. For example Westminster Hospital was founded by a private bank in 1719 and Guy's Hospital was founded by a merchant called Thomas Guy in 1724. Hospitals could also be built by 'private subscription' where local people would club together to pay for the construction and building of the hospital.

What happened in an 18th century hospital?

- The sick were not just cared for, doctors of the future received training, as medical schools were often attached to hospitals.
- Individual wards were attached to a different type of disease.
- Although a lot of doctors learned through reading and lectures, in their final year they would gain some experience by following a medical professor through the wards.
- Doctors also like to gain an official post at the hospitals which gave them a better reputation and attracted wealthy patients.
- Doctors attended ordinary people for free, the fees paid by private patients gave the doctors a source of income.
- Treatments were largely based on the four humours, bleeding and purging.
- Towards the end of the 18th century, as well as treating patients for free, hospitals added dispensaries where the poor could obtain medicine free of charge.

Types of hospitals:

- There were general hospitals and specialist types.
- St Luke's in London (1751) became the second largest hospital for the mentally ill.
- London's Lock Hospital specialised in sexually transmitted diseases in 1746.
- Another new type of hospital was the maternity hospital. For example, wards were set aside at the Middlesex Hospital for pregnant women in 1747, and became known as the British Hospital for Mothers and Babies in 1749.
- High mortality rates were an issue during this period of time, severe epidemics in the 1720s and 1730s of influenza and typhus hit children particularly.
- There were provisions made for the poorest babies and children to try ad aid them.
- Thomas Coram, a retired ship's captain, gathered public support for a hospital to help sickly and ill children. The Founding Hospital was set up in 1741 caring for orphaned children. They were given a clean environment, clothing and a simple education up to 15 years old. It became one of London's most popular charities.

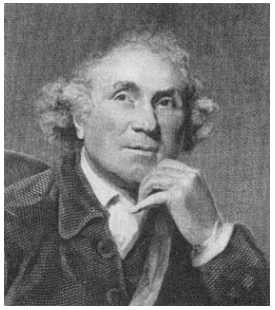
Key Terms	Definitions
Influenza	The flu, fever, runny nose, sore throat etc.
Typhus	Bacterial disease that is passed on by rats.

Hospital boom:

- Between 1720 and 1750 five new hospitals were built were added in London and nine more throughout the country.
- 1800 – London's hospitals were dealing with 20,000 patients a year.
- In 1400, 470 hospitals in England had room for only ten patients!
- There was a religious motive behind this change as 17th century conflicts were based around religion, in the 18th century there were some Christians who wanted to include as many different opinions as possible within the Church of England. They downplayed the importance of religious beliefs and styles of church services, and stressed that good Christians did more than go to church – they did good deeds within the community.
- Attitudes to disease were changing too. People abandoned the idea that illness was a punishment and began to think more evidence based.
- William Battle – advocated that mental illness was no less curable than any other disease.

History Knowledge Organiser: John Hunter (18th century)

Biography



- Born into a farming family in Scotland, 1728.
- Moved to London and joined his elder brother who had started an anatomy school and was a popular doctor in childbirth. John showed a flare for research.
- He showed a great talent for dissection and anatomical research.
- Studied with two surgeons: William Chelseden and Percivall Potts.
- Became an army surgeon in 1760.
- After three years he left the army and set up a surgical practice.
- 1768 – surgeon at St George's Hospital.
- 1776 – King George III surgeon.
- 1790 – Surgeon-General to the army.
- Died in debt and poverty in 1793.

Teaching

In 1768 he set up a large practice and trained hundreds of surgeons in his scientific approach. Many young surgeons that Hunter trained and inspired became great teachers and professors. Edward Jenner became a firm friend.

Books

Hunter's writings were widely read and a major contribution to surgical knowledge. His work helped the surgical profession by showing theoretical knowledge about anatomy that every surgeon needed. Writings were based upon observations, his practical skill as a dissector, and his willingness to experiment.

1786 – *On Venereal Disease*

1771 – *History of Teeth*

Blood inflammation and gunshot wounds (published after his death).

From dissecting many human bodies, Hunter was able to make discoveries about the nature of disease, infections, cancer, and the circulation of the blood.

What were John Hunter's contributions in medical progress?

Scientific Method

Promoted careful observation and the use of scientific method in surgeries. He even experimented on himself in 1767 due to a debate on whether gonorrhoea and syphilis were the same STD. It was thought they could not exist at the same time in the body. Hunter injected himself with pus from the sores of a gonorrhoea patient. Unfortunately the patient had syphilis too. It took him three years to recover using the mercury treatment.

Willingness to try radical approaches was seen in 1785 when a man was admitted to hospital with a throbbing lump on his knee joint. The usual treatment would be to amputate it, but Hunter said that if the blood supply was restricted it would encourage new blood vessels to develop and bypass the damaged area. Six weeks later the man walked out of hospital.

Specimens

Collected a huge collection of anatomical specimens. He preserved 3000 stuffed or dried animals, plants, fossils, diseased organs, embryos, and other body parts.

Hunter experimented with inflating narrow blood vessels with wax to study the blood flow.

Compare the work of Andreas Vesalius and John Hunter. In what ways are they similar?

8 marks

History Knowledge Organiser: Edward Jenner

Key Terms	Definitions
Virus	An infection carried by molecules that are too small to be seen.
Vaccination	Giving the body a mild dose of an infection for it to build up an immunity to that particular disease/illness.
Variolation	First method to try and immunise. Rub /insert powdered smallpox scabs into scratches in the skin.

What was inoculation?

- In China they had been using a basic form of inoculation to prevent smallpox.
- They scratched pus or scabs from a smallpox victim onto healthy people's skin: they didn't realise it but it gave the healthy persona a mild dose of the disease which would allow the body to build up a resistance to the actual disease.
- 1721 – Lady Mary Wortley Montagu had seen the inoculation take place in Turkey and had her children inoculated. It therefore, became an in demand idea.
- It was a profitable idea, however only the rich could afford the treatment.

Problems with inoculation:

- Religious objections: some argued that God sent an illness to test people's faith or punish them for their sin.
- As germs and infections were not understood, it was hard for people to accept the idea of giving themselves a small dose of a disease.
- Sometimes inoculation gave people a strong dose of smallpox, which could kill them.
- Any inoculated person could still pass smallpox onto others.
- The poorest people could not afford inoculation, so they were not protected.

Jenner's discovery of vaccination:

- Jenner heard that milkmaids who caught cowpox were protected against smallpox.
- In 1796, in Gloucestershire, Jenner carried out his experiment on an 8 year old boy called James Phipps. He inserted cowpox into James and then six weeks later gave James the smallpox inoculation: no disease followed.
- Jenner called his technique vaccination because *vacca* is the Latin word for cow.
- To prove that his idea worked, Jenner gave cowpox to another patient and then took cowpox pus from that patient to vaccinate a new patient. He did this over several weeks and 16 times across this period. None of the patients reacted to the smallpox inoculation.
- Jenner could then conclude that cowpox protected humans from smallpox.

Opposition to change:

- Jenner published his work in 1798, but could not explain how vaccination worked, which made it difficult for others to accept it.
- Many doctors profited from inoculation, so they disliked his findings.
- Others tried to retry Jenner's experiment but when it failed (patient died), they concluded that it was wrong (their equipment was contaminated).
- Jenner was not a fashionable city doctor so they was snobbery against him.
- However, it must be noted that some did support him. In 1802 Jenner received £10,000 for his research from parliament.

Impact of Jenner's discovery:

- Attitudes did change once they realised that the vaccination worked.
- Jenner had used scientific methods to deliver his theory which gave it more gravitas as well as evidence that it worked.
- Jenner may not have discovered vaccination but he made others notice it.
- By the 1800's, doctors were using his technique in America and Europe.
- In 1853, the British government made smallpox vaccination compulsory.
- It is said that by the 1980's smallpox had been eradicated.

Has the role of the individual been the main factor in the development of medicine in Britain since Medieval times?
16+4 marks

History Knowledge Organiser: How was pain dealt with?

Background:

- The idea of pain relief was **not new**. For example opium was used in the Medieval period to numb the pain, however, getting the dosage right was often a problem.
- Alcohol was used too, but this made the heart beat faster and bleeding became more difficult to deal with as a surgeon. There were also religious objections against the use of alcohol.
- The result of this was surgery carried out was simple and quick, meaning that complicated surgery could not be carried out.

Nitrous Oxide:

- Scientific knowledge developed in the 18th century meaning that new ideas could be tried and tested, one of these was nitrous oxide.
- 1795 – Thomas Beddoes (physician) and his assistant Humphry Davey experimented inhaling nitrous oxide.
- In 1800 Davy published an account describing how the nitrous oxide made him laugh, feel giddy and relaxed. He did not recognise the value in it and it later became a novelty where people would inhale it to have fun!
- 1844 – Horace Wells, an American dentist saw this anaesthetic as a way of removing teeth in more comfort, his demonstration failed to impress.

Ether:

- William Clark, another American dentist experimented with ether.
- In 1842 he used it for a tooth extraction, and this time doctors took notice.
- In March 1842, Crawford Long used ether to remove a neck growth from a patient.
- 1846 – William Morton gave a public demonstration of this anaesthetic.
- This spread to Europe. Robert Liston, a British surgeon was keen to use this, and used it in a leg amputation in December. An effective anaesthetic had arrived.
- However, ether has its drawbacks:
  - Difficult to inhale.
  - Causes vomiting
  - Highly flammable

Chloroform:

- Still a need for a safe and effective anaesthetic.
- Breakthrough in 1847 with a Scottish doctor, James Simpson.
- It is said that Simpson and his friends were testing a number of substances when someone knocked over a bottle of chloroform. Simpson's wife brought them dinner to find them all sleeping peacefully!

Opposition:

- There were plenty of objections:
  - Surgeons were used to operating quickly and on a conscious patient.
  - Some surgeons who had operated during the Crimean War (1853-56) believed that the soldiers should dutifully put up with the pain!
  - Some patients died in the early stages of chloroform use, and this was due to the quantity people should have (depending on size).
  - Religious objections – for example people believed that women should suffer pain in childbirth because that is what God expected.

Overcoming opposition:

- By 1850, opposition was lessening.
- Queen Victoria had suffered many difficult labours and in 1853, Victoria gave birth to Prince Leopold using chloroform. She wrote 'the effect was soothing, quieting and delightful beyond measure'.
- For the patient, the conquest of pain was a major step forward but it did not revolutionise surgery. Infection was the next issue to be tackled.

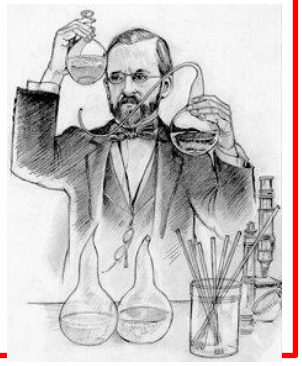
History Knowledge Organiser: Finding out about germs

What did people think caused infections?

- In 1677, the first basic microscope was invented, which allowed scientists to see tiny micro-organisms moving. Scientists even identified microbes in the blood of sick people, but no link was found between microbes and disease back then.
- 1699 – Francesco Redi boiled up a liquid and sealed it against the air. No microbes appeared, so he concluded the infection came from outside.
- 1748 – John Needham repeated Redi's experiment and found microbes. People did not realise that the results depended on how clean the equipment was.
- 18th century – **spontaneous generation** was a key concept that scientists believed in.
- 19th century – questioning of these theories. They believed in specificity.
- 1835 – Agostino Bassi linked a specific microbe (fungus) to a silkworm disease.
- 1840 – Friedrich Henle was the first person to challenge spontaneous generation and suggest microbes were causing infection.

Public health debates:

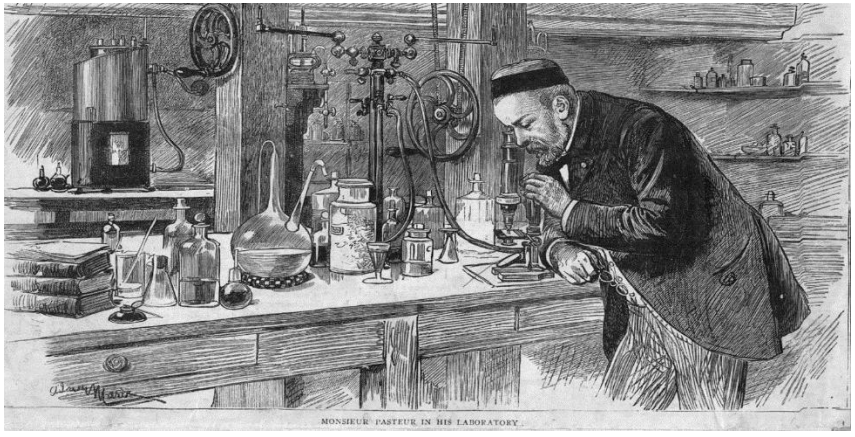
- Increased concern over disease and infection in the 19th century. There were many epidemics that were hitting large and overcrowded cities that couldn't be stopped.
- Florence Nightingale and William Farr argued that cleaning up these environments would stop epidemics. such as plague, cholera and typhoid. **They were know as anti-contagionists.**
- James Simpson also advocated this, suggesting that some hospitals should relocate or be rebuilt.
- Many people also believed in the theory of miasma.
- However, there were people who opposed these ideas (contagionists).
- John Simon – believed that infection was spread by contact with an infected person or bacteria. They believed that epidemics could be controlled by quarantine or preventing contact. Even though this theory was correct, the problem for them was the fact that some people who came into contact with sick people did not become ill themselves.
- Thomas Wells – in 1864 he suggested a non-chemical cause of infection and referred to the French scientist, Louis Pasteur. His theory looked at antiseptic substances to destroy microbes.



Key Terms	Definitions
Microbe	A microorganism, especially a bacterium causing disease.
Spontaneous Generation	Idea that microbes could appear as if by magic when something rotted. They thought the disease caused the microbes, not the other way around.
Antiseptic	Keeps an area clean/free of germs.
Miasma	'bad air' – disease was spread via this.
Germ theory	Theory by Pasteur that showed that microbes cause things to 'go off' and did not suddenly appear.
Specificity	Microbes were not all the same, and that certain ones caused certain illnesses/diseases.
Anti contagionists	Believed that epidemics were caused when infection interacted with the environment.

Who was Louis Pasteur? Biography:

- Pasteur was a French chemist and biologist best known for his new discoveries on the causes and preventions of diseases.
- 1861 – published the Germ Theory which has often been marked as a 'turning point' in medicine.
- Made important contributions to advances in vaccination, fermentation and pasteurisation (the process of killing bacteria in liquid food such as milk and wine).



History Knowledge Organiser: Finding out about germs

Louis Pasteur's work :

- Pasteur was the biggest challenge to spontaneous generation and miasma in Europe.
- Between 1857 and 1860 he investigated why wine and beer often went sour.
- He designed a series of experiments to show that if air was kept out of the swan neck flask, the liquid inside would not go off. He identified the specific microbe responsible for souring wine, and showed that heating it at the right temperature would kill microbes.
- He proved that germs did not come alive on their own.
- Pasteur concluded that bacteria – or germs – were the real cause and that it was a biological, not chemical, process. The Germ Theory had been born.
- In the late 1860's, largely through the work of Joseph Lister, Pasteur's Germ Theory came to the attention of British doctors.

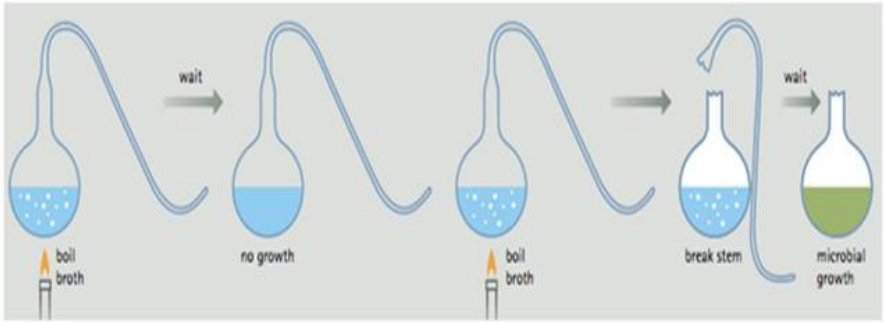


Figure 3.2.3 Pasteur's experiment. These flasks allowed oxygen to enter but their long curving necks trapped microorganisms and protected the nutrients in the flasks from microbial growth

Aseptic surgery:

- Lister had introduced antiseptic methods, but by the 1890s, surgeons in Europe and North America had gone one step further. Aseptic surgery.
- Operating theatres were no longer doused in carbolic acid in order to kill microbes, with aseptic surgery, the microbes were to be banished from the start.
- Surgeons had to be well scrubbed, wearing gowns and new, thin flexible gloves. All instruments were to be sterilised.
- Facemasks, rubber gloves, surgical gloves reduced infections, along with smaller surgical theatres rather than one large room.
- However, aseptic surgery depended on people wanting to accept Pasteur's Germ Theory.

Evidence for the Germ Theory:

- Pasteur understood that specific germs might turn liquid foods – such as milk – sour, or give diseases to animals. However, these ideas were not immediately accepted in Britain.
- Doctors at the time still did not believe that microscopic germs could harm something as large and advanced as a human.
- Instead, the idea that specific germs might cause diseases was not noted by doctors, but by vets.

Cattle Plague 1866:

- It was assumed that this started spontaneously.
- It was soon realised that by quarantining and slaughtering cattle were the only methods in which this could be controlled.
- As a result of this, there were food shortages and prices rose.
- Professor Lionel Beale was employed to investigate the crisis.
- June 1866 – recognised the specific microbe responsible BUT demonstrated how the microscope helped with complex medical research.
- The cattle plague = contagious disease.
- People in Britain now believed that something as small as a 'germ' could cause illness in humans.

Bastian vs Tyndall:

- However, the dominant view in Britain was still 'spontaneous generation'. A chemical action was producing poisons.
- Charlton Bastian – ideas and theories used spontaneous generation as the basis (Professor of Anatomy, University College of London).
- January 1870 – John Tyndall (Physicist) defended Pasteur's Germ Theory and argued against Bastian. He lectured on both Pasteur and Lister's work and showed that tiny microbes were in the air.

Typhoid fever:

- It was common throughout Britain, but was raised to the public when it was said to be the cause of Prince Albert's death.
- Anti-contagionists said this proved that cleaning up urban areas was essential.
- 1874 – Emanuel Klein announced that he had identified the typhoid microbe.
- This led to Tyndall criticising spontaneous generation and said that the Germ Theory explained typhoid fever.
- Unfortunately, Klein was wrong. He had not found the typhoid microbe.
- However, two years later Robert Koch proved to doctors that the Germ Theory COULD explain human diseases.

History Knowledge Organiser: How important was Joseph Lister?

Biography:

Studied surgery and became a fellow of the Royal College of Surgeons in 1852. in 1860 he moved to Glasgow to become a Professor of Surgery. He introduced the new principles of cleanliness in surgery.

Lister and the antiseptic approach:

- Believed that infection only happened once the skin was broken, where microbes could get in and start an infection.
- In place of the skin, Lister decided to put a chemical barrier.
- His first experiment was with a young boy who had been run over by a cart and had fractured his leg. The bones were sticking through the boy's leg. Traditionally this would have led to amputation. However, Lister soaked a cloth in carbolic acid, set the bones and dressed it. The dressings stayed in place for four days, until the young boy complained of irritation. Lister feared the worst and took off the dressings. However, he saw that the fracture and the skin were healing well. The irritation had occurred due to the strength of the carbolic acid. The dressing were replaced and stayed infection free. After six weeks, the young boy walked out of hospital.
- Lister began to test his antiseptic approach in surgeries by spraying carbolic acid onto the surgeons hands, the wound and the instruments used in the operation. Bandages, ligatures and dressings were also diluted in carbolic acid.

Reactions to Lister's work in Britain:

- Work was published in March 1867. it gave details of 11 patients with compound fractures, none of whom died from infection.
- He publicised Pasteur's Germ Theory through his explanation of the antiseptic technique.
- August 1867 – Lister lectured doctors about techniques for using carbolic acid dressings in compound fractures.
- What was controversial was the fact that he said infection in wounds was caused by microbes in the air.
- **Surgeons had long debated whether to leave wounds open to the air or to cover them with bandages. Lister argued that the oxygen in the air was irrelevant: it was the microbes in the air that were important. He was questioning spontaneous generation.**
- Again, ideas were criticised. In 1860's Britain, people were still unfamiliar with the Germ Theory, and Lister's ideas were not seen as favourable. The public health debates that took place still centred on chemical theories.
- It was the likes of Charlton Bastian who advocated Lister's work that later saw it become of some relevance.

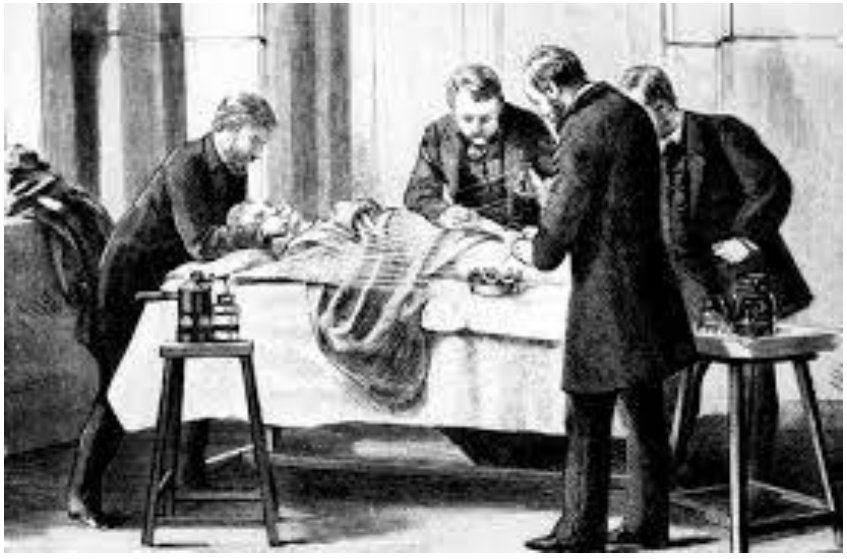
Key Terms	Definitions
Aspetic	Keeping germs away – sterilising the environment beforehand rather than during.

Opposition to antiseptic surgery:

- Doctors did not accept Pasteur's Germ Theory and there were many different opinions about the role of microbes in surgery.
- In the late 1860's antiseptic chemicals had been widely used so what Lister was proposing was not revolutionary.
- Lister claimed that his methods were superior to others, but some surgeons believed existing theories/methods worked just as well.
- His methods were often difficult and unpleasant to use. Carbolic acid made people's skin dry and crack and it irritated the lungs.
- Although Lister gave advice to prevent hospital infections, he still did not fully understand microbes. He also did not scrub his hands before surgery, but rinsed them in carbolic acid, and operate in his street clothes.

Explain the significance of Lister's work for the development of medicine.

8 marks



History Knowledge Organiser: How did scientists discover that germs caused human diseases?

Robert Koch:

- 1843-1910, born in Germany.
- Studied to be a doctor and was a brilliant student under the tuition of Professor Frederick Henle, who challenged spontaneous generation.
- Koch worked as a surgeon in the Franco-Prussian War; from 1872-1880 he was a German Medical Officer.
- Pioneering microbiologist and was appointed to the Imperial German Health Bureau in Berlin.
- Known as the founder of modern bacteriology, and made key discoveries in public health. This included identifying specific bacteria that caused anthrax, cholera and tuberculosis.
- Awarded the Nobel Prize in 1905.

Koch & Pasteur's Germ Theory:

- 1876 – Koch became famous for his work on anthrax.
- Koch found a way of staining and growing the particular germ that was responsible for anthrax. He then proved that it was this bacterium that caused the disease by injecting mice and making them ill. For the first time he was able to apply Pasteur's theory to prove that germs caused diseases in humans.
- Using similar methods, Koch was able to identify germs that caused the deadly diseases, cholera and tuberculosis (TB).
- Even though Koch was inspired by Pasteur, they saw each other as rivals: they competed in their respective countries, and it didn't help that both countries had fought each other in various wars.

Robert Koch's methods:

- Koch made improvements, but also changed the study of bacteria.
- It had been believed that most germs were the same. His methods and findings allowed other scientists to locate specific germs that might cause specific human diseases. Some of the principles of studying bacteriology are highlighted below:
  - Koch said the bacterium had to be present in successive experimental animals that were infected with a specific disease. The bacterium could be taken from the deceased animal and cultured (grown) again.
  - Koch developed a technique of growing microbes on a plate of solidified agar (seaweed extract), which encourages microbes to grow.
  - Found ways of using dyes to stain specific microbes under the microscope so that they would stand out amongst other germs.
  - Developed ways of photographing microbes so that other scientists could study them in detail, and find them in samples.
- Koch turned bacteriology into a science.

Key Terms	Definitions
Bacteriology	Study of bacteria
Anthrax	Disease that causes sores on the lungs can kill both humans and animals.
Cholera	A water-born disease that causes severe vomiting and diarrhoea.
Tuberculosis	Infectious bacterial disease characterized by the growth of nodules (tubercles) in the tissues, especially the lungs.

Reactions to Koch and Pasteur's work in Britain:

Role of Tyndall: In the mid-1870's the Germ Theory was finally starting to be accepted in Britain. A number of British studies between 1873 and 1875 and used microscopic evidence and answered questions about germs. For example, William Dallinger and John Drysdale published a paper describing the life cycle of microbes. Secondly, John Tyndall continued to promote Pasteur's work and in 1876, lectured to British doctors on Koch's discoveries on anthrax.

Roberts and Cheyne: in the end, the acceptance of the Germ Theory was down to two key individuals. William Roberts was a doctor from Manchester who supported Tyndall's criticisms of spontaneous generation and he developed a doctor's version of the Germ Theory of disease: he linked all the labatory research work with the practical evidence of surgeons and public health doctors. He used Koch's work to draw attention to germs and their role in human infections.
In 1879, Joseph Lister's surgeon, William Cheyne translated Koch's work into English. He also wrote a paper based on Koch's findings. He explained that some microbes were present in healthy tissue and wounds were harmless and did not always produce disease.

By the 1880's, British doctors accepted the Germ Theory and its role in explaining infection.

Surgery and public health benefited from the Germ Theory, but doctors dealing with disease deep in the body could not use intense heat or powerful antiseptics. Nobody had yet come up with a way of killing microbes without damaging healthy tissue.

History Knowledge Organiser: Search vaccines and cures in Europe & Britain

War:

- 1871 – rivalry between Pasteur and Koch increased after France lost a war with Germany. At this time, nations were interested in medical research because armies could lose more men to illness than bullets. Defeating diseases could have a major impact on the battlefield.

Government & Finance:

- Both Pasteur and Koch were equipped with a laboratory and a team of scientists, paid for by governments. Both were internationally recognised. In 1905 Koch won the Nobel Prize and in 1874, Pasteur won the Copley Medal in 1874.

Teamwork:

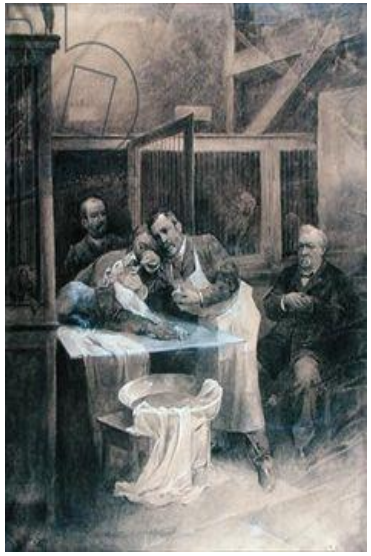
- 1880-1884 – working with Charles Chamberland and Pierre Roux, Pasteur developed a vaccine for rabies. He was reluctant to test it on a person.
- 1885 – Pasteur proved that vaccines worked on human, as well as animal, diseases when he gave a boy who had been bitten by a rabid dog the rabies vaccine.
- 1888-1890 – rivalry continued over the research of diphtheria, a highly contagious disease that affects the nose and throat. Pierre Roux showed that the diphtheria germ produced poison or toxin. In 180, in Germany, Emil Behring, showed that weakened diphtheria germs could be used to produce an antitoxin.

Individual character – Pasteur:

- 1860's: He was determined and hard working scientist.
- 1871-1875: investigated agricultural problems, studying fermentation of beer, and defended ideas about the Germ Theory.
- 1876-1881: Koch's success in identifying anthrax germ in 1876 spurred Pasteur and his team to quickly develop a vaccine for animal diseases such as cholera and anthrax.

Individual character – Koch:

- 1882 – strong minded and rigorous scientist and doctor. Studied TB. Rivalry further inflamed when Koch made a breakthrough in 1882 by identifying the TB germ.
- 1883 – Koch's team of scientists also beat the French team to identify the cholera germ.

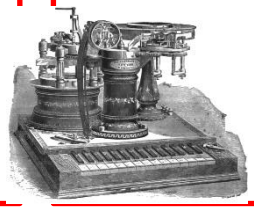


Luck: (chance)

- 1879 – investigating chicken cholera and by accident one of Pasteur's assistants used an old and weakened sample of the disease microbes. When the chickens were injected, they survived. More importantly, these chickens also survived when given the fresh, stronger germs. Pasteur showed that the weakened microbes built up the chicken's ow defences against the stronger ones. This was how the vaccines, and prevention of diseases worked!

Communication:

- Pasteur developed a vaccine against anthrax. Demonstrating in front of key individuals such as politicians, journalist and farmers, this became a triumph. This was spread by electric telegraph.
- Koch's discoveries were spread by scientific articles and at conferences.



Impact of Pasteur and Koch's work in Britain:

- Between them, Pasteur and Koch encouraged a whole new generation of scientists to study deadly diseases ad find way of preventing them.
- Many of the discoveries spread to Britain. Joseph Lister introduced the French serum for diphtheria and was widely used after 1895.

within a period of 10 years, the mortality rate in England had dropped to less than half.

History Knowledge Organiser: How dirty were towns during the 1800's?

Background:

- Public Health during the 1800s was poor. The average age of death for a working man was approximately 30 years of age. In some places, such as Liverpool, it was 15!
- In Manchester, 1 in every 5 children died before their first birthday and 1 in 3 died before they reached the age of 5.
- Despite the fact that medical knowledge and understanding was developing, people's health in general is said to have been worse during the 1800s.

Key Terms	Definitions
Public Health	Health and well-being of men, women and children, now maintained by the government.
Typhoid	Contaminated water or food spread by unhygienic conditions.
Cholera	Water-born disease, several epidemics during the 1880s.

Growth of towns and cities:

- The Industrial Revolution was a peak time in British history, towns and cities grew very quickly, with the health of people living in them growing worse. For example, in 1750 Sheffield had a population of 12,000 but by 1850, the number had risen to 150,000.
- People had flocked to Sheffield to get a job in the new factories, and the belief that these jobs would lead to a new and prosperous life for them.
- In order for the factories to function they often needed thousands of workers, meaning that houses in these cities needed to be built quickly. Therefore, they were built back-to-back so more could be built in a small area.
- Almost all these houses were crowded, often with four or five people sharing one room. In 1847, 40 people were found sharing one room in Liverpool.

Disease in the slums:

- Few houses had toilets. The best that could be managed was a bucket in the corner of the room. This would be emptied into the street, or stored until there was enough manure to sell to the farmers.
- Occasionally there was a street toilet. This would be shared by lots of families.
- Water was sometimes provided via a water pump, but the water source was a local river or pond, and this was often filthy.
- There were no rubbish collections, no street cleaners or sewers, and no fresh running water.
- Sewage trickled down the streets and into nearby rivers. This is where families washed their clothing, bathed and drank from.

Government Response:

- Governments were concerned about the outbreaks of serious illnesses but did not know how to deal with it.
- A link had been made between poor conditions in Britain's towns and cities and the rising death rate, but in the early 1800s, people still didn't know what caused disease and how to deal with it effectively.

Population of British towns and cities, 1801-1851

Town	1801	1851
Bradford	13,000	104,000
Glasgow	77,000	329,000
Liverpool	82,000	376,000
Birmingham	71,000	233,000
Manchester	70,000	303,000
Leeds	53,000	172,000
London	957,000	2,362,000
Bath	33,000	54,000
Norwich	36,000	68,000
York	17,000	34,000

History Knowledge Organiser: Cholera

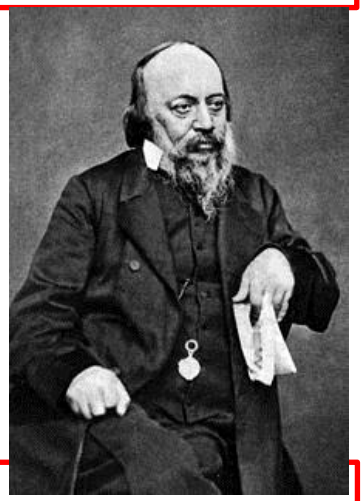
The first outbreak:

- 1831 – 50,000 people were victims to the disease. Cemeteries were full and one Vicar in the West Midlands commented that 'the coffins could not be made fast enough for the dead'.
- The frustration was the fact that there was complete lack of understanding of this new killer disease, and there was no cure.

What did people think caused cholera?

- Most common belief that the disease was spread by miasma – an 'infectious mist' given off by rotting animals, rubbish and human excrement.
- Some towns did try and clean up their streets, but the importance of clean water still wasn't understood.
- After a few months the epidemic passed and people thought it would not return.

A COURT FOR KING CHOLERA.

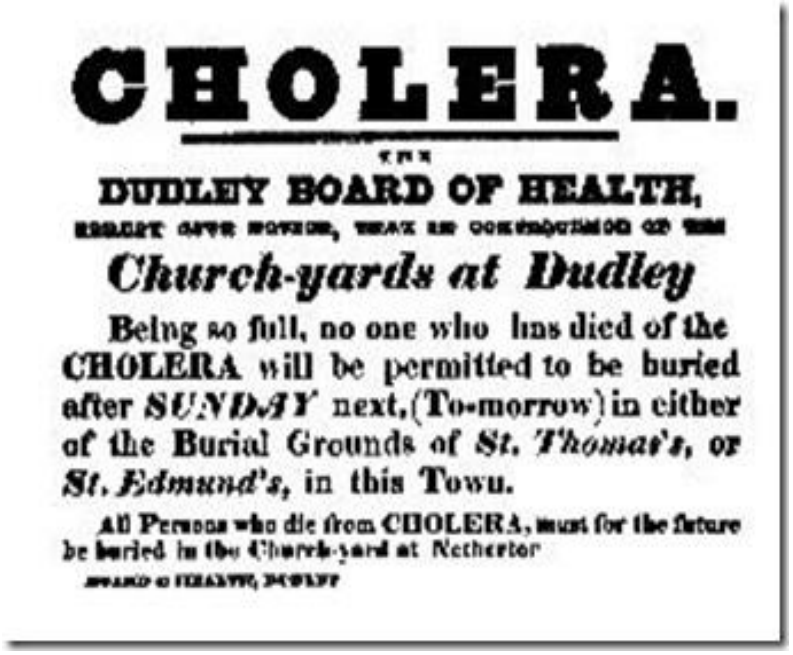


Action:

- After more outbreaks in 1837 and 1838, the government decided to act. In 1839, they set up an inquiry to find out what living conditions were like for the poor. The man in charge of this was Edwin Chadwick.
- Chadwick's report shocked Britain. Over 10,000 copies were handed out to politicians, journalists and writers and anyone who could change public opinion. 20,000 more were sold to the public.
- It didn't really matter that Chadwick had mistakenly believed in the miasma theory: what was important was the fact that the reports suggested there was a need for cleaner water supplies and cleaner streets.
- It also showed that people were wrong in blaming the poorer people for bad housing and living conditions.
- The only people that could do something about the crisis was the government.

Edwin Chadwick (1800-1890):

- A lawyer who devoted his efforts towards health and social reforms.
- He worked on the famous public health inquiry by sending ou doctors to most major town and cities; they set questionnaires and interviewed hundreds of people.
- Chadwick was appointed Sanitation Commissioner and a new Central Board of Health was created with the powers to clean the streets and improve both the water and sanitation systems. Chadwick had many ideas on how he could improve the lifestyle of the poor but his priorities were a constant supply of fresh and clean water, toilets in homes and a sewage system that would carry sewage from the cities out to rural areas where it could be treated. One of his innovations was the use of glazed earthenware pipes for sewage, which reduced the possibility of contamination of drinking water. Shallow drinking wells were abolished and replaced by a mains water supply.
- The report was published in 1842 - Poor Law Commissioners on an Inquiry into the Sanitary Conditions of the Labouring Population of Great Britain.


CHOLERA.

THE

DUDLEY BOARD OF HEALTH,

Church-yards at Dudley

Being so full, no one who has died of the CHOLERA will be permitted to be buried after SUNDAY next, (To-morrow) in either of the Burial Grounds of St. Thomas's, or St. Edmund's, in this Town.

All Persons who die from CHOLERA, must for the future be buried in the Church-yard at Netherton

History Knowledge Organiser: Fighting Cholera

Cholera returns:

- Although Chadwick had written and used evidence to show that there was an issue with dirt and disease, as well as poverty and disease , it was up to the government to instigate things further. Initially, they didn't. The 19th century can be divided into two. Half the century where little changed, and half the century where it began to!
- The reason why things did not initially change was because of the laissez faire concept.
- Those that believed in laissez faire said it was the governments job to keep law and order, NOT keep people clean.
- Also, some MP's were making vast fortunes from rents in the slums, so knocking them down would result in a loss of money!
- Cholera changed their minds. With another epidemic sweeping across Europe, the government decided to take action … and passed the first Public Health Act 1848.

First Public Health Act 1848:

- Gave councils the power to spend money on cleaning up their towns. a Central Board of Health was established.
- Corporate boroughs were to assume responsibility for drainage, water supplies, removal of 'nuisances', paving etc.
- Non-corporate towns should set up local Boards of health
- Finance was to be raised from the rates to pay for improvements
- Local Boards of Health HAD to be set up in places where the death rate was above 23 per 1,000
- **THIS WAS NOT COMPULSORY**.
- However, the likes of Birmingham, Liverpool and Sunderland made huge improvements. Many others didn't bother doing anything.
- By 1853, only 103 towns had set up their own Boards of Health.
- In 1854, the Central Board of Health was closed down because of strong resentment of government interference.

John Snow 1833-1858:

- Famous surgeon, worked in Broad Street, London.
- 1854 – over 700 people living in, or nearby, this street died of cholera within 10 days.
- Snow began to investigate and found that all the victims got their water from the same pump on Broad Street.
- Those that didn't die seemed to be getting their water from a different pump.
- Snow asked permission to remove the pump handle of the water pump so that people were forced to get water from elsewhere.
- Investigating further, Snow discovered tht a street toilet, had a cracked lining that allowed polluted water to get into the drinking water.
- Snow proved that cholera was not carried via miasma but through contagion.

Key Terms	Definitions
Laissez-Faire	Let it be – the government should not interfere in the lives of ordinary people and force them to change.
Contagion	A disease passed from one person to another.
Cholera	Water borne disease causing horrendous vomiting and diarrhoea.

John Snow and his discovery:

- 1848 – 60,000 people had died from cholera.
- 1854 – 20,000 people died from cholera.
- The discovery made by Snow showed that cholera was a water=borne disease.
- The government now had growing evidence that the state of the nation's health was based on dirty, overcrowded towns.
- They also had medical evidence that made a link between the water supply and cholera.
- The Great Stink of 1858 was the event that forced them into action.

Map showing deaths of cholera and water pumps

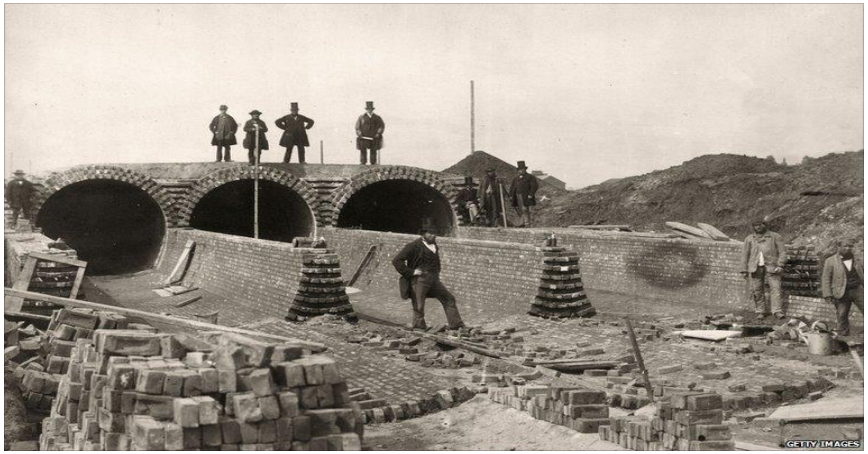
History Knowledge Organiser: The Great Stink – the death of Laissez Faire?

The Great Stink:

- 1858 – Britain was experiencing a particularly hot summer. In places such as London this brought its own problems. London was overcrowded, and the River Thames was the main dumping ground for the cities waste.
- Politicians in the Houses of Parliament demanded to meet somewhere else due to the fact the smell was so bad (Houses of Parliament next to the Thames).
- The MP's turned to a man they hoped could help save their city, that man was Joseph Bazalgette.

A new sewer system:

- 1855 – Bazalgette had been asked to draw up plans for a network of underground tunnels (sewers), to intercept the waste that was produced by nearly 1 million homes before it had chance to flow into the Thames.
- Bazalgette's design used gravity and the slope of the London river basin to get the sewers to flow downstream before the sea.
- Pumping station was built at Crossness and this was the largest that had ever been made. This pumped the sewage up to the level of the Thames at high tide, released into the river and the river would then take it out to sea.
- Provided with £3 million (£1 billion in today's money) in 1858 and was told he had to start work immediately.
- 83 miles of sewers were built that would receive 420 million gallons of sewage each day.
- Sewers finished in 1866 and when fully operational saw off the threat of cholera.
- From this, the government starting to look at public health and made a series of changes from this point onwards. Therefore, the second half of the 19th century saw the belief in laissez faire lessen.



Public Health Reforms:

Date	Public Health Reform
1842	Chadwick report.
1848	First Public Health Act.
1853	Compulsory vaccination.
1858	Work on London sewer system begins.
1866	Sanitary Act: local councils responsible for sewers, water, street cleaning. Town to have health inspector.
1875	Artisans Dwelling Act (aka Housing Act): house owners responsible for keeping properties in good order. Council had power to buy and demolish slum housing if not improved.
1875	Second Public Health Act: councils were forced to appoint Medical Officers. They were responsible for public health. They were ordered to cover up sewers and keep them in good condition. Fresh water was to be supplied and collect rubbish as well as provide street lighting.
1875	Sale of Food & Drugs Act: guidelines set up to check the quality of food and medicine that was sold.

The death of laissez-faire:

- 1867 – working class men were given the vote.
- It was these people that were suffering at the hands of poor public health.
- Political parties soon realised that if they wanted more support and promised to deal with issues such as poor public health, working class men would vote for them.
- When the Conservatives won in 1874, the majority of votes was from the w/c.

History Knowledge Organiser: Penicillin and modern medicine

Prevention and cure:

- The late 19th century saw an increase in knowledge of disease. Doctors and scientists started to identify which bacteria caused certain diseases, leading on to people wanting to find ways in which these diseases could be prevented. Alongside this, was curing them too. The research into prevention and cure led to some dramatic advances in understanding health and medicine.

Prevention:

- When the Germ Theory was established in 1861 the world began to realise that bacteria caused may diseases – not miasma, God's punishment or a other causes that people had believed in for centuries.
- After Pasteur and Koch identified different types of bacteria caused specific diseases, doctors began to use weakened forms of the bacteria to allow the body to build up immunity.
- This had been tried by Jenner in 1796, but hadn't been fully understood.
- The vaccinations that were developed from Jenner's worked showed how some diseases could be prevented TB, rabies, anthrax and diphtheria.

Cure:

- Koch found out that certain chemicals sought out specific bacteria in the body.
- His assistant Paul Erlich worked at finding a chemical that would actually stain the bacteria as well as kill it.
- He came across something called 'Salvarsan 606', a 'magic bullet'. It was called this as it was the 606th time in which they had tested it and showed it had worked.
- Erlich found a cure for syphilis in 1909, and from this point onwards, other scientists found 'magic bullets' targeting other diseases.
- The most notable was Prontosil, this was a red chemical that worked against the germs that caused blood poisoning.
- More magic bullets – or 'sulpha-drugs' were soon developed to control meningitis, pneumonia, and scarlet fever.

Key Terms	Definitions
Magic bullet	Certain chemicals would target the actual bacteria that caused the disease and kill it.
Prontosil	A red chemical that works against germs causing blood poisoning. Active ingredient was sulphonamide.
Sulphonamide	A chemical from coal tar.

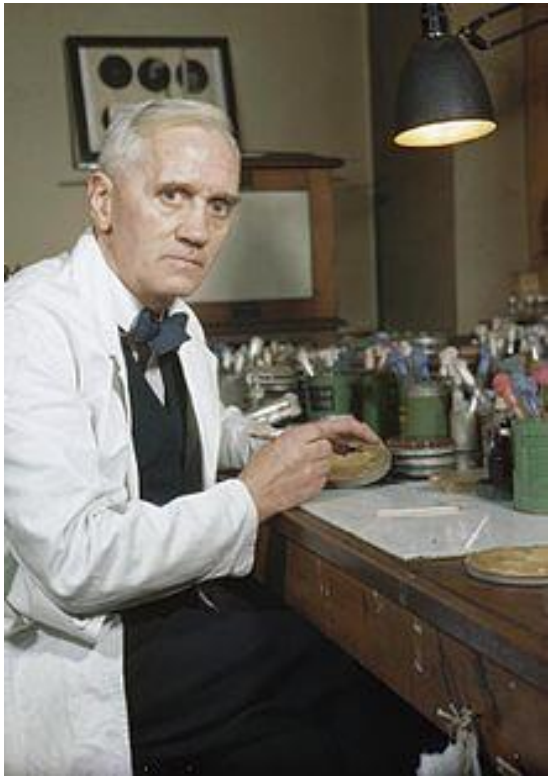
Staphylococcus:

- By the 1920's a germ called staphylococcus was undefeated. It was a highly resistant bacteria that had over 30 different strains causing a range of illnesses. Particularly food and blood poisoning.
- Scientists had known since the 1870s that some moulds could kill germs. One type of mould – penicillin – proved good at killing staphylococcus.
- Its discovery and the development of penicillin became one of the most famous antibiotics we know today.
- A range of factors contributed to its discovery and development – chance (luck, individual brilliance, war and science and technology).

History Knowledge Organiser: Penicillin and modern medicine

Alexander Fleming:

- During WW1, Alexander Fleming was sent to St Mary's Hospital in London to study the treatment of wounded soldiers.
- Many soldiers were suffering from the ill effects of the staphylococcus germ.
- Chemical antiseptics (which were not used much at this time) were not working on some of the deeper wounds and Fleming saw at first hand the impact this was having on the soldiers – they were in agony.
- In 1928, he published findings on the effect of the penicillin mould.
- In 1945 he won a Nobel Prize for 'the discovery of penicillin and its curative effect'.
- The Nobel Prize was won along with Howard Florey and Ernst Chain. These two individuals were responsible for the development of penicillin – they enabled it to become mass produced and it was used during WW2. They realised it was essential for their soldiers.



Key Terms	Definitions
Bacteriologist	The science and study of bacteria and their relation to medicine and to other areas such as agriculture (e.g., farm animals) and industry.
Antiseptic	Chemical that is mostly used outside the body, on skin or objects to kill germs.
Antibiotic	Medicine that can be digested or injected into the body. Kills certain germs as it travels around the body.
Spore	a minute, typically one-celled, reproductive unit that can lead to disease and illness.

Fleming's discovery:

- After WW1, Fleming become determined to find a better way to treat infected wounds and conducted detailed experiments.
- By 1928, he was still working in the hard-to-kill staphylococcus germs.
- When he went on holiday, he left several plates of germs on a bench. When he came home, he noticed a large blob of mould on one of the dishes. Investigating further, he noticed that the staphylococcus germs next to the mould had been killed.
- Taking a sample of the mould, Fleming discovered it was the penicillin mould. A spore from the penicillin mould had floated upstairs to Fleming's laboratory.
- Fleming realised the germ-killing capabilities of penicillin and published his findings that year.
- Today, we know penicillin as an antibiotic BUT Fleming did not know this and though it was a natural antiseptic.
- The one test that was missing from his work was the test of injected penicillin into an infected animal. This would have shown that penicillin could be used as a medicine, and could kill infections in the body without harming living cells. The results of the test would most likely have sparked great interest in penicillin and could have advanced its development.
- As a result of this, few people regarded Fleming's work as a major breakthrough and Fleming lost interest in the work himself.
- However, the story of penicillin did not end there.

Factors that influenced the development of penicillin:

Think about which factors contributed to the discovery of penicillin, these are important and show how factors will generally work together in the development of medicine.

History Knowledge Organiser: Development of penicillin

The development of penicillin:

- In the 1930's, a research team from Oxford University began compiling a list of all natural substances that could kill germs.
- They got hold of Fleming's article on penicillin and two scientists – Howard Florey and Ernst Chain applied to the British government for some money to further their research into penicillin.
- They received £25! This was not enough to conduct thorough scientific research. The interest of the government was not to put money into medical research at this time, but into WW2.
- However, Florey and Chain did not give up hope. They managed to produce enough penicillin to test it on eight mice. They needed to test it on humans, but they needed 3000 times the amount they had used on mice. Turning their university department into a penicillin producing factory.
- A 43 year old policeman, Albert Alexander, was selected as he had been scratched by a rose bush and had contracted a nasty infection. All drugs had failed him. When he was injected by penicillin the infection began to clear up. Tragically though, after five days, the penicillin had ran out and the man died.
- Despite this, the success of penicillin had been noticed.

How was penicillin mass produced?

- WW2 was a vital factor for the development of penicillin. The growing number of soldiers that had infected wounds was increasing. More penicillin was needed – and quickly.
- 1941 – Florey went to America to meet the US government. Realising the potential of penicillin, they agreed to pay huge chemical companies to make millions of gallons of it.
- 1943 – enough had been made to treat 1000 soldiers.
- 1944 – enough had been made to treat 40,000 soldiers.
- By the end of the war in 1945, Britain and America were working close together and 250,000 soldiers were being treated.
- It was made for public used when the war ended.
- The need to produce such large quantities of penicillin was a key factor in developing the pharmaceutical business.
- Companies today such as GlaxoSmithKline, Beecham, Pfizer started out as small scale chemists and pill-makers.
- Penicillin was seen as a 'wonder drug/ in the early 20th century and saw a surge in government spending.
- Today, the pharmaceutical industry is the biggest in the world.

Impact of penicillin:

An estimation of 15% wounded British and American soldiers would have died without the use of penicillin during WW2. Also thousands of soldiers returned to service quicker given the penicillin treatment.

It was classified as an antibiotic and after the war, penicillin became used for the public too, and has saved millions of lives.

From this, other antibiotics were found such as streptomycin (1944) which treated TB, tetracycline (1953) which cleared up skin infections.

Sir Alexander Fleming
(1881-1955)

Ernst Boris Chain
(1906-1979)

Sir Howard Walter Florey
(1898-1968)

Has science been the main factor in the development of penicillin?

16+4 marks

History Knowledge Organiser: How have drugs and treatment developed since 1945?

Pharmaceutical Industry:

- These companies have been important in curing new diseases and researching new forms of treatment:
    - Chemotherapy – treatment of cancer using drugs. It began to be developed during WW2, and pharmaceutical companies have been producing cancer drugs since the 1960s.
    - 1981 – doctors identified a new illness – AIDS which was caused by the HIV virus. In 1987, pharmaceutical companies began mass producing a drug called AZT, the first drug approved to treat HIV. They have since been involved in developing more effective treatments of HIV.
    - 2002 – outbreak of a new virus called SARS in China. The virus spread quickly in many different countries. The virus can cause severe breathing difficulties that are sometimes fatal. To date there is no treatment to cure SARS, but companies produce treatments to reduce the symptoms.

Facing problems:

- Drugs have to go through a number of clinical tests to ensure they work properly and don't cause damaging side-effects.
- Companies experience high costs for research and development of new medicines. This means that rare diseases sometimes go unresearched because of the high costs. Companies often focus on treatments for common diseases because this will make them a lot of money.
- Overuse of antibiotics can also cause problems because people and diseases can become resistant to them.

Transplants:

- Over the years they have become more successful.
- 1905 – first transplant for the cornea of the eye.
- The first organ transplant was of the kidney. Now transplants for the liver, lungs, pancreases and bone marrow are common.
- First heart transplant was in 1967 by Christiaan Barnard in South Africa. However, the patient only survived for 18 days as he contracted pneumonia.

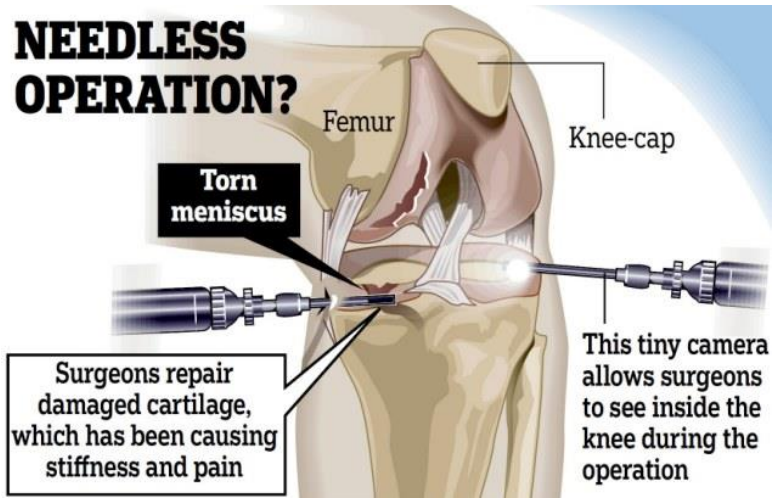
Technology:

- Improvements in science and technology have allowed improvements in the treatments of disease such as cancer.
- Radiation was discovered between 1896-1898 by Antoine Henri Becquerel, Marie Curie and Pierre Curie which led to the creation of radiation therapy. This was used to kill cancer cells.
- Laser development since the 1950's has allowed this to be used more regulalry since the 1980's. This can be used for eye treatments, cancer and dentistry.
- Key hole surgery has been developed and used since the 1950s too. This leads to less invasive surgery.

Key Terms	Definitions
Key hole surgery	Less invasive surgery. Leaves little scaring and usually completed by using a small endoscope through the body to complete treatments.
Acupuncture	Needles in specific areas to reduce pain/discomfort.
Homeopathy	Uses weak solutions of natural substances.

Alternative treatments:

- There has been mistrust with the use of some of the developments we have seen, which has led to people wanting to use alternative treatments such as acupuncture and homeopathy.
- These methods are not based on scientific research so there is no specific evidence to suggest whether these methods work or not or are good for the body. Some doctors believe that they do more harm than good.
- However, some doctors are now working with alternative therapists to see if using a mix of alternative treatments alongside mainstream treatments may benefit the patient.



History Knowledge Organiser: Impact of war and technology on surgery and health

X-Rays

- WW1 made x-rays more reliable and mobile.
- Wilhelm Rontgen discovered x-rays in 1895. x-rays passed easily through soft flesh, but less well through bone. X-ray images could therefore be produced by directing x-rays at a body part in front of a photographic plate.
- X-rays were used from the start of WW1 to find broken bones. However, the equipment was often unreliable and hospitals were located far from the battlefields.
- William Coolidge (USA) invented a more reliable x-ray tube in 1913. It was called the 'Coolidge tube' and was widely used by the end of WW1. It is still used today.
- In 1914, Marie Curie developed mobile x-ray units. These were ambulances equipped with x-ray machines which could be transported where they were needed.
- The war increased the need for radiologists.

Blood Loss

- Although there had been an idea of blood transfusions in the 17th century, they were rarely successful. This was because there was no knowledge of different blood groups/blood clotted/and there were problems with storing it.
- 1900- Karl Landsteiner discovered blood groups. Certain blood groups could not be mixed together as the blood would clot, in turn blocking blood vessels. With this discovery, more transfusions could take place that were successful – as long as the donor's blood group was the same as the patients.
- During WW1 the seriousness of wounds from gunshots and explosive shells meant that many soldiers were dying of blood loss. The storing of blood became very important.
- 1914 – doctors found sodium citrate stopped blood from clotting so could be sored. In 1917, the first ever blood depot was set up at the Battle of Cambrai (Northern France).
- 1946 – British National Blood Transfusion Service was established.

Plastic Surgery

- Although there had been some work on skin grafts, the extent of injuries during WW1 sped the need for this to be furthered.
- Work that had already been conducted in Germany and France paved the way for Harold Gillies who set up a plastic surgery unit for the British Army during the war.
- Gillies was interested in reconstructing facial injuries and developed pedicle tubes and documented all of his work.
- Gillies work was continued throughout WW2 and developed by Archibold McIndoe. A lot of the patients who used McIndoe were RAF pilots who had suffered burns.

Key Terms	Definitions
Radiologist	People who knew how to work x-ray machines/use x-ray equipment.
Pedicle Tube	Skin graft technique where skin is partially cut rom a healthy part of a patient's body, grown and then attached to the affected area.

WW2

- The legendary work of Archibald McIndoe and his team at the Burns Unit at Queen Victoria's Hospital, East Grinstead, has been well documented.
- Less well known is the work of the Russian Filatov who is credited with pioneering the work now taken for granted on skin grafts. The Russians also worked on 'biogenic agents' that encouraged healing and the re-growth of a damaged area.
- Mass production of penicillin after Fleming's discovery.
- World War Two also saw the growth of the blood transfusion service from a relatively primitive organisation at the start of the war to a sophisticated well-oiled machine at the end, storing blood and distributing it to where it was needed.
- Heart Surgery – Dwight Harken (USA) who was stationed in London cut into beating hearts and used his bare hands to remove shrapnel and bullets. By doing this, heart surgery developed after the war.
- The NHS – in 1942, William Beveridge suggested there should be health care for all. After WW2, the NHS was set up (1948).
- Diet – shortages of food during WW2 meant the government encouraged people to grow their own and eat as healthily as possible.
- Hygiene and disease – posters were produced in order to keep people active. National immunisation programme was introduced against diphtheria, a bacterial infection which commonly killed children.
- Poverty – during the war over one million children were evacuated to the countryside from towns and cities. Their lifestyles were very different and often better. The levels of poverty were highlighted during this time which encouraged the government to do something about it after the war.

History Knowledge Organiser: Why did the government try and improve the nation's health after 1900?

Key Terms	Definitions
Slums	Incredibly poor housing, overcrowding, poor living conditions etc.
Social reformers	Someone who believes something needs to change in society to make things better.
Reform	To change something that isn't working for the better.

The Boer War:

- Before the two world wars, Britain fought in South Africa between 1899 and 1902. this was know as the Boer War.
- During this time it is said approximately 40% of the men who signed up were unhealthy.
- This worried army leaders and the government too. How were they supposed to protect Britain and its interests if the men in their army were unhealthy/unfit. They knew that something needed to be done.
- Therefore, reforms needed to be made.
- Within five years of the end of the Boer War the government had introduced free school meals for the poorest of children, school medical inspections and National Health Insurance Act which gave people access to free medical treatment.
- Was this just the start though?

The effects of poverty:

- In 1900, slums and overcrowding were still problems in Britain. The poor worked long hours and were paid low wages. Many people couldn't afford to see a doctor, or provide three decent meals for their children as suggested.
- Two reports showed how bad the problem of poverty was. These were by Charles Booth and Seebohm Rowntree – social reformers.

Booth's report:

- 1889 – *Life and Labour of the People in London.*
- Showed 30% were living in severe poverty.
- It was sometimes impossible for people to find work.
- Showed that wages were so low that a family could not be supported.

Rowntree's report:

- Had a factory in York.
- Didn't believe the problem in York was as bad as London so did a survey to see.
- 1901 – *Poverty, a study of Town Life* showed that 28% of people in York could not afford basic food and housing.

National Insurance Act – health insurance for workers. Worker, employer and the government all contributed to a central fund that workers could use for sick pay or to pay for a doctor.

Liberal Reforms:

- Booth, Rowntree and the Boer War showed that there was a link between poverty and ill health.
- David Lloyd George (newly elected liberal government), realised it had to take action if it wanted a fit and healthy society that could stand up to a war if it were to happen.
- Therefore, a number of new reforms were put into place in order to combat the problem between poverty and ill health.

1906 – Free School Meals were introduced paid for by council taxes.

1907 – Local Education Authorities started giving children free medical inspections.

1908 – Old Age Pensions. For people aged 70 and over. First ever welfare scheme to be paid by national taxes.

1909 – Labour exchanges were introduced to help unemployed people find work.

1911 – National Insurance Act was passed.

History Knowledge Organiser: Why did the government try and improve the nation's health after 1900?

Public Health and the World Wars:

- Both world wars saw Britain having to raise mass armies. This made the government and military officials more aware of the health problems of the poor as recruits were often in poor health.
- Powerful people were more concerned with solving these problems when a country was at war rather than at any other time.
- Evacuation of children during WW2 increased awareness in richer rural communities.
- After WW2, people looked for improvements in society. Such feelings led to the victory of the Labour Party in 1945, which promised healthcare for everyone and full employment.

Housing and Health improved after WW2:

- Towards the end of WW1, David Lloyd George promised 'homes fit for heroes'. New council homes were built in the 1920s and 1930s, but even these were often too expensive for the poorest families, who still lived in slums.
- During WW2, destruction from bombing and a lack of construction led to sever housing shortages, making the situation worse.
- After the war, Labour built 800,000 new homes between 1945-51.
- 1946 – New Towns Act was passed creating new towns near major cities.
- Governments in the 1950s and 1960s demolished over 900,000 old, cramped slums and over 2 million inhabitants were rehoused.
- 1961 – Homes for Today and Tomorrow report published. Gave specific standards of housing, including adequate heating, flushing toilet, and enough space inside and outside.
- This was a final step in tackling issues of overcrowding, poor nutrition and poor waste disposal that caused public health problems.

Beveridge Report and the Welfare State:

- 1942 – a social reformer called William Beveridge published the Beveridge Report. It was read widely and became a best seller.
- He said that the government had a duty to care for all its citizens, not just the poor or unemployed. He suggested that a welfare state was created – a system of grants and services available to all British citizens.
- 1945 Labour government was elected and promised to implement these proposals. One of their first acts was to pass a new National Insurance Act in 1946 to support anyone who couldn't find work, whether as a result of sickness, pregnancy, unemployment or old age.
- This was to further what had already been put in place by the Liberal government, the difference being anyone could apply for this.

The NHS:

- Established in 1948.
- Aneurin Bevan was the Labour minister for Health who acted upon Beveridge's work.
- The government nationalised hospitals and put them under local authority control.
- Treatment was free for all patients.

FOR:

- During WW2 the government took control of all hospitals, creating the Emergency Medical Service. It's success led to much support for the NHS.
- The NHS made medical care free, accessible to everyone.
- NHS guaranteed that hospitals would receive government money, rather than from charities.

AGAINST:

- Many Conservatives opposed the NHS as they believed the cost would be too high.
- Doctors saw themselves as independent and would lose income.
- Many doctors threatened to go on strike and protest against the NHS.

- Although the Conservatives were opposed to the creation of the NHS, when they came back into power in 1951 they could not abolish it as it was too popular.
- The NHS increased the number of people with access to healthcare. The number of doctors doubled between 1948 and 1973 to keep up with demand.
- The NHS today provides a range of services including accident and emergency, mental health care, maternity care and major surgery, as well as pharmacies, dentists, sexual health clinics and so on.

Problems today:

- Dealing with a nation of rising life expectancy.
- Lifestyle choices are putting a strain on the NHS e.g. smoking, obesity, alcohol consumption.
- Treatment, equipment, medicine is very expensive.
- Cost of the NHS is rising rapidly. In 2015/2016 the NHS budget was £116 billion overall.
- Backlash from the public due to the strain it is under.

History Knowledge Organiser: The 21st century

The Welfare State:

- The NHS was set up in 1948 providing healthcare for everyone. All medical treatment was free to those that wanted it.
- A weekly family allowance was introduced to help with childcare costs.
- The very poor received financial help too – 'benefits'.
- The school leaving age was raised to 15 to give children a greater chance of a decent education. More free university places were made available to.
- Slum clearance – continued in order to build better housing. 280,000 council houses were being built each year.

Impact of the NHS:

- Aneurin Bevan was appointed to become the Minister of Health and introduce the NHS.
- It saw an immediate impact. Before it was set up approximately 8 million people had never seen a doctor, now this was a choice they had.
- The impact is still felt today. Women are more likely to go and see a doctor than men.
- Life expectancy for women has raised from 66 to 83 since 1948 and for men 64 to 79.
- However, even today life expectancy can be influenced on your living conditions.

Costs of the Welfare State:

- The NHS costs money, so eventually the idea of 'free' healthcare for all was subsidised through taxes which workers had to pay, as well as some services starting to charge.
- Today prescriptions are paid for as well as eye care and dentistry.
- However, services are still accessible to all ranging from family planning to surgery.
- When the NHS was launched in 1948, it had a budget of **£437 million** (**roughly £15** billion at today's value). For 2015/16, the overall NHS budget was around **£116.4 billion**.

Evening Standard

The National Health Bill is out. It will cost £152,000,000 a year

STATE TAKE OVER DOCTORS, HOSPITALS AND DENTISTS

'Free for all'—1948

PRIVATE PRACTICE STAYS, BUT NEW DOCTORS DIRECTED

Can they stay outside?

What you get—

FIGURES

HAMBURG WITHOUT BREAD

PLANE DIVES ON SCHOOL

200 children at play: All safe

Mr. Claude de Bernales

JOHN FROST COLLECTION

Healthcare in the 21st century

- The NHS is often at the forefront of the news, or if not, regular topics of conversation amongst adults, which seems to be rarely positive.
- It is often in the media with comments such as 'dirty wards', 'long waiting times', 'insufficient staffing', 'insufficient pay', 'long working hours' etc. .
- This all stems to money. Developing and prescribing new drugs is an expensive business, and more are needed as the population is living longer. Therefore there is extra requirements placed on the NHS and on times may see it struggle.
- However, the NHS introduces a number of initiatives to try and help people stay fit and healthy such as banning smoking in public places in 2007, and in 2015 smoking in cars with children was banned too.
- Campaigns from the NHS also involve spotting early signs of cancer, how to spot a stroke, eating healthier with the 5 a day campaign and ideas developed the government to introduce a 'sugar tax' in which there was an additional cost placed on fizzy drinks/high sugar drinks.
- There will be technological breakthroughs to consider too.
- Digital therapy is something which is designed for those who need treatment at home or cannot travel for treatment.