

GCSE History - Medicine Through Time Revision Notes

TOPIC 5 – MEDIEVAL

Background Information

- Wars destroyed the Roman public health systems and medical libraries.
- The rulers of the small kingdoms built up armies rather than improving medical skills or public health.
- War disrupted trade so countries became poorer.
- Travel became more dangerous, reducing the communication between doctors.
- Training of doctors was abandoned. Copies of Galen's books were either lost, or hidden away for safety.

HOWEVER, LATER...

- The church had set up universities where doctors could be trained.
- Armies took trained doctors to war with them where they gained experience as surgeons.
- Rulers were taken to clean up towns.
- Merchants and scholars were once again travelling around Europe, sharing ideas

Influence of the Christian Church

- The Christian Church grew stronger in the Middle Ages.
- Monasteries controlled education, priests and monks were the only people who could read. The Church opened medical schools where the ideas of Galen were taught.
- The only libraries were in monasteries, church sometimes banned books they did not want people to read.
- Monasteries made an effort to provide clean running water and toilets.

Medieval Hospitals

- Medical care for the poor came from hospitals set up by monasteries, and run by monks and nuns.
- They provided "hospitality" for visitors.
- Genuinely ill people were often turned away due to fear of disease spreading.

The Return of Hippocrates and Galen

- Galen's ideas were rediscovered. Church leaders looked carefully at Galen's works and decided that they fitted in with Christian ideas because he referred to "the creator" in his works.
- Doctors in the believed his ideas were correct and it was nearly impossible to improve his work.
- Galen had great influence on the doctors in the Arabic world and in medieval Christian Europe
- Medical schools began to appear in Western Europe, starting with the one in Salerno, Italy. Translations of Galen's and Hippocrates' work were accepted as absolute truth in medical schools.

Arab Medicine – *Islamic scholars picked up and developed ideas from the Greeks whom they greatly admired.*

- Aristotle's four humours, Galen's treatment by opposites and Hippocrates' clinical observation lived on.
- Books were written that brought together the ideas of Aristotle, Galen and Hippocrates. These books were important means by which these ideas got back to Western Europe.
- The attitude of Muslims towards the Koran meant that they were unwilling to criticise the works of Galen.

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The Four Humours Theory

- Medieval doctors believed illness was caused by an imbalance of the four humours.
- The theory developed into a more complex system, based on the position of the stars.
- Although human dissection was carried out in medical schools, findings were interpreted as the theory of the four humours – although some later doctors began to challenge traditional understandings.

New Developments in Medieval Medicine

- More schools sprang up and human dissection was allowed. There were some doubts about classical texts.
- New techniques included diagnosis by urine sample. This is a good aid to diagnosis, which is done today!
- Doctors also believed the stars caused disease and relied on astrology when deciding on treatments
- Trained doctors were very expensive. Medicine practised amongst the most was provided by monasteries and housewife-physicians, using traditional cures and their experience.

Supernatural Beliefs and Treatments

- The church believed that illness was a punishment for sins – they prayed to god if they became ill.
- Some believed that pilgrimages to holy shrines could cure illness.
- Doctors had superstitious beliefs, saying magical words when treating patients and consulting stars.

Developments in Surgery

- In the Middle Ages, there was great demand for surgery because of warfare.
- Surgery was held in such low regard that many procedures were often left to untrained barber-surgeons.
- Wine was first used as an antiseptic.
- Surgical treatments were still simple, as major surgery was risky.

Public Health Measures

- Towns lacked the public health schemes of the Romans.
- People relied on cesspits and wells. Waste was frequently disposed of into the street.
- People found it healthier to drink beer, than to drink water.

The Black Death – 1348

- Spread by coughs and sneezes or by black rat flea bites – black rats were carried overseas by ships.
- Arrived in Britain in 1348. Its victims were struck down suddenly and most died.
- Symptoms included exhaustion, high temperatures, swellings and difficulty breathing.
- Ships were made to wait 40 days before landing – they were quarantined.

What did people think caused the plague and how did they treat it?

- Miasma – carried sweet smelling herbs, sat between two large fires.
- God – tried to appease god by praying, or becoming flagellants (whipping themselves as a punishment).
- Humours out of balance – use of opposites, purging, vomiting and blood letting.
- Poisoned water – blamed the Jews.

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Quick Summary of Medieval Medicine.

- Doctors followed the ideas of Galen. They believed illness was caused by an imbalance in humours.
- Believed that God and the Devil influenced health. Disease was seen as God's punishment for sins.
- Astrology became important. Doctors studied star charts because they believed that the movement of the planets affected people's health.

TOPIC 6 – RENAISSANCE

Background to the Renaissance

- Renaissance means rebirth. It began with close study of classic texts and was critical of old translations
- There was a greater interest in how the human body worked based on observation and dissection.
- Artists attended dissections of human corpses and did wonderful illustrations for medical books.
- Return of classical texts led to a renewed faith in the four humours theory and treatment by opposites.

Andreas Vesalius – Anatomy

- Studied anatomy, became professor of surgery and anatomy at Padua. He was allowed to do dissections.
- Did his own dissections and wrote books based on his observations using accurate diagrams to illustrate his work. His most famous book was 'On The Fabric of the Human Body' written in 1543.
- He was able to point out some of Galen's mistakes. Vesalius said there were no holes in the septum of the heart and that the jaw bone is not made up of two bones.
- Vesalius encouraged doctors to dissect and look for themselves.

Ambroise Paré – Surgery

- Paré was a battlefield surgeon; this was still a low status profession.
- In battle, he ran out of boiling oil which was used for treating gunshot wounds. Paré made an old Roman ointment of roses, turpentine and egg yolk.
- Paré develops ligatures to seal wounds instead of using a cauterising iron.
- Carried out an experiment to disprove Galen by proving the bezoar stone isn't a treatment for poison.
- Writes 'Notes on Surgery' and becomes the King's surgeon.

William Harvey – Circulation of the Blood

- Discovers the circulation of the blood, disproving Galen's ideas.
- Identifies the difference between arteries and veins.
- Becomes doctor to the King, his ideas are very influential.
- To spread his ideas he writes "An Anatomical Account of the Motion of the Heart and Blood".
- However, bleeding operations still continue after Harvey as people are unsure of what else to do.
- Blood groups are discovered in 1901, which makes blood transfusions successful.

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The Great Plague of 1665

- This was the worst of the reappearances of the Black Death. The death toll in London was about 100 000.
- Efforts were made to control the spread of disease. Households were locked in and red crosses were painted on their doors with the words, “Lord have mercy upon us.”
- Carts organised by the authorities roamed the city to the now infamous cry of “Bring out your dead!” collecting corpses for mass burial in “plague pits”.
- People realised disease was contagious, but they still didn’t understand about germs causing disease.
- The Great Fire of London in 1666 effectively sterilised large parts of London, killing the plague bacteria.

Public Health

- There were many wars during the renaissance. Warfare gobbled up resources.
- Populations were beginning to increase in the towns and cities, placing more strain on the available clean water supplies and sewage disposal systems.

What factors affected progress in medicine during the renaissance?

- The Printing Press – new ideas could spread more easily and rapidly now that books could be printed.
- The Weakening Power of the Church – people did not have religious beliefs about the causes of diseases, meaning that people started to look for natural causes. Doctors could now dissect.
- Artists Drawing from Life – medical drawings could be drawn and shared among doctors through medical books, new anatomy books were produced.
- Renewed Interest in Ancient Learning – people wanted to learn how to read, they began to challenge old medical ideas (e.g. Galen holes in the septum).

TOPIC 7 – 1750 TO 1900

Background Information

Why Had They Stopped Reading Galen in the Nineteenth Century?

- New understanding of the body and Galen’s descriptions were incomplete and sometimes wrong.
- The invention of the microscope proved that Harvey’s ideas were right.
- Theory of the four humours no longer accepted. People initially thought that miasma, caused disease.
- Doctors carried out dissections and used microscopes. Galen’s books were no longer important.

Smallpox and Edward Jenner

Inoculation

- In the 18th century, smallpox was a big killer. Lady Mary Wortley Montagu brought inoculation to Britain.
- She discovered that a healthy person could be immunised against smallpox using pus from the sores of a sufferer with a mild form of the disease.
- However, inoculation sometimes led to smallpox and death.

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Edward Jenner

- Jenner was a country doctor. He heard that milkmaids didn't get smallpox, but instead a milder cowpox.
- Jenner investigated and discovered people who had already had cowpox didn't get smallpox.
- In 1796 he took a small boy and injected him with pus from the sores of a milkmaid with cowpox. Jenner then injected James with smallpox. James didn't catch the disease!

Opposition to the Smallpox Vaccination

- Jenner could not scientifically explain how it worked.
- Inoculators were afraid of losing money.
- Many were worried about side effects; they worried about giving themselves a disease that from cows.
- Some members of the Church believed that vaccination was not natural.

Developments in Nursing

Florence Nightingale

- Nightingale brought discipline and professionalism to a job that had a bad reputation at the time.
- From a wealthy background, she became a nurse despite the opposition of her family.
- Went out to the Crimean War to sort out nursing care in the English camp.
- She made huge improvements in the death rate, due to improvements in ward hygiene.
- When she returns home, she writes a book 'Notes on Nursing' and sets up a hospital in London.

Mary Seacole

- From a poor background in Jamaica. Seacole volunteers to help as a nurse in the Crimean War, she is rejected, but goes anyway self-financing her journey.
- She nursed soldiers on the battlefields and built the 'British Hotel'.
- Goes bankrupt when she returns to England – but receives support due to the press interest in her story and she writes an autobiography.

How Did Scientists Discover the Causes of Disease?

Louis Pasteur's Germ Theory – 1857

- Scientists thought microbes were caused by disease and appeared because of illness. This was the theory of spontaneous generation. Instead of blaming microbes, people looked for miasmas.
- Louis Pasteur was employed in 1857 to find the explanation for the souring of sugar beet used in fermenting industrial alcohol. His answer was to blame germs in the air.
- He proved there are germs in the air by sterilising water and keeping it in a flask that didn't allow airborne particles to enter. This stayed sterile – but sterilised water kept in an open flask bred microbes again.

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Robert Koch

- German scientist. He began linking diseases to the microbe that caused that specific disease.
- Koch developed a solid medium to grow cultures, and dyeing techniques to colour microbes, which he viewed through high-powered microscopes.
- He identified anthrax spores and the bacteria that cause septicaemia, tuberculosis and cholera.

Louis Pasteur – Chicken Cholera Vaccine

- Hearing of Koch's, Pasteur came out of retirement and competed to find new microbes and combat them.
- Pasteur looked for cures to anthrax and chicken cholera. Both he and Koch worked with large teams of scientists. Charles Chamberland was in Pasteur's team.
- Chamberland was told to inject chickens with chicken cholera, but it was the day before his holiday and he forgot. He left the germs on his desk and injected the chickens when he returned from his holiday.
- The chickens survived, Pasteur and Chamberlain tried again with new germs, but the chickens survived.
- The cholera had been weakened by being left out, and the weakened cholera made the chickens immune. Chamberland's error had produced a chance discovery.

Louis Pasteur – Anthrax Vaccine

- Pasteur's team managed to produce a weakened version of the anthrax spore that would make sheep immune to the disease. They demonstrated this in a public experiment.

Overcoming the Problems of Surgery

Surgery in the early 1800s was **dangerous** and **painful**. **Infection** was the greatest danger to patients.

What problems faced surgeons in 1800?

1. **Pain** – patients can die of clinical shock during surgery.
2. **Infection** – people were unaware of microbes that cause infection. Surgeons would wear the same dirty apron for every surgical procedure they carried out, passing on infection between patients.
3. **Bleeding** – patients can die if they lose too much blood during surgery.

How was the problem of pain overcome?

In 1800, surgeons tried various ways to ease suffering of patients – e.g. getting them drunk, knocking them out and giving them opium.

Nitrous Oxide or 'laughing gas' was discovered by Sir Humphry Davy. It was never really widely used as Davy's findings were published in a book that was not well known, the book was given an obscure name.

Ether used by J.R. Liston during a leg amputation. However, it had very unpleasant side effects.

Chloroform used by James Simpson and some friends at his home. They realised that it could be used as during surgery. However, it led to unexplained deaths. The dose given could not be measured or controlled.

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Reasons for opposition to anaesthetics:

- They were uncomfortable for patients.
- Some doctors believed that pain was good for healing.
- People didn't understand how they worked.
- Didn't understand the side effects that new substances could have on the body.

The final acceptance of anaesthetics:

The final breakthrough came when Queen Victoria accepted the use of chloroform as an anaesthetic during the delivery of her eighth child.

How was the problem of infection overcome?

Until germ theory in the 1850s, surgeons didn't take precautions to protect open wounds. They reused bandages, didn't wash their hands before operations and didn't sterilise surgical equipment.

Joseph Lister and the discovery of antiseptics:

- Heard that carbolic spray was used on sewage. He knew sewage had a similar smell to gangrene.
- He had read the work of Pasteur on his germ theory.
- He was prepared to take risks.

Reasons for opposition to Lister:

- Lister's methods slowed down surgery.
- The spray was uncomfortable for doctors to use, it affected their skin.
- Pasteur's germ theory was not widely accepted in 1857.
- Surgeons did not copy his methods correctly and were therefore disappointed with their results.

The final development of aseptic surgery:

By the late 1890s Lister's antiseptic methods led to aseptic surgery. This is the removal of all possible germs from theatres to ensure absolute cleanliness. The following methods were introduced...

- Operating theatres and hospitals were rigorously cleaned.
- All surgical instruments were steam sterilised.
- Sterilised rubber gloves were first used and surgeon's hands were scrubbed.

How was the problem of bleeding in surgery overcome?

Once William Harvey had discovered the circulation of the blood, the first blood transfusions were attempted.

Early blood transfusions often ended disastrously because...

- Blood groups had not been discovered.
- They could not prevent the blood from clotting.
- Infection could be passed on.

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Developments in Public Health

Public Health Problems in the Early 1800s

- During the late 1700s and the first half of C19th, conditions in British towns became worse than ever.
- Houses were built as close together as possible as more people crowded into factory towns to work.
- Towns could not cope with the need to provide people with water and sewage disposal facilities.
- In these squalid conditions, diseases spread easily and rapidly.
- The conditions were so bad that many people's health may have even become worse than ever before.

The Battle to Improving Public Health

- Some thought that the government should force local councils to clean up their towns.
- However, many believed that the government shouldn't interfere – this attitude is called laissez-faire.
- They believed the government should allow each local area to control its own affairs.
- This meant that local ratepayers made all the decisions. Local ratepayers didn't want the government to force them to pay for improvements to their towns.

Edwin Chadwick

- In 1842 he was asked by the government to report on the living conditions and health of the poor.
- Chadwick concluded that poverty was caused by ill health which was caused by the terrible conditions in which people lived.
- He said that ratepayers can cut their taxes and save money in the long-term by looking after the poor and to spend money improving their health.
- In his "Report on the Sanitary Conditions of the Labouring Population" he said industrial towns should:
 - Organise drainage and refuse collection
 - Provide a pure water supply
 - Appoint a Medical Officer of Health

For over 30 years an argument went on about the need for town councils or the government to take action. Towns such as Liverpool and Manchester did start to build sewage and water-supply systems.

1848 Public Health Act

- The government did nothing at first about Chadwick's recommendations.
- However, in 1848 there was another outbreak of cholera, this put pressure on the government to do something. Parliament reluctantly agreed to pass Public Health Act.
- Although it was **not compulsory**. The government set up a Board of Health to encourage, but not to force, local authorities to improve conditions.
- They gave local authorities money to make improvements in their areas if they wanted to and had the support of local ratepayers.
- Only a few local authorities took any new measures.
- By 1872 only 50 Medical Officers of Health had been appointed.
- The Board of Health was abandoned in 1854.

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1853 John Snow

- In 1854 John Snow proved that there was a link between cholera and water supply. He used research, observation and door-to-door interviews to build a detailed map of a cholera epidemic in Broad Street.
- Nearly all the deaths had taken place within a short distance of the water pump.
- Near to the pump, there was a brewery and none of the people there had cholera. The brewery had its own water pump, and the men had been given free beer. They didn't use the Broad Street Pump at all.
- After collecting evidence, John Snow removed the handle from the Broad Street pump.
- There were no more deaths. It later came to light that a cesspool near to the pump had a cracked lining which allowed the contents to contaminate the drinking water.
- Snow put pressure on water companies to clean up their water supplies.

1858 Great Stink

- For years human waste made its way from the latrines in London into the River Thames.
- In 1858 the hot weather caused a 'great stink'. The putrid smell was right under Parliament's nose.
- Parliament considered moving and had to coat their curtains with a deodorant to get rid of the smell.
- The Great Stink prompted Parliament to sort out London's sewage and drainage system and to clean up the River Thames.
- Within a year Sir Joseph Bazalgette had begun to build an extensive system of sewers and drains that are still in operation today.

1867 Second Reform Act

- Working class men were given the right to vote.
- For the first time, it wasn't just the ratepayers who got a say in improving public health.
- MPs were forced to improve the living conditions of the poor.

1875 Second Public Health Act

Unlike the 1848 Public Health Act, the 1875 Public Health Act actually **forced** local authorities to introduce the following measures:

- Provision of clean water
- Proper drainage and sewage
- The appointment of a Medical Officer of Health

But why was the act introduced?

Factor	Explanation
Scientific Developments	In 1861 Louis Pasteur published his germ theory which proved the link between dirt and disease. With scientific proof, people were more willing to pay taxes to cover the costs of public health reforms.
New Voters	Working-class men were given the vote in 1867. MPs were more likely to take notice of the victims of poor public health.

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Statistics	The government published statistics of where death rates were highest and what people died of. The statistics shamed some unhealthy towns into action.
Cholera Outbreaks	When cholera returned in 1865 and the link between disease and dirty water had been proven by John Snow, ratepayers were finally prepared to take action.
Weakening of Laissez Faire	The government saw it could no longer leave public health measures to individuals or councils, and realised that they had to take action.

The Public Health Act of 1875 was very effective. By 1900 most British towns had built effective hygiene and water systems.

Result of the Public Health Act of 1875

- Improved the standards of housing
- Stopped the pollution of rivers from which people got water
- Shortened working hours in factories for women and children
- Made it illegal to add ingredients that made food unhealthy
- Made education compulsory

Public Health – 1800 to Present Day

Limited – 1830s	Optional – 1848	Compulsory – 1875	Comprehensive – 1948
A few towns introduced sewers, refuse disposal and clean water.	1848 Public Health Act, towns could set up Boards of Health if 10% voted for it.	1875 Public Health Act, councils forced to provide basic sanitation and medical officers	From cradle to grave, Pensions, National Insurance, Welfare State and the NHS.

TOPIC 8 – 20TH CENTURY

What Medical Progress Did the First World War Bring About?

- Surgeons had the opportunity to experiment with new techniques. Surgeons developed techniques to repair broken bones, and perform skin grafts – plastic surgery.
- Soldiers promised good housing when they returned. This helped to get rid of unhealthy slum housing.
- Surgery of the eye, ear, nose and throat all improved rapidly. Brain surgery also advanced.

The Development of X-rays

- X-rays were first discovered 20 years before the war.
- Hospitals installed X-ray machines, but it was the First World War which confirmed their importance.
- More were manufactured to meet demand and they were installed in hospitals along the Western Front.
- X-rays immediately improved the success rate of surgeons in removing deeply lodged bullets and shrapnel which would otherwise have caused fatal infections.

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Blood Transfusions

- In the renaissance, Harvey proved blood circulates and this encouraged experiment with transfusions.
- It sometimes worked and sometimes failed. Scientists didn't know about different blood groups.
- Blood groups were discovered in 1901 by Karl Landsteiner. The discovery made transfusions successful.
- During the First World War vast amounts of blood was needed. On-the-spot donors were impractical. Many soldiers bled to death in the trenches before blood could get to them.
- The search began for a better method of storage and transfusion. Doctors discovered how blood can be bottled, packed in ice and stored where it was needed. This discovery helped to save many lives.

The Discovery and Development of Penicillin

- 1 Fleming discovered mould killed germs. Writes articles but publishes them in book with an obscure name.
- 2 Chain and Florey begin research in Oxford after reading an article by Fleming. They experiment with mice.
- 3 Penicillin is first tested on a human being in Oxford.
- 4 U.S. and Britain fund production of penicillin.
- 5 Enough penicillin is produced to treat all the allied forces wounded in the D-Day invasion of Europe.

How Was Penicillin Discovered?

- The discovery of penicillin is a great example of a chance finding helping science.
- One day in 1928 Fleming came to clean up some old culture dishes he had been growing bacteria for his experiments on. By chance, a fungal spore had landed and grown on one of the dishes.
- He noticed that colonies of bacteria around the mould had stopped growing. The fungus was identified and the substance given the name penicillin. It produced a substance that killed bacteria.
- Fleming was unable to take his work further. The industrial production of penicillin still needed work.

How Was Penicillin Developed?

- In the 1930s two Oxford scientists, Florey and Chain, became interested in Fleming's 1929 paper.
- In 1939 they gathered a skilled research team and three days after the outbreak of the Second World War Florey asked the British Government to fund the team's research into penicillin.
- British chemical firms were too busy making explosives to start mass production – so Florey went to US.
- America helped to mass produce penicillin, the casualties of the Second World War added to the urgency.
- By 1944 mass production was sufficient for the needs of the military medics. Fleming, Florey and Chain were awarded the Nobel Prize in 1945.

Factors Leading to the Development of Penicillin

- Government – British government funded Florey's research, U.S. government funded mass production.
- Technology – microscopes and bacteria growing mediums.
- Scientific experiment – testing on mice.
- Individuals – Florey and Chain were skilled scientists supported by a skilled team of researchers.
- War – the growing casualties of World War Two added to the urgency to mass produce penicillin.
- Chance – Alexander Fleming discovered penicillin by chance in 1928.

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Impact of the Second World War

- Blood transfusion – blood could be stored for longer, civilians donated blood.
- Diet – rationing improved some people's diet, government encouraged healthy eating.
- Drugs – penicillin was developed as the first antibiotic.
- Poverty – evacuation took children out of urban areas. Highlighted contrast between rich and poor.
- Surgery – developments in the use of skin grafts and treatment of burns.
- Hygiene – government posters education people about health and hygiene.

The National Health Service

Influence of WW2

- WW2 broke down social distinctions and brought people together.
- The raising of armies made powerful people take notice of the health problems of the poor.
- Evacuation of children increased awareness of how disadvantaged many people were.
- After the Second World War people looked for improvements in society. Such feelings led to the 1945 victory for the Labour Party.

Introduction of the NHS

- Sir William Beveridge published his famous Beveridge Report in 1942. In it he called for the state provision of social security "from the cradle to the grave". The report became a bestseller.
- Aneurin Bevan was the Labour Minister for Health who introduced the National Health Service.
- National Insurance was introduced to pay for the NHS. Doctors and dentists were wooed with a fixed payment for each patient. They were also allowed to continue treating private fee-paying patients.

The NHS Still Has A Few Problems...

- Governments have reduced how much of the NHS is free – charging for prescriptions and dental health.
- Long waiting lists and doubts about the quality of treatment have led to paying for treatment outside NHS.
- Longer life expectancies have meant more need for care of the elderly and increased costs for the NHS.