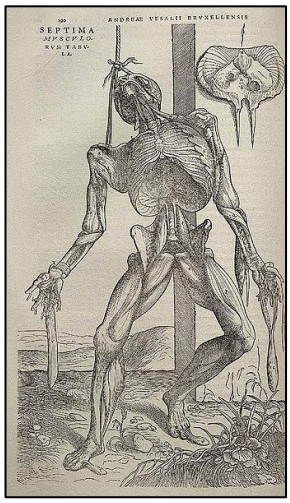
Paper 1:
MEDICINE IN BRITAIN, c1250-present



AND

THE BRITISH SECTOR OF THE WESTERN FRONT, c.1914-18: Injuries, treatment and the trenches

Name:_____

Every week, you MUST bring this booklet to your lessons.

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THE MIDDLE AGES (1250-1500)
1.0: CONTEXT OF THE PERIOD

TIMELINE OF MEDICINE IN THE MIDDLE AGES

11th century	*Latin translations of Hippocrates' and Galen's works started to appear in Europe.*
1215	*The Church banned members of the clergy from carrying out operations that involved cutting a patient.*
1348	*The Black Death arrived in England.*

SPECIALIST TERMINOLOGY

Apothecary	*A medical practitioner who mixed herbal remedies for physicians or directly for patients.*	**Theriaca**	*A spice-based mixture used to treat illness.*
Astrology	*The study of the planets and stars.*		
Barber surgeon	*Barbers worked with sharp knives, so also carried out medical procedures such as bleeding and smaller surgeries.*	**Vivisection**	*Execution in which the criminal was dissected alive and examined by physicians and medical students.*
Bleeding / blood-letting	*Taking blood out of the body to cure or prevent an illness.*		
Cupping	*A method of bleeding, where a heated cup was placed over a cut to draw out blood.*		
Emetic	*Something taken to make a person vomit.*		
Leprosy	*Leprosy begins as a painful skin disease, followed by paralysis and eventually death. Fingers and toes often fall off.*		
Miasma	*Bad air believed to be filled with harmful fumes which could cause illness.*		
Physician	*Someone who practices medicine (the word doctor was not used in the Middle Ages).*		
Purging	*Removing leftover food from the body.*		
Self-flagellation	*Whipping yourself to show God that you are sorry for your sins.*		
Theory of the Four Humours	*This stated there were four liquids that made up the body, and were created by digesting different foods.*		

GLOSSARY OF NEW WORDS

Clergy	*Everyone who works for the Church.*
Excommunicate	*To expel someone from the Church and condemn them to hell.*
Monks and nuns	*Members of religious communities who are entirely devoted to God.*
Pilgrimage	*A journey to an important religious monument, shrine or place.*

KEY INDIVIDUALS / INSTITUTIONS

The Church	*A religious organisation spread all over Europe and headed by the Pope.*
Galen	*An Ancient Greek physician who liked and developed the ideas of Hippocrates.*
Hippocrates	*An Ancient Greek physician who created the Theory of the Four Humours in the 5th century BC.*

WHAT WERE THE KEY FEATURES OF LIFE IN THE MIDDLE AGES?

Role of the crown and government	*The king's main tasks were to defend his people in wartime and to keep the country peaceful by punishing lawbreakers. Taxes were only raised to pay for wars.* *Keeping streets clean and towns healthy was the work of local councils, but they had little money.*
The Church	*The Christian Church was incredibly powerful across Europe in the Middle Ages, headed by the pope. People were very religious and almost everyone followed the teachings of the Church. They attended Church services regularly and were expected to give a sum of money (called the tithe) to the Church each month. The Church punished people who challenged its ideas and authority.* *The Church built churches, monasteries and convents, which became important centres of the community, providing a range of services beyond religion. The largest libraries were in monasteries where monks copied books by hand.*
Attitudes towards science	*People were taught to respect ancient ideas and what was written in the Bible. Very few people used scientific methods of experimentation and observation to challenge ideas or find new ones.*
Education	*The Church controlled education, including universities where physicians were trained. Ordinary people also received most of their education from the Church. Most people could not read or write, so they learned from the stories they heard and the paintings they saw in church.*
Communication	*Books had to be written and copied by hand, usually by members of the Church (particularly monks).*
Living conditions	*Disease spread easily in cities where there were crowded and dirty streets and no drains for waste.*
Work	*90% of England's population worked as farmers, growing and harvesting crops for wealthy landowners.*
Diet	*Sickness was often caused by poor nutrition, especially when food was scarce after bad harvests.*

OVERVIEW OF HEALTH AND DISEASE IN THE MIDDLE AGES

Average life expectancy	*Around 30 years old. Nearly half of the population died before reaching adulthood.*
Common diseases	• *Dysentery (which causes serious diarrhoea) spread by contaminated food or water* • *Lung diseases (caused by open fires in homes)*
Beliefs about the causes of disease	*1. Disease was sent by God* *3. The Theory of the Four Humours* *2. Misalignment of the planets and stars* *4. Miasma (bad air)*
Main types of treating disease	*1. Prayer, fasting and pilgrimage* *3. The Theory of Opposites* *2. Bleeding and purging* *4. Herbal remedies*
Main methods of preventing disease	*1. Regular prayer and confession* *3. Purifying the air* *2. Maintaining good health, as advised in the Regimen Sanitatis*
Main source of treatment	*Female family members in the home.*
Who ran hospitals?	*The Church was the main provider of hospital care.*

MIDDLE AGES (1250-1500)
1.1: BELIEFS ABOUT THE CAUSES OF DISEASE

MAIN BELIEFS ABOUT THE CAUSE OF DISEASE	
Religious explanation: Disease was sent by God	*The Church taught that God sent disease:* *1. As a* **punishment** *for those who had sinned* *2. To* **cleanse** *one's soul of sin* *3. To* **test** *one's faith.*
Supernatural explanation: Astrology	*The* **misalignment of the planets and stars** *could cause disease. This belief became more popular after the Black Death. Many physicians used star charts to diagnose an illness.*
Rational explanation: Theory of the Four Humours	*The theory originated from the Ancient Greeks and stated that the body was made up of four humours:* **blood**, **phlegm**, **black bile** *or* **choler** *(yellow bile). It was believed that disease and illness was caused when the four humours became* **unbalanced**.
Rational explanations: Miasma	*A miasma was* **bad air** *believed to be filled with* **harmful fumes** *which could cause illness. Hippocrates and Galen said that miasma from swamps and corpses spread disease.*

WHAT WAS THE THEORY OF THE FOUR HUMOURS?	
What were the humours?	*Blood, phlegm, black bile or choler (yellow bile).*
What caused disease?	*An imbalance of the humours.*
Hippocrates	*An* **Ancient Greek** *physician who* **created** *the theory in the 5th century.*
Galen	*An* **Ancient Roman** *physician who believed and* **developed** *the ideas of Hippocrates.*
How was disease diagnosed?	*Each humour was linked with certain* **characteristics** *and one of the* **seasons**. *Physicians would use these when working out which humour was out of balance.*
How was urine used?	*This was also examined as a way of checking the balance of humours in the body.*
The Church	*Supported and promoted the Theory – Galen too believed in the idea of the soul.*

DIAGNOSING DISEASE USING THE THEORY OF THE FOUR HUMOURS

HUMOUR	SEASON	CHARACTERISTIC	ILLNESS	SYMPTOMS
Blood	*Spring*	*Hot and wet*	*Fever*	*Temperature and hot, red skin*
Phlegm	*Winter*	*Cold and wet*	*Coughs and colds*	*Sneezing*

WHY DID IDEAS ON THE CAUSES OF DISEASE NOT CHANGE IN THE MEDIEVAL PERIOD?

REASON	EXAMPLES	EXPLANATION
Institutions: The Church	• *The Church chose which books were copied out by hand by monks and given to libraries.* • *Dissections were illegal. The Church taught that a body needed to be buried for the soul to go to heaven.* • *The Church punished those who disagreed with it (e.g. through excommunication).*	*The only books / works that could be copied were ones the Church agreed with (e.g. Galen and Hippocrates and the Theory of the Four Humours). Books that challenged these ideas were not copied.* *There were limited opportunities for physicians to carry out scientific experiments, which prevented the development of new medical ideas.* *People did not question the Church's ideas and risk going to hell. This meant that the Church's ideas on what caused disease remained widely believed.*
Individuals: Hippocrates and Galen	• *Created and developed the Theory of the Four Humours (see above).* • *The Church supported Galen's ideas.* **E.g.** *Galen too believed in the soul.* • *Their writings were translated by monks in the 11th century and given to universities to be used for medical training.*	*The writings of Hippocrates and Galen were widely read, respected and believed.* *The Theory of the Four Humours continued to be learnt and respected by generations of physicians.* *The Theory of the Four Humours remained a popular explanation for the causes of disease.*
Lack of scientific observation / experiments	• *Physicians and medical students rarely carried out scientific experiments and observation, such as dissections.* • *Occasionally, physicians dissected executed criminals. However, physicians sat away from the body reading the works of Galen, while a barber surgeon carried out the dissection.*	*There were limited opportunities to develop new ideas about the causes of disease.* *Dissections were carried out to prove traditional theories, not to make new scientific discoveries about the causes of disease.*
Attitudes in society	• *People in medieval times were very religious.* • *The Church played a central role in the community (e.g. education; care for the sick).* • *People respected traditional medical ideas, such as the Theory of the Four Humours.*	*People hugely respected the Church and their teachings, which encouraged them to follow the Church's ideas on the causes of disease.* *Physicians who did not follow traditional ideas found it hard to get work, which meant that they continued to follow the ideas and practices to diagnose the cause of diseases.*

MEDIEVAL PERIOD (c.1250-1500)
1.2: APPROACHES TO TREATMENT AND PREVENTION

HOW WAS DISEASE TREATED IN MEDIEVAL TIMES?

BELIEF ABOUT CAUSE	EXAMPLE OF TREATMENTS
Disease was sent by God as a punishment for sin	• *Healing prayers* • *Fasting* • *Pilgrimage to the tombs of someone remembered for their healing powers, and touching a holy relic or presenting an offering.*
Disease was caused by the misalignment of the planets and stars	*The alignment of the planets was checked at every stage of treatment: herb gathering, bleeding, purging and operations all had to be done at the right time.*
Disease was caused by an imbalance in the four humours	**The balance of the four humours would be restored through…** • **BLOOD-LETTING / BLEEDING:** *Bad humours were removed from the body by removing some of the blood. Different methods of bleeding included cutting a vein, leeches, and cupping.* • **PURGING THE DIGESTIVE SYSTEM**: *Patients were given something to make them vomit (called an emetic), or a laxative.* • **GALEN'S THEORY OF OPPOSITES**: *Illness could be treated by something with opposite qualities.* **E.g.** *Too much phlegm (cold and wet) could be cured by eating hot peppers.*

HOW WAS DISEASE PREVENTED IN MEDIEVAL TIMES?

AIM OF PREVENTION	EXAMPLE OF PREVENTION
To ensure minor sins were forgiven and to prevent punishment from God	*Regular prayers, confessions and offering tithes to the Church.*
To prevent an imbalance of the four humours	• **DIET**: *People thought carefully about what and when they ate. Eating too much was strongly discouraged.* • **PURGING**: *Many people purged themselves.* **E.g.** *Hippocrates recommended using an emetic once a fortnight in the winter.*
To keep clean and prevent bad smells (e.g. a miasma)	**BATHING**: *The wealthy could afford a private bath. Public baths could be used for a fee. The poor swam in rivers.*
To ward off a miasma	*Some people carried a bunch of flowers or wore herbs in jewellery.*
To purify the air in the home	*People swept their homes regularly and laid down rushes on the floor, often with sweet smelling herbs (e.g. lavender).*
To purify the air in towns	*Local authorities put in place measures to keep towns clean.* **E.g.** *They tried to prevent rotting animals from being left lying around.*

OTHER HERBAL REMEDIES USED IN MEDIEVAL TIMES

HERB / REMEDY	MEDICAL USE
Theriaca *(a spice-based mixture, which included up to 75 ingredients)*	*Used to treat many different illnesses.*
Aloe Vera	*Prescribed to improve digestion.*

REGIMEN SANITATIS

This was a set of instructions given by physicians to their patients to advise them on how to maintain good health and to prevent illness. It first appeared in the work of Hippocrates and was very common by 1250 AD. The rich could have a Regimen Sanitatis written personally for them, which would take into account their balance of humours and lifestyle.

WHO PRACTICED MEDICINE IN MEDIEVAL TIMES?

PRACTITIONER	TRAINING	ROLE	COST
PHYSICIANS	*7 to 10 years* **professional training** *at university.*	*Diagnosed illness, recommended treatment and prescribed medication. Many were* **clergyman** *and so* **did not** *carry out treatments, such as bleeding.*	**Very expensive**; *many did not use them*
APOTHECARIES	*Knowledge from herbal manuals, family, and own experience.*	*Mixed* **herbal remedies** *(sometimes simply prescribed by physicians), prescribed poisons and made supernatural remedies (such as charms and amulets).*	*A* **cheap** *alternative to physicians*
SURGEONS	*Some were highly trained and learned their skills at university.*	*Performed* **operations**, *including setting broken limbs, removing arrows or removing cataracts from the eyes.*	
BARBER SURGEONS	**Least qualified** *practitioners.*	*Good* **barbers** *who regularly performed small surgeries, such as bleeding patients.*	

WHERE WAS CARE FOR THE SICK PROVIDED?

HOSPITALS	
How many hospitals were there?	*The number rose in the Middle Ages. By 1500, there were 1100 hospitals.*
Who ran hospitals in the Middle Ages?	*30% were owned and run by the Church, attached to monasteries and convents. The rest were funded by wealthy people who had left money in their will.*
What was the purpose of hospitals in looking after the sick?	*To* **care** *for the sick,* **not to** *cure or treat disease.* **E.g.** *The hospitals were kept clean and patients' bed linen and clothing were changed regularly. Many patients could see religious statues / the church altar.*
Who cared for the sick in medieval hospitals?	**Nuns**: *Routine nursing (washing and cleaning).* **Monks and priests**: *Said prayers for the sick and led Church services.*
Who was cared for?	*Travellers, pilgrims, the elderly and a few sick people.*
Who did hospitals reject?	*Infectious or terminally ill patients, pregnant women and the mentally ill.*
THE HOME	
How common was care in hospitals?	*Not very –* **most people** *were cared for at home.*
Who provided care in the home?	**Female** *family members were expected to care for the sick, and were respected for their healing skills.*
What care was provided in the home?	*Keeping the patient clean, warm and well fed; mixing herbal remedies; in some cases, carrying out minor surgeries and bleedings.*

THE MEDIEVAL PERIOD (c.1250-1500)
1.3 CASE STUDIES: THE BLACK DEATH AND LEPROSY

WHAT WAS THE BLACK DEATH?	
When did the Black Death arrive in England?	*1348*
What was the Black Death?	*A plague which was unfamiliar to people in England.*
Who did the disease affect?	*Everyone, regardless of wealth or where you lived.*
What were the three main symptoms of the disease?	*Buboes (large swellings in the armpit or groin), fever and coughing up blood.*
How many people died from the Black Death?	*Historians estimate that a third of the population of England died.*
At its height, how many were being buried in London?	*200 people a day*
How do we know medieval people could not control the disease?	*It returned every 10-20 years after 1348.*

WHAT DID PEOPLE THINK CAUSED THE BLACK DEATH?	
Religious cause	*Many believed the Black Death was a punishment from God for the sin in the world.*
Supernatural cause (astrology)	*In 1345, there was an unusual positioning of the planets Mars, Jupiter and Saturn. Astrologers saw this as a sign that something terrible was about to happen.*
Rational cause: A miasma	*Many believed the Black Death was caused by a miasma, which may have come from poisonous fumes released by an earthquake or volcano. Breathing in this bad air caused the body's humours to become unbalanced.*

HOW WAS THE BLACK DEATH TREATED?	
Religious treatments	*The main recommendation was to confess your sins and ask God for forgiveness through prayer.*
Re-balancing the humours	*At first, physicians tried bleeding and purging. However, this often made people die more quickly.*
Removing a miasma	*Physicians recommended strong-smelling herbs, like aloe and myrrh. Lighting a fire and boiling vinegar were also used.*
Herbal remedies	*Physicians often prescribed theriaca to treat the Black Death.*
Surgical treatment	*Physicians sometimes burst patients' buboes (occasionally this led to survival). This showed how desperate people were at the time, as many physicians were clergymen and were banned from cutting into people.*

HOW WAS THE BLACK DEATH PREVENTED?	
Religious methods	**This included:** • *Praying to God* • *Fasting* • *Going on pilgrimage* • *Self-flagellation (whipping yourself)*
Avoiding the miasma	• *People moved from affected areas.* • *People held a posy of flowers or fragrant herbs to the nose.*
Government actions: Introducing quarantine laws	**The government passed laws which stated that:** • *Those new to an area had to stay away from everybody else for 40 days. (This was partly done to persuade people not to move areas)* • *Stopped people from visiting houses where the disease had broken out.*
Government actions: Warding off a miasma	*Local councils stopped cleaning the streets, as they believed that the foul stench of rubbish and rotting bodies would help to prevent the spread of the plague. This again showed how desperate people were at the time.*

KEY POINTS ABOUT THE BLACK DEATH…

- *The lack of medical knowledge about exactly what caused the Black Death meant that people in England would have heard many conflicting ideas about what caused it.*
- *The Black Death was terrifying, as it quickly became clear that neither priests nor physicians were capable of curing the disease. This made people desperate, leading them to try a variety of different treatments and preventions (some of which went against traditional ideas, e.g. using bad smells to ward off a miasma).*
- *Since local governments did not have a great deal of power at this time (particularly in comparison to the Church), they could not fully enforce the laws they tried to introduce – many people did not follow them.*

LEPROSY	
What is leprosy?	*Leprosy begins as a painful skin disease, followed by paralysis and eventually death. Fingers and toes often fall off.*
What did people in the Middle Ages believed caused leprosy?	*They believed it was sent by God as a punishment for sin, as this was said in the Bible. However, people also believed that a leper's breath was contagious.*
How were lepers (someone with leprosy) treated in the Middle Ages?	*They were banished from communities and usually had to move to leper houses or isolated communities (called leper colonies).*
What rules did lepers have to follow if they lived in towns?	*They had to wear a cloak and ring a bell to announce their presence, and they were banned from going down narrow alleys.*

THE RENAISSANCE (1500-1700)
2.0: CONTEXT OF THE PERIOD

TIMELINE OF MEDICINE IN THE RENAISSANCE

c1440	*Invention of the printing press.*
1536	*Dissolution of the Monasteries in England.*
1543	*Publication of Vesalius' On the Fabric of the Human Body.*
1628	*William Harvey published his first book on the circulation of the blood.*
1660	*The Royal Society met in London for the first time.*
1665	*The Great Plague arrived in Britain*
1676	*Thomas Sydenham published Observationes Medicae*

SPECIALIST TERMINOLOGY

Alchemy	*An early form of chemistry, which focused on trying to turn materials into gold.*
Anatomy	*The study of the structure of the body.*
Dissolution of the monasteries	*In 1536, Henry VIII closed down monasteries and convents and confiscated their land.*
English Reformation	*Henry VIII broke from Rome and created the Church of England. England eventually became a Protestant country.*
Iatrochemistry	*Looking for chemical cures for disease.*
Microscope	*An instrument used to see objects too small to see with the naked eye.*
Pest houses	*Specialist hospitals caring for patients suffering from the plague or pox.*
Pomander	*A container carrying strong-smelling substances.*
Printing press	*A machine that allowed many copies of the same text or picture to be printed.*
Quarantine	*A method of isolating people who are infected with a disease.*
Royal Charter	*A document from the monarch, granting a right or power to a person or group.*
Transference	*A new theory of treatment that a disease could be transferred to something else.*

GLOSSARY OF NEW WORDS

Arteries	*Blood vessels carrying blood away from the heart.*
Humanism	*A new set of ideas, including the belief that human beings are able to learn more about the world around them.*
Protestantism	*A form of Christianity that started in 1517, which saw errors in the ways of the Catholic Church.*
Secular	*Not religious or spiritual.*
Veins	*Blood vessels carrying blood back to the heart.*

KEY INDIVIDUALS / INSTITUTIONS

William Harvey	*An English doctor who discovered how blood circulates around the body.*
The Royal Society	*An organisation which aimed to promote and carry out experiments to further scientific understanding, and encourage the sharing of scientific knowledge.*
Thomas Sydenham	*A well-respected doctor in London, who laid the foundations for a more scientific approach to medicine by encouraging careful observation of symptoms.*
Andreas Vesalius	*An Italian doctor and lecturer in surgery, who proved through dissection that Galen's work on anatomy was wrong.*

WHAT WERE THE KEY FEATURES OF LIFE IN THE RENAISSANCE?

The crown and government	*People in England accepted that the monarch ruled 'by the grace of God', and so the monarch kept personal control over the government. However, the power of the English parliament grew.*
The Church	*Protestantism challenged the teachings of the Catholic Church. This made the Catholic Church less successful in promoting its preferred beliefs about medicine and disease.*
Attitudes towards science	*More people were using scientific experimentation and observation to test traditional ideas. Scientists began to provide evidence that the Greek teachings about how the world worked were incorrect.*
Education	*Grammar schools offered free education, but the vast majority of poor children did not attend school, as they needed to work to support their family.*
Communication	*The printing press meant that ideas could be published and spread more widely. The Church lost control over the copying of books, so ideas that went against the Church could be published.*
Living conditions	*Life became more comfortable for the upper and middle classes, but for the poor life changed little. Disease continued to spread easily in cities, where there were crowded streets and no drains.*
Work	*Most of England's population continued to work in agriculture. However, there was a growth in the number of merchants involved in trade, and some industries grew, such as coal mining.*
Diet	*Generally, diets remained very plain. However, foods were introduced from the New World, such as bananas, potatoes, tea and coffee.*

OVERVIEW OF HEALTH AND DISEASE IN THE RENAISSANCE

Average life expectancy	*Around 35 years old.*
Common diseases	• *Smallpox (which causes a rash) spread particularly quickly in cities amongst the under-5s* • *Syphilis (also known as the Great Pox), a sexually transmitted infection*
Beliefs about the causes of disease	3. *Disease was sent by God* 4. *The Theory of the Four Humours* 4. *Misalignment of the planets and stars* 5. *Miasma (bad air)* 3. *Disease was caused by external factors*
Main types of treating disease	3. *Bleeding, purging and sweating* 3. *New herbal remedies* 4. *Transference* 4. *Chemical cures*
Main methods of preventing disease	3. *Cleanliness* 3. *Purifying the air* 4. *Avoiding external factors that people believed affected disease*
Main source of treatment	*Female family members in the home.*
Who ran hospitals?	*Charities or local councils.*

THE RENAISSANCE (1500-1700)
2.1: BELIEFS ABOUT THE CAUSE OF DISEASE

CONTINUITY AND CHANGE IN MEDIEVAL BELIEFS ABOUT THE CAUSE OF DISEASE

Religious explanation: Disease was sent by God	*Most people now recognised that this was* **not** *a cause of disease. However,* **in times of epidemics** *(e.g. the Great Plague), this belief reappeared.*
Supernatural explanations (e.g. Astrology)	*This belief became* **less popular** *from 1500. However,* **in times of epidemic** *(e.g. the Great Plague), people still wore charms to ward off the disease.*
Rational explanation: Theory of the Four Humours	**Few physicians** *believed this theory by the end of the 17th century. However, it was* **still believed by the general public** *of Britain, so was still used by physicians to diagnose disease.*
Rational explanations: Miasma	*There was still* **widespread belief** *in this as a cause of disease.*

WHAT NEW IDEAS WERE THERE IN THE RENAISSANCE ABOUT WHAT CAUSED DISEASE?

INDIVIDUAL	NEW IDEA
Paracelsus	*Rejected the Theory of the Four Humours, and theorised that disease was caused by problems with chemicals inside the body.*
Jan Baptiste van Helmont	*Claimed that digestion happened because of stomach acid, rather than anything to do with the four humours. Urine was no longer seen as an accurate method of diagnosis.*
Thomas Sydenham	*Theorised disease was caused by external factors, rather than the four humours. In 1676, he published his ideas in the medical textbook Observationes Medicae.*
Anthony van Leeuwenhoek and Robert Hooke	*Used more powerful microscopes to observe tiny 'animalcules' (the first recorded observation of bacteria).*

WHY DID MEDIEVAL IDEAS OF THE CAUSES OF DISEASE CONTINUE IN THE RENAISSANCE?

REASON	EXAMPLE	EXPLANATION
Technology	*The quality of medical instruments, such as microscopes, remained very poor in the period of the Renaissance.*	*There was no scientific proof that traditional theories were incorrect (e.g. miasma), and there was little scientific evidence to prove new theories (e.g. Sydenham could not observe the external factors that he believed caused diseases) → most people therefore continued to believe old theories.* *There were still huge gaps in medical knowledge → no* **complete** *new theory was put forward to explain how disease was caused.*
Attitudes in society: Popular belief in medieval ideas	*Even the medical community questioned the Theory of the Four Humours by the end of the 17th century, and new theories were developed, the general public continued to believe the Theory of the Four Humours explained why disease was caused.*	*People expected physicians to still use and refer to this theory when diagnosing disease → physicians stuck to the old ideas about the causes of disease to ensure patients continued to pay for their services → traditional medieval ideas remained popular.*
Attitudes in society: Religious beliefs	*Despite the declining power of the Church over medicine, people in Britain in the Renaissance remained very religious.*	*This meant that people still respected the Church and its teachings and, therefore, the medieval religious explanation that God sent disease was widespread in times of epidemic (such as the Great Plague) and when they were most desperate.*

WHY DID NEW IDEAS ABOUT THE CAUSES OF DISEASE ARISE IN THE RENAISSANCE?

REASON	EXAMPLE	WHY DID THIS LEAD TO NEW IDEAS?
Institution: The Royal Society	• *The Royal Society met for the first time at Gresham College in London in 1660.* • *It aimed to promote & carry out experiments to improve scientific understanding.* • *It encouraged scientists to share new scientific knowledge, and encouraged debate over new theories/ideas.* • *Published the world's first scientific journal, called Philosophical Transactions from 1665.* • *Received a royal charter from Charles II in 1662.*	*The society encouraged people to carry out scientific observation and experiments to come up with new theories.* *Scientists shared their work, which allowed new ideas and theories to spread → other scientists could learn from each other's research, which caused new medical ideas to develop (e.g. Robert Hooke used his own microscope to confirm the 'animalcules' Leeuwenhoek had seen).* *Royal charter gave the society credibility → more people funded and supported the scientific work of the society.*
Institution: The Church	• *The rise of Protestantism in the 1500s meant that the teachings of the Catholic Church were challenged.* • *The belief of "humanism" became more popular, which rejected the Church's view that God was responsible for everything that happened.*	*Scientists had more freedom to challenge the medical ideas of the Church about what caused disease → the medical community began to question traditional ideas and come up with new theories.* *The Church's power over medicine began to decline, which provided more opportunities for scientific experimentation → new theories arose which challenged medieval ideas that were supported by the Church (such as the Theory of the Four Humours).*

Individuals: Thomas Sydenham	• *A well-respected doctor in London in the 1660s and 1670s.* • *Did not rely on traditional medical books (e.g. the works of Galen and Hippocrates) when diagnosing an illness.* • *Instead, he closely observed the symptoms of patients, which he believed were caused by one disease. He believed the disease itself should be treated, not individual symptoms.* • *Sydenham challenged the Theory of the Four Humours. He did not believe an illness was personal to a patient, caused by their diet or an imbalance of their humours. Instead, he theorised that diseases were caused by external factors (published ideas in 1676).*	*Sydenham challenged traditional ideas on the causes of disease (e.g. the Theory of the Four Humours) → he encouraged medical students to carry out careful scientific observation, instead of relying on what you read → this laid foundations for a more scientific approach to medicine and the rise of new medical theories.*
Technology: The invention of the printing press	• *Johannes Gutenberg created the world's first printing press in 1440.* • *There were hundreds of printing presses in Europe by 1500. Texts no longer had to be copied by hand.*	*This allowed scientific work to published and spread more accurately and quickly → encouraged and inspired the sharing of new medical ideas.* *Medical books were no longer controlled and copied by the Church → this reduced the Church's influence over medical ideas → more opportunity for new books to be published and spread that challenged medieval theories (e.g. the works of Galen).*

THE RENAISSANCE (1500-1750)
2.2: APPROACHES TO TREATMENT AND PREVENTION

HOW WAS DISEASE TREATED IN THE RENAISSANCE?

TREATMENT	DESCRIPTION	KEY EXAMPLE
Medieval methods of bleeding and purging	*These treatments* **continued** *to be used to re-balance the body's humours.*	
Transference	*A* **new theory** *that a disease could be transferred to something else.*	*People believed rubbing warts with an onion would transfer the warts to the vegetable.*
New approach to herbal remedies	*These began to be chosen because of their colour.*	*Smallpox, which has a red rash as one of the symptoms, was treated with a red cure, such as drinking red wine.*
New herbal remedies from the New World	*Physicians believed that countries had herbal remedies that could cure diseases from that country.*	*Thomas Sydenham popularised the use of cinchona bark from Peru in treating malaria.*
Iatrochemistry *(medical chemistry)*	*Scientists (e.g. Paracelsus) began to look for* **chemical cures** *for diseases, using salts, metals and minerals.*	**Antimony** *was used to purge the body through sweating and vomiting.*

HOW WAS DISEASE PREVENTED IN THE RENAISSANCE?

CONTINUITY FROM MEDIEVAL TIMES	CHANGES FROM MEDIEVAL TIMES
The importance of cleanliness: *People still believed the home and the body needed to be kept clean and free from bad smells.*	*Bathing became a lot less popular, as syphilis had spread quickly among people who regularly visited public bathhouses (Henry VIII had them closed). Instead, people changed their clothes more often.*
Regimen Sanitatis: *People continued to follow physicians' advice about how to look after themselves (e.g. not overeating).*	*People began to believe that external conditions, such as the weather, could spread disease so avoided illness by moving away from an area with a disease.*
People still believed that it was important to remove a **miasma** *to prevent disease.*	*More was done to purify the air.* **E.g.** *Homeowners were fined for not cleaning the street outside their house. There were more attempts to remove sewage and rubbish from the streets.*

MEDICAL PRACTITIONERS IN THE RENAISSANCE

PRACTITIONER	TRAINING AND ROLE
PHYSICIANS	**CHANGES FROM THE MEDIEVAL PERIOD:** • *Training courses changed little.* • *New training, such as in iatrochemistry and anatomy.* • *The printing press improved access to medical textbooks and fugitive sheets.* **CONTINUITIES:** • *Most learning was still from books, rather than practical experience and observation.* • *Despite dissections being legal, few universities thought it an important part of medical training.*
APOTHECARIES	**CHANGES FROM THE MEDIEVAL PERIOD:** • *Received more formal training before becoming a master apothecary.* • *Needed a licence to practice.* • *Used new chemical ingredients in their remedies, as well as herbs.*
SURGEONS	**CHANGES FROM THE MEDIEVAL PERIOD:** • *Received more formal training before becoming a master surgeon.* • *Needed a licence to practice.*

HOSPTIALS AND THE HOME: WHERE WAS CARE PROVIDED IN THE RENAISSANCE?

HOSPITALS	
How many hospitals were there?	*Most hospitals were closed due to Henry VIII's dissolution of the monasteries. By 1700, there were only 5 hospitals left in the country (all in London).*
Who ran hospitals in the Renaissance?	*Smaller hospitals were opened to replace those that were closed, funded by charities. Some were taken over by local councils.*
What was the purpose of hospitals in looking after the sick?	*There was a greater focus on medical treatment, including:* • *A good diet* • *Visits from physicians, who observed symptoms and prescribed treatments* • *Medicines mixed by an apothecary*
Who was cared for?	*Mainly the elderly poor, but people with wounds and curable disease, such as fevers and skin conditions, began to be cared for.*
Who did hospitals reject?	*Patients who were contagious. Instead, they were treated by specialist hospitals.*
Who were pest houses?	*Specialist hospitals caring for patients suffering from the plague or pox.*
THE HOME AND THE LOCAL COMMUNITY	
How common was hospital care?	*Not very – most sick people continued to be cared for at home.*
Who provided the care?	*Women in the family, or from the local community.*
How widespread was care provided by women?	*Many poor women in cities mixed and sold simple herbal remedies. They were cheap and popular. Many were prosecuted for practicing without a licence.*

SUMMARY: CHANGES AND CONTINUITIES IN CARE FROM MEDIEVAL TO THE RENAISSANCE

CONTINUITY FROM MEDIEVAL TIMES	CHANGES FROM MEDIEVAL TIMES
• *Those with infectious diseases rejected from ordinary hospitals.* • *Most people continued to be cared for at home.*	• *Hospital care no longer in Church's hands.* • *Emphasis on* **treatment** *in hospitals.* • *Specialist hospitals set up.*

EXPLAIN WHY THERE WAS CHANGE IN THE TREATMENT AND PREVENTION OF DISEASE IN THE RENAISSANCE

FACTOR	EXAMPLE	EXPLANATION
Institutions: The Church	• **The English Reformation**: *Henry VIII broke from Rome, created the Church of England, and dissolved (closed down) monasteries and convents.* • *The power of the Catholic Church was challenged.*	*Fewer hospitals were run by the Church → less belief in hospitals that disease was sent by God → most hospitals now focused on medical treatment, rather than on care and prayer.* *Scientists began to challenge traditional ideas and treatments about disease → they began to experiment with new chemical cures (E.g. iatrochemistry).*
Individuals: Andreas Vesalius	• *Andreas Vesalius carried out a large number of dissections.* • *He published his findings in On the Fabric of the Human Body in 1543.* • *He identified 300 errors in Galen's work on human anatomy, such as that the jaw bone is made up of one bone, not two.*	*Anatomy became a central part on the study of medicine → physicians' training started to change, and they gained more detailed and accurate knowledge on anatomy (E.g. Vesalius' book was used by medical students in Cambridge University from 1560).* *Physicians began to carry out dissections themselves and to learn through observation, rather than simply reading books (E.g. first dissection carried out at Cambridge University in 1565).*
Attitudes in society	*The Renaissance was the* **age of exploration** *with Europeans discovering the New World (North and South America).*	*New plants and herbal remedies became available in England → new possibilities for treatments and cures of disease.* *New focus on developing chemical cures for diseases, known as iatrochemistry.*
Technology : Printing Press	• *Johannes Gutenberg created the world's first printing press in 1440.* • *There were hundreds of printing presses in Europe by 1500.* • *Texts no longer had to be copied by hand.*	*Medical practitioners had much better access to medical books, which could be published and spread accurately and quickly → encouraged and inspired the sharing of new medical ideas and treatments.*

EXPLAIN WHY THERE WAS CONTINUITY IN THE TREATMENT AND PREVENTION OF DISEASE IN THE RENAISSANCE

FACTOR	EXAMPLE	EXPLANATION
Institutions: The Church	*Despite the declining power of the Church over medicine, people in Britain in the Renaissance remained very religious.*	*This meant that people still respected the Church and its traditional teachings → religious preventions were used in times of epidemic (such as the Great Plague) when people were most desperate.*
Attitudes in society: Belief of Miasma	*Miasma being a cause of disease remained a popular belief in the Renaissance.*	*Preventing bad smells and cleansing the air remained an important focus on preventing disease → cleanliness remained important, and even more steps were taken by local authorities to purify the air (E.g. fines).*
Attitudes in society: Popular belief in medieval ideas	*Even though treatments and ideas on disease were developed in the Renaissance, the general public continued to believe the Theory of the Four Humours and therefore expected traditional treatments.*	*People expected physicians to still use and refer to this theory when diagnosing disease → physicians stuck to the medieval treatments of treating disease (E.g. bleeding and purging) to ensure patients continued to pay for their services.*

THE RENAISSANCE (1500-1750)
2.3 CASE STUDY (A): THE GREAT PLAGUE (1665)

WHAT WAS THE GREAT PLAGUE?	
When did the Great Plague break out?	*June to November* **1665**
What was the Great Plague?	*The last serious outbreak of the plague in England.*
How many people in London died from the Great Plague?	*100,000 – one in five of the population in London.*
At its peak in September, how many died in one week?	*7,000 people*

WHAT DID PEOPLE THINK CAUSED THE GREAT PLAGUE?	
Religious cause	*Many believed the Great Plague was a punishment for humankind's wickedness, and was sent by God to clean up the world.*
Supernatural cause (astrology)	*There had been an unusual alignment between Saturn and Jupiter in October 1664, and a comet had been seen. This was seen as unlucky, and suggested there was trouble ahead.*
Natural / rational cause	*The most popular theory was that the Great Plague was caused by a miasma, which had been created by stinking rubbish and dunghills in 17th century cities. The bad air was present in soil and would pour out of the earth when the weather turned warmer.*
Contagion	*Many people believed that disease could be spread from person to person, but it was not the most popular theory because there was no proof.*

TREATING THE GREAT PLAGUE	
Sweating out the disease	*Physicians advised that patients be wrapped in thick, woollen cloths and laid by a fire.*
Transference	*Methods such as strapping a live chicken to a bubo, or lancing it with a feather plucked from a live chicken, were meant to draw out the poison.*
Herbal remedies	*These remained extremely popular and took the form of medicines, poultices or rubs. Quack doctors mixed remedies and advertised them as fabulous cures.*

PREVENTING THE SPREAD OF THE GREAT PLAGUE	
Advice given by physicians	• *Prayer and repentance* • *Quarantine* • *Pomanders to drive away miasma* • *Recommended diets (e.g. fasting)* • *Plague doctors wore hooked, bird-like masks with sweet-smelling herbs, and a cloak treated with wax to prevent pus or blood soaking into it.*
Advice from other healers	• *Apothecaries sold plague water and theriaca as preventatives against the plague.* • *Smoking tobacco was encouraged to ward off the miasma.* • *Some went out of their way to become infected with syphilis; they believed this would prevent them catching the plague because the symptoms were similar.*
Government actions	**Quarantines**: *Searches went from house to house checking for plague victims. If a household was infected, inhabitants were either taken to the pest house or quarantined inside the house for 28 days. The house was painted with a red cross.*
	Preventing gatherings: *Public meetings, fairs and large funerals were banned, and theatres were closed.*
	Cleanliness: *Streets were swept and cleaned, fires were set to burn on street corners, and 40,000 dogs and 200,000 cats were slaughtered.*

KEY POINTS ABOUT THE GREAT PLAGUE…

- *People **still** did not understand the cause of the Great Plague and therefore could not treat it effectively, causing great panic.*
- *During the epidemic, **religious and supernatural explanations became more popular**, despite these being less widely believed in the Renaissance in general.*
- *Since there was no known cure for the disease, **people focused on prevention**.*
- ***Local governments and the king did more** than in the time of the Black Death. King Charles II suggested that people should fast regularly and made a list of actions to try to stop the spread of the Great Plague, which were carried out by local government officials.*

THE RENAISSANCE (1500-1750)
2.3 CASE STUDY (B): ANDREAS VESALIUS AND WILLIAM HARVEY

INDIVIDUAL 1: ANDREAS VESALIUS

On the Fabric of the Human Body	*Vesalius' most famous book, the first highly illustrated and detailed book on human anatomy*
1543	*Vesalius published On the Fabric of the Human Body*
Dissection	*The method Vesalius used to find out about the anatomy of the human body*
A local magistrate in Padua	*Allowed Vesalius to dissect the bodies of executed criminals*
300	*The number of errors Vesalius found in Galen's work, as Galen only dissected animals*
Vesalius' corrections of Galen's errors	• *The lower jaw is made from one bone, not two* • *The breast bone has three parts, not seven*

WHY WAS VESALIUS SIGNIFICANT? WHAT WAS THE IMPACT OF HIS WORK?

IMPACT ON MEDICINE	KEY EXAMPLE
Encouraged professors and doctors to carry out dissections to make further advances in medical knowledge.	*The first dissection by an anatomist in Cambridge was carried out in 1565.*
Vesalius encouraged others to do disprove Galen and make further discoveries about human anatomy.	*After Vesalius' death, Fabricius discovered valves in human veins and shared his work with his medical students at Padua, one of whom was William Harvey.*
Anatomy, and Vesalius' book, became a central part of the study of medicine, giving doctors more detailed and accurate knowledge of the human body.	*Vesalius' book was being used in Cambridge by 1560.*

INDIVIDUAL 2: WILLIAM HARVEY

An Anatomical Account of the Motion of the Heart and Blood	*Harvey's book which described how the blood circulates around the body.*
1628	*Harvey published An anatomical account of the motion of the heart and blood.*
Dissection of live cold-blooded animals	*Allowed Harvey to observe the movement of heart and the blood as they had a much slower heartbeat.*
Dissection of human corpses	*Used to find out more about the valves in human veins.*

WHAT DID WILLIAM HARVEY DISCOVER? HOW DID HE PROVE GALEN WRONG?

GALEN'S CLAIMS	HARVEY'S DISCOVERIES	METHOD: HOW DID HARVEY PROVE THIS?
Blood is made in the liver, distributed around the body and absorbed.	**Blood only moves in one direction around the body. Blood in veins only flows towards the heart.**	*Harvey tried to pump liquids through the veins the other way, and saw that the valves prevented blood from flowing the other way.*
Arteries and veins form two separate systems.	**Arteries and veins are linked together in one circulatory system. Blood passes from arteries to veins (though Harvey couldn't see the tiny capillaries where this happened).**	*Harvey tied a tight cord around somebody's arm, cutting off blood flow. Loosening the cord a little allowed blood to flow into the arm (as arteries are deeper) but stopped it from flowing out, causing the veins to swell with blood.*
New blood is constantly made in the liver to replace blood burned up in the body.	**The same blood is being pumped around the body by the heart.**	• *Dissection and careful observation of anatomy.* • *Harvey calculated how much blood went into arteries each hour (three times a man's weight).*
Veins carry blood and air.	**Veins carry only blood.**	

WHY DID KNOWLEDGE OF HUMAN ANATOMY CHANGE IN THE RENAISSANCE?

FACTOR	EXAMPLE		EXPLANATION
Individuals: Vesalius	*Vesalius had identified errors in Galen's work in his book, On the Fabric of the Human Body.*	→	*It was more acceptable to question Galen's theories → inspired others (e.g. Harvey) to carry out dissections and develop knowledge further.*
Institutions: The Church	*Following the* **English Reformation** *under King Henry VIII, the power and influence of the Church began to decline.*	→	*Vesalius and Harvey were able to carry out dissections and print books that criticised Galen more easily.*
Institutions: The Crown	*William Harvey was employed by King Charles I as his personal physician.*	→	*Harvey gained greater credibility → more people heard about, and respected, his new ideas.*
Attitudes in society: Greater emphasis on science	*Scientists and other practitioners were beginning to turn to scientific experimentation & observation to test / challenge traditional ideas.*	→	*Vesalius and Harvey were inspired to test Galen's ideas through experimentation, dissection and careful observation of anatomy → new discoveries about the body.*

HOW SIGNIFIANT WAS WILLIAM HARVEY? WHAT WAS THE IMPACT OF HIS WORK?

IMPACT ON MEDICINE	EVIDENCE
Harvey's theory encouraged other scientists to experiment on actual bodies.	*Harvey had proved that the liver did not create blood, encouraging scientists to explore what the liver did do.*
Harvey's discoveries had little impact on medical treatments, and didn't make anyone better, as there was still much more to discover about blood.	• *Doctors could not carry out blood transfusions until 1901.* • *Harvey said that he had fewer patients after he published his book.*
Many doctors ignored or criticised Harvey's theory.	*Harvey's ideas only began to appear in universities from 1673.*

THE INDUSTRIAL REVOLUTION (1700-1900)
3.0: CONTEXT OF THE PERIOD

TIMELINE OF MEDICINE IN THE 18TH AND 19TH CENTURIES

1796-1798	*Edward Jenner discovered the smallpox vaccination and published his findings.*
1847	*James Simpson discovered the effects of chloroform as an anaesthetic to stop pain during surgery.*
1852	*Jenner's smallpox vaccination was made compulsory in Britain.*
1854	*John Snow discovered that contaminated drinking water causes cholera.*
	Florence Nightingale travelled to Crimea to treat wounded soldiers.
1861	*Louis Pasteur published the Germ Theory of disease.*
1865	*Joseph Lister used carbolic acid as an antiseptic in surgery for the first time to prevent infections.*
1875	*The government passed the Second Public Health Act.*

SPECIALIST TERMINOLOGY

Anaesthetic	*A drug given to patients to make them unconscious before and during surgery.*
Aseptic surgery	*Surgery where the operating theatre has been made free of bacteria (e.g. sterilising/cleaning equipment).*
Antiseptics	*Chemicals used to destroy bacteria and to prevent infection.*
Bacteria	*Tiny organisms, also known as* **microbes**, *which are too small to be seen and can cause disease.*
Germ	*A type of bacteria (or microbe) which causes disease.*
Inoculation	*Putting a low dose of smallpox into the body to help it to fight against a more severe form of the disease.*
Organisms	*Living things, such as humans, plants, or bacteria.*
Patent remedies	*Medicines usually sold for profit. They were also known as "cure-alls".*
Petri dish	*A dish used to grow bacteria under controlled conditions.*
Sanitation	*Making sure something or somewhere is clean and hygienic.*
Vaccination	*Injecting a killed or weakened microbe into the body to develop resistance against a disease.*

KEY INDIVIDUALS / INSTITUTIONS

Edward Jenner	*An English doctor who developed the smallpox vaccination by proving that catching cowpox prevented people from catching smallpox.*
James Simpson	*A surgeon from Edinburgh who discovered that chloroform was an effective anaesthetic.*
John Snow	*A London surgeon and leading anaesthetist who discovered that contaminated water caused cholera.*
Florence Nightingale	*A leading nurse in London who worked to improve the design and sanitation of hospitals, as well as the training of nurses.*
Louis Pasteur	*A French chemist who developed the Germ Theory of disease.*
Joseph Lister	*An English surgeon who theorised that germs caused the rotting flesh he observed in the infected wounds of his patients.*
Robert Koch	*A German scientist who identified that different germs cause different diseases.*

WHAT WERE THE KEY FEATURES OF LIFE IN 18TH AND 19TH CENTURY BRITAIN?

The crown and government	*In 1800, governments believed they should not interfere in people's lives. By the late-18th century, this attitude had changed. More men had been given the right to vote and Parliament was enforcing laws to appeal to the masses, such as improving health and living conditions and preventing disease.*
The Church	*A movement called 'The Enlightenment' helped to undermine the influence of traditional powers such as the Church. It was seen as important that people should think for themselves. Many people no longer believed that God was responsible for all events, including the outbreak of disease.*
Attitudes towards science	*Scientific experimentation and observation continued to be used to prove new scientific ideas, which began to replace older theories. This was helped by the development of new technologies. A movement known as 'The Enlightenment' saw more and more people try to find answers to questions, including those to do with disease and illness.*
Communication	*The development of the steam engine and trains allowed scientists and doctors to travel more quickly to attend medical conferences. News was also reported more quickly – details of scientific experiments abroad could be reported in Britain the next day. Scientific journals published accounts of new medical methods.*
Living conditions	*For the first time more people lived in towns or cities than in the countryside. Conditions in towns and cities became overcrowded and dirty, leading to devastating epidemics of disease.*

OVERVIEW OF HEALTH AND DISEASE IN THE 18th AND 19TH CENTURIES

Average life expectancy	*By 1900, the average life expectancy had increased to 50 years.*	
Common diseases	• *Smallpox* • *Cholera*	• *Tuberculosis*
Beliefs about the causes of disease	5. *Miasma* 6. *Theory of spontaneous generation*	*3. The Germ Theory*
Main types of treating disease	5. *Home remedies* 6. *Patent remedies*	*3. Surgery* *4. Hospital care*
Main methods of preventing disease	5. *Vaccinations* 6. *Government action (e.g. the Second Public Health Act of 1875)*	
Main source of treatment	*A lot of people, especially the rich, still chose to pay to be treated at home.*	
Who ran hospitals?	*Many hospitals were run by charities or groups of local people. From the 1860s, however, the government ordered some local governments to build hospitals for the poor, funded by taxes.*	

THE INDUSTRIAL PERIOD – THE 18TH AND 19TH CENTURIES (1700-1900)
3.1: BELIEFS ABOUT THE CAUSE OF DISEASE

BELIEFS ABOUT THE CAUSE OF DISEASE IN THE 18TH AND 19TH CENTURIES	
Miasma	*People still believed in this cause, but it had become less popular.*
Theory of spontaneous generation	*Microscopes improved in the 18th century which meant that scientists could see microbes on decaying (or rotting) matter. At first, scientists believed that these* **microbes** *were* **created by** *rotting matter and then spread through a miasma, causing disease.*
Germ Theory	*In 1861, Louis Pasteur proved that it was microbes, or germs, that caused food / drink to decay and go off. He applied this to disease and theorised that* **microbes also caused disease** *in the human body.*

WHAT WAS THE IMPACT OF PASTEUR'S THE GERM THEORY (1861)?		
LIMITED SIGNIFICANCE	**Dr Henry Bastian**	*A well-respected English doctor who promoted the theory of spontaneous generation, despite Pasteur proving it wrong. He prevented Pasteur's work from having an immediate impact.*
SIGNIFICANCE	**Joseph Lister**	*An English surgeon who used the Germ Theory to theorise that germs caused the rotting flesh in the infected wounds of his patients. Lister set out trying to get rid of these germs, leading to his development of carbolic acid spray and the creation of an aseptic environment in surgery.*
SIGNIFICANCE	**Robert Koch**	*A German scientist who developed and* **proved** *the Germ Theory. Koch identified the specific germs that cause different diseases. He read Pasteur's work in 1875 and discovered the bacteria that caused tuberculosis and anthrax in 1882, and cholera in 1883. He developed new ways of observing (using dye) and growing bacteria (using agar jelly in a petri dish).*

WHY WAS THERE <u>CONTINUITY</u> IN IDEAS ABOUT THE CAUSES OF DISEASE (1700-1900)?

FACTOR	EXAMPLE	WHY DID THIS LEAD TO CONTINUITY?
Attitudes in society	• *The medical world trusted doctors, such as Dr Henry Bastian, over scientists.* • *Pasteur did not have proof of his Germ Theory – that microbes caused disease.*	*British doctors supported Dr Henry Bastian's belief in spontaneous generation over Pasteur's findings (and the theories of others, such as Lister) → they refused to recognise the link between germs and disease.*
Lack of scientific understanding	• *Pasteur's work focused on food, not disease.* • *Microbes were present in the blood or in the gut – even in healthy people.* • *Doctors could not yet identify what microbes were or what role they played.*	*People could not accept that microbes could also cause disease → doctors could not believe that there was a link between germs and disease → Pasteur's Germ Theory was not believed.*
Institutions: The British government	• *At first, the British gov. rejected the Germ Theory - it gave no solution to the problem of disease.* • *Even when Koch proved that microbes in water caused cholera when working in Calcutta, India, the government said that it was spread by miasma.*	*This encouraged others to also reject the Germ Theory → many doctors continued to believe in older theories, such as miasma and spontaneous generation.*

WHY WAS THERE <u>CHANGE</u> IN IDEAS ABOUT THE CAUSES OF DISEASE (1700-1900)?

FACTOR	EXAMPLE	EXPLANATION
Individual : Louis Pasteur	• *Pasteur was employed by the wine industry to find out why wine went off.* • *Pasteur proved spontaneous generation wrong & found microbes caused decay.* • *Pasteur came up with the* **Germ Theory** *and theorised that* **germs might also cause disease** *in the human body.*	• *Pasteur challenged traditional ideas of what caused disease (e.g. miasma and spontaneous generation).* • *Successfully identified what caused some diseases.* • *Inspired other medics and scientists, such as Lister and Koch, to develop and prove the Germ Theory and also find ways to prevent disease (e.g. antiseptics; vaccinations).*
Individual : Robert Koch	• *Koch read Pasteur's Germ Theory in 1875 and worked to develop / prove it.* • *Koch identified the microbes that caused particular diseases (see above).* • *Koch developed new methods of growing and observing bacteria (see above).*	• *Koch* **proved** *the Germ Theory, making it more widely believed. He also challenged traditional ideas of disease.* • *It became easier for future scientists to study bacteria and the diseases they caused.* • *Encouraged other scientists to discover other microbes responsible for causing disease (e.g. diphtheria).* • *The ability to isolate the specific bacteria for diseases led to the development of vaccinations to prevent disease.*
Technology	• *More advanced microscopes had been developed by the mid-19th century.* • *Microscopes improved in quality, with clear images and higher magnification.*	• *It was possible to observe microbes using a microscope → most microbes could be seen and therefore studied.* • *Pasteur was able to see the microbes in wine the off wine → allowed him to develop the Germ Theory of disease.* • *Other doctors and scientists were able to observe and study microbes (e.g. Koch).*
Attitudes in society	**The Enlightenment**: *A movement in 18th century Europe. People wanted to find rational answers to unanswered questions.* **Cities**: *More people moved to cities, living in overcrowded conditions. Diseases (e.g. tuberculosis; smallpox) spread more quickly.*	• *Scientists were inspired / encouraged to discover the cause of disease.* • *Scientists were more motivate to find the cause of disease so it could be effectively prevented and/or treated.*

THE INDUSTRIAL PERIOD – THE 18TH AND 19TH CENTURIES (1700-1900)
3.2: APPROACHES TO TREATMENT AND PREVENTION

HOW WAS DISEASE TREATED?

TREATMENT	DESCRIPTION	EXAMPLE
Home remedies	*These continued to be used, particularly by the poor, and had changed little since the medieval period.*	*To cure smallpox, people applied cool, boiled turnips to the feet.*
Patent remedies	*These mass-produced treatments were often known as 'cure-alls' and were bought from new pharmacies, such as Boots.*	*James Morrison claimed his pills, made of lard, wax, soap and ginger, cured everything. He sold over 1 million boxes a year.*
Surgery	*Became a more effective in treating disease because of developments in anaesthetics and antiseptics (see below).*	

NEW WAYS OF PREVENTING DISEASE

METHOD	DESCRIPTION
Vaccinations against diseases	• *Jenner's small pox vaccine (**see 3.3**).* • *Inspired by Jenner, Pasteur developed vaccines for animal diseases (e.g. chicken cholera; rabies).* • *Koch identified the microbes that cause specific diseases, which also led to the development of vaccines (e.g. tetanus and diphtheria vaccines in 1890).*

More government action to improve sanitation and prevent disease	• *By the late-19th century, the government thought it was important to improve public health and prevent disease.*
	• *1300 miles of sewers built in London by 1865.*
	• **1875 Second Public Health Act** *meant that it was compulsory in law to improve sanitation in Britain. City authorities:*
	  ○ *Provided clean water to stop diseases spread in dirty water (e.g. cholera).*
	  ○ *Disposed of sewage to prevent contamination of drinking water.*
	  ○ *Built public toilets.*
	  ○ *Employed public officers of health to monitor outbreaks of disease.*

IMPROVEMENTS IN HOSPITAL CARE FROM THE 18TH CENTURY TO THE 19TH CENTURY

BACKGROUND: PROBLEMS IN HOSPTIALS IN THE 18TH CENTURY

How many hospitals were there?	*At the start of the century, there were only 5 hospitals in the country. However, new hospitals began to open over the course of the 18th century.*
Who set up hospitals?	*New hospitals were set up using donations from wealthier people.*
What was the purpose of hospitals in the 18th century?	*Hospitals increasingly became places where sick people were* **treated**: • *Doctors visited patients regularly* • *There was a surgeon of apothecary on sight for daily treatments* • *A small staff of untrained nurses cared for the patients.*
Who was cared for?	• *"The deserving poor" – respectable, working-class people who could not afford medical bills.* • *More infectious patients were admitted.*
What were conditions like in hospitals?	*Very poor and unsanitary. People did not yet understand germs caused disease. No steps were taken to avoid spreading germs (e.g. doctors didn't wash their hands or change their clothes).*
How common was hospital care?	*A lot of sick people, especially the rich, chose to be treated at home, which was usually cleaner and safer.*

IMPROVEMENTS IN THE 19TH CENTURY: THE WORK OF FLORENCE NIGHTINGALE IN THE CRIMEAN WAR

Florence Nightingale	*A leading nurse in London.*
1854	*The Crimean War started between Russia and Britain.*
38	*No. of nurses that went with Nightingale to Crimea to improve hospitals for injured soldiers.*
Improved sanitation	*How Nightingale changed the hospitals in the Crimea (E.g. she ordered nurses to remove dirt near patients and to ensure all patients had clean clothing and bedding).*
40% to 2%	*The drop in the death rate of wounded soldiers in the Crimean War in 6 months.*
1859	*Nightingale published her book Notes on Hospitals, which described the role of a nurse and the importance of nursing training.*

WHAT IMPACT DID NIGHTINGALE HAVE ON HOSPTIALS IN BRITAIN BY THE END OF THE 19TH CENTURY?

	IMPACT	DESCRIPTION
Significant	**Changed how hospitals were designed.**	*She said hospitals should be built in the* **"pavilion style"** *–more windows, improved ventilation; separate wards for infectious patients and those needing surgery.*
Significant	**Made sanitation more important in hospitals.**	• *New hospitals were built out of materials which could be easily cleaned.* • *More hospitals had clean water supplies and good sewers.*
Significant	**Improved the training of nurses.**	*She set up the Nightingale School for Nurses at St Thomas' Hospital, London, in 1860. Nurses were trained about sanitary conditions.*
Significant	**Improved the reputation of nursing.**	*More training turned nursing into a profession, rather than an unskilled job. This encouraged more women to become nurses.*
Limited (counter)	**Did not understand what caused of disease.**	*Nightingale believed that disease was caused by miasma and sanitation was important in warding off a miasma. The Germ Theory was not yet discovered.*

IMPROVEMENTS IN SURGERY FROM THE 18TH TO THE 19TH CENTURY

HOW WAS PAIN REDUCED IN SURGERY?

ANAESTHETIC	DISCOVERY	PROBLEMS WITH ANAESTHETIC
Laughing gas	*In 1795, a dentist's assistance discovered that it numbed pain.*	*It was only successful for small operations, such as pulling teeth.*
Ether	*In 1846, Robert Liston used this to anaesthetise a patient during amputation.*	*It caused coughing, even while the patient was unconscious, and was very flammable.*
Chloroform	*In 1847, James Simpson discovered this effective anaesthetic. Queen Victoria used it during childbirth.*	*It was easy to overdose a patient and kill them.*

HOW WAS INFECTION DEALT WITH IN SURGERY?

Joseph Lister	*An English surgeon in the mid-19th century.*
The Germ Theory	*Inspired Lister's work. He theorised that germs could also cause the rotting flesh he saw in the infected wounds of his patients.*
A half	*The proportion of Joseph Lister's patients who died after surgery from infection from 1861-1865.*
Carbolic acid spray	*This was used to clean wounds, equipment and bandages in surgery. It was developed by Lister from 1865 to ensure wounds healed cleanly after surgery.*
Antiseptic surgery	*Promoted by Lister - involved using chemicals to kill off bacteria during and after operations.*

WHAT IMPACT DID LISTER AND OTHERS HAVE ON SURGERY IN BRITAIN BY THE END OF THE 19TH CENTURY?

	IMPACT?	DESCRIPTION
SIGNIFICANT (long-term)	**By 1900, most operations in Britain were carried out in aseptic conditions, preventing infection.**	*The Germ Theory was more widely believed. Therefore, Instruments were sterilised; all medical staff also had to wash their hands, face & arms, & wear gloves and gowns.*
SIGNIFICANT (short-term)	**Lister's development of carbolic acid reduced the death rate from infection after surgery.**	*In 1867, Lister announced that his wards had been free from infections for 9 months.*
LIMITED	**Anaesthetics allowed for deeper and more complex surgeries to be attempted.**	*This meant there was more blood loss in surgery, causing more deaths → people did not trust the technique.*
LIMITED	**There were significant risks associated with using anaesthetics.**	*Surgeons were reluctant to use it. E.g. It was difficult to get the dose of chloroform right, which could cause death.*
LIMITED (short-term)	**Surgeons did not believe that microbes caused disease and infection.**	*The Germ Theory had not yet been proved. Many surgeons were not willing to use antiseptics to remove germs.*
LIMITED (short-term)	**In the short-term, surgeons were reluctant to use carbolic acid spray.**	*Carbolic spray dried out the skin and made surgeons' hands sore, discouraging them from using it.*

WHY WAS THERE CHANGE IN TREATMENTS AND PREVENTION IN THE 18TH AND 19TH CENTURIES?

FACTOR	EXAMPLE	EXPLANATION
Better scientific understanding of what caused disease	*Pasteur developed the Germ Theory (1861) and Koch proved the theory (see 3.1).*	*Encouraged scientists to develop methods of treating and preventing disease by removing germs and stopping germs from spreading → Lister developed antiseptics and Pasteur and Koch developed vaccinations (see above).*
Individual: Florence Nightingale	• *Improved sanitation in hospitals and reduced death rates.* • *Improved hospital lay-out and nurses' training.* *(See above for more detail)*	*Hospitals began to be designed in the "pavilion style", nurses were trained about the importance of sanitation in hospitals, and hospitals became cleaner → disease was more easily prevented in hospitals.*
Individual: Edward Jenner	• *Jenner proved that catching cowpox prevented people from catching smallpox.* • *Jenner worked to develop a vaccine for smallpox.* *(See 3.3 for more detail)*	*The smallpox vaccine was accepted worldwide and eventually in Britain → compulsory smallpox vaccinations were introduced in Britain from 1852.* *Inspired other scientists, such as Pasteur and Koch, to search for microbes and develop vaccinations for other diseases.*
Individual: Joseph Lister	*From 1865, Lister successfully used carbolic acid during and after surgery to prevent infection of wounds.* *(See above for more detail)*	*In the long-term, surgeon's attitudes changed as they understood the important of aseptic surgery to stop infections → by 1900 most surgeries were carried out in aseptic conditions.*
Institutions: The government	• *In the mid-19th century, the gov. collected stats. on death rates – these were higher in towns/ cities where there was poor public health (this was also supported by Chadwick's work of 1842).* • *During the 19th century, more men won the right to vote in elections.* • *There was better knowledge and understanding of the cause of disease and how to prevent it (e.g. vaccinations; the Germ Theory; John Snow's work during the cholera epidemics [see 3.3]).*	*More pressure was put on the government, convincing them that it needed to take steps to improve public health.* *The government passed laws to improve people's lives and get support from the people → the Second Public Health Act was passed in 1875 to stop disease from spreading.* *The government funded Jenner's research in the early-19th century and eventually made the smallpox vaccination compulsory (see 3.3).*

THE INDUSTRIAL PERIOD – THE 18TH AND 19TH CENTURIES (1700-1900)
3.3 CASE STUDY (A): EDWARD JENNER

EDWARD JENNER AND THE DEVELOPMENT OF THE SMALLPOX VACCINATION	
SMALLPOX IN THE 18TH CENTURY	
11	*The number of smallpox epidemics in London in the 18th century (the worst was in 1796).*
Mild form of smallpox	*People noticed that those who caught this, and recovered, did not catch it again.*
Inoculations against smallpox	*Were used in the 18th century to prevent people from catching a more severe form of smallpox. This did not always work and some patients died of the disease.*
The rich	*The group of people who could afford the expensive inoculations against smallpox.*

THE WORK OF EDWARD JENNER	
Edward Jenner	*A trained English doctor who proved that catching cowpox prevented people from catching smallpox.*
1000	*The number of cases Jenner identified where smallpox inoculation had failed.*
Dairy maids	*Working in rural areas, Jenner regularly treated this group for cowpox. He noticed that those who had suffered from cowpox did not catch smallpox during outbreaks.*
1796	*Jenner tested his theory and infected a local boy with cowpox. Jenner later attempted to infect the boy with smallpox, but he did not catch it.*
1798	*Jenner wrote up his findings and named the technique 'vaccination'.*

INITIAL OPPOSITION TO JENNER'S NEW VACCINATION IN BRITAIN	
GROUP	**REASON FOR OPPOSITION**
The Church	*Claimed that the idea of infecting someone with an animal disease was against God's will.*
Inoculators	*Made a lot of money and were respected in society. They did not want to lose their business and encouraged anti-Jenner propaganda in the media, reducing his popularity.*
The Royal Society	*Refused to publish Jenner's ideas because lots of scientists opposed his work and Jenner could not explain how or why his vaccination worked.*

WHAT REASONS HELPED JENNER TO DEVELOP HIS SMALLPOX VACCINATION?		
REASON	**EXAMPLES**	**EXPLANATION**
The importance of science	• *Jenner used the scientific method of* **observation** *and* **experimentation** *to test and prove that his vaccination worked.*	*Jenner proved that his vaccination worked → his work slowly began to develop credibility amongst scientists and politicians → Jenner was given funding to continue his work.*
	• *Jenner published his findings in detail in 1798.*	*Knowledge of Jenner's discovery and success spread worldwide → by 1800, 100,000 people around the world had been vaccinated.*
	• *The Lancet medical journal blamed inoculation for the 1837-40 smallpox epidemic, which killed 35,000 people.*	*The medical community no longer supported the use of inoculations → Jenner's vaccination was promoted, as it did not have the same risks.*
Institution: The government	• *In 1802 and 1807, Parliament gave Jenner £30,000 to open a vaccination clinic.* • *Following the 1837-40 smallpox epidemic, the government favoured Jenner's method of vaccination, as it was safer and cheaper.* **E.g.** *did not have to be quarantined.*	*Jenner's smallpox vaccination was increasingly promoted by the government → inoculation was made illegal (1840) → the smallpox vaccination was made compulsory (1852), funded by the government.*
Attitudes in society	• **The Enlightenment**: *A movement in 18th century Europe. People wanted to find rational answers to unanswered questions.* • **Cities**: *Became overcrowded → poor conditions and more epidemics.*	*Scientists, such as Edward Jenner, were more motivated to find a way to prevent diseases. This encouraged Jenner to begin to investigate smallpox epidemics in the 18th century.*

HOW SIGNIFICANT WAS JENNER'S SMALLPOX VACCINATION?	
IMPACT ON MEDICINE	**EXAMPLE**
Jenner inspired other scientists, such as Pasteur and Koch, to search for the vaccinations of other diseases.	• *Pasteur developed vaccines for animal diseases from 1878.* • *Koch identified microbes that caused specific diseases, enabling the development of vaccines against other human diseases (e.g. tetanus in 1890 and diphtheria in 1923).*
Jenner's vaccination eventually saved many lives from the smallpox disease.	*From 1872, the number of smallpox cases fell significantly. By the 1979, the disease had been wiped out worldwide.*
LIMITED IMPACT ON MEDICINE	**EXAMPLE**
Scientists were unable to develop other vaccines based on Jenner's method.	*Jenner's vaccination was a "one-off". It only dealt with the smallpox disease. By chance, Jenner had made the connection between cowpox and smallpox.*
There was a lot of opposition to vaccinations and the impact of Jenner's work was not immediate. It was not enforced for many decades and many lives were lost.	*The British government made the vaccination compulsory in 1852, and only began to fine people for not having their children vaccinated in 1871.*

THE INDUSTRIAL PERIOD – THE 18TH AND 19TH CENTURIES (1700-1900)
3.3 CASE STUDY (B): JOHN SNOW

JOHN SNOW AND FIGHTING CHOLERA	
CHOLERA IN THE 19TH CENTURY	
1831	*The year cholera first arrived in Britain. Severe epidemics broke out in the decades after.*
53,000	*The approximate number of people who died from cholera in the years 1848-1849*
2 to 6 days	*Sufferers usually died in this time after falling sick from cholera.*
• **Burning barrels of tar or vinegar** • **"Cure-all" remedies**	*How people tried to stop cholera during epidemics.*

THE WORK OF JOHN SNOW	
John Snow	*A surgeon who moved to London in 1836 and became a leading anaesthetist. He was popular and well respected, and gave Queen Victoria chloroform during childbirth in 1851.*
1848-1849	*Snow observed the cholera epidemic that broke out in these years.*
Miasma	*Snow suggested that this did not cause cholera as it affected the gut, not the lungs.*
Contaminated drinking water	*Snow suggested that water contaminated with the faeces of cholera victims, caused the disease.*

THE CHOLERA EPIDEMIC OF 1854	
August 1854	*Cholera broke out in Soho, London, where John Snow worked.*
Street map	*Snow used this to plot where people had died from cholera in the area.*
Broad Street water pump	*Snow noticed that a lot of cholera deaths were around this area.*
500	*The number of cholera deaths within 200 metres of the Broad Street pump.*
The handle of the water pump	*Snow removed this to prevent locals from using the water. The cholera outbreak soon went away.*
Cesspit	*Only a metre away from the pump, it was found that waste from this was seeping into the drinking water.*

HOW SIGNIFICANT WAS JOHN SNOW'S WORK?	
IMPACT ON MEDICINE	**EXAMPLE**
Snow was the first to make the link between cholera and contaminated water.	*Snow's investigations of the 1853-54 epidemic in Soho led him to come up with his theory. (See above for more detail)*
Snow's work had a short-term impact on those living in Soho.	*Snow had removed the handle of the water pump on Broad Street, which prevented people from using it. This stopped the disease from spreading further.*
The government eventually took up Snow's recommendations on improving London's sewer systems to stop the spread of the disease.	• *They invested money in a new sewer system in London, which was completed by 1875.* • *They introduced the Second Public Health Act (1875), making it compulsory for local authorities to provide clean water and dispose of sewage to prevent contamination.*
LIMITED IMPACT ON MEDICINE	**EXAMPLE**
The impact of Snow's work was slow to take off and, at first, many people rejected his work.	*John Snow presented his findings to a government committee in 1855. However, the committee supported the theory of miasma and dismissed his findings.*
Snow did not have any scientific evidence to show what caused the disease.	*Pasteur's Germ Theory had not yet been published and Koch only discovered the microbe which caused cholera in 1883.*
The new sewer system in London was not just down to the work of John Snow.	*The hot and dry summer of 1858 caused the 'Great Stink' in London – the low water level of the Thames exposed the sewage in the water.*

WHAT REASONS HELPED JOHN SNOW'S WORK TO HAVE AN IMPACT?		
REASON	**EXAMPLES**	**EXPLANATION**
Individual: Louis Pasteur	*Pasteur's Germ Theory (1861) proved that there was a link between germs and disease.*	*Old theories on the causes of disease, such as miasma, became less popular → John Snow's findings became more credible.*
Institution: The Government	*During the 19th century, more men won the right to vote in elections.*	*More pressure on the government → they began to pass laws appealing to the people → began to take steps to prevent cholera from spreading and to improve living conditions in towns and cities.*
Attitudes in society	• *More people believed that the government had a responsibility to improve public health.* • *People were more willing to pay taxes to improve public health.*	*The government became much more involved in improving living conditions in towns and cities → introduction of the new sewer system in London and the Second Public Health Act (1875).*
Science and technology	*New knowledge on engineering developed during the years of the industrial revolution, with the development of steam engines and new methods of building pipelines.*	*Engineers were able to design and built London's sewer systems, including pumping stations to ensure sewage flowed along the pipes.*

MODERN BRITAIN (1900-PRESENT)
4.0: CONTEXT OF THE PERIOD

TIMELINE OF MEDICINE IN MODERN BRITAIN

1909	*Salvarsan 606, the first 'magic bullet', was discovered as a cure for syphilis.*
1928	*Alexander Fleming discovered that penicillin killed harmful bacteria.*
1941	*Florey and Chain developed penicillin into a usable treatment for infections in humans.*
1942	*The government launched a national vaccination campaign against diphtheria.*
1948	*The NHS was launched by the government, providing medical care to everyone free at the point of use.*
1953	*Watson and Crick discovered the structure of DNA and how it passed on information from parents to child.*
1956	*The Clean Air Act was passed to reduce air pollution.*
1990-2003	*Scientists worked on the Human Genome Project, identifying the exact purpose of each gene.*
July 2007	*The government made it illegal to smoke in enclosed workplaces*

SPECIALIST TERMINOLOGY

Antibiotic	*Drugs made from bacteria that kill or limit the growth of other bacteria, and so cure an infection or illness.*
Antibody	*A substance produced in the body to fight infections.*
Chemotherapy	*Treatment of a disease, often cancer, using chemicals.*
CT Scan	*An advanced form of x-rays, used to diagnose tumours or growths.*
DNA	*Carries genetic information.*
Electron microscope	*Very powerful microscopes, which can produce a clear image up to 10,000,000 times magnified.*
Gene	*Part of a cell, made up of DNA, that determines how our bodies look and work.*
Hereditary disease	*Diseases caused by genetics, so can be passed from parents to children.*
Human genome	*The complete set of DNA containing all the information to build a human.*
'Magic bullets'	*Chemical cures that attack the microbes in the body causing disease.*
MRSA	*A type of bacteria that is resistant to antibiotics.*
Penicillin	*The first antibiotic.*
Pharmaceutical companies	*Discover, develop, produce and sell drugs for use as medication.*
Radiotherapy	*Treatment of disease, e.g. cancer, with rays.*
Salvarsan 606	*The first 'magic bullet', which cured syphilis.*
Transplant surgery	*An organ is placed in the patient's body to replace a damaged or missing organ.*
Tumour	*A swelling, that can be cancerous, caused by cells reproducing at an increased rate.*
X-ray	*Rays that can penetrate the human body, allowing images to be created of the inside of the body.*

KEY INDIVIDUALS / INSTITUTIONS

Paul Ehrlich	*A German scientist who tested chemical compounds to find a cure for syphilis, eventually discovering Salvarsan 606.*
Alexander Fleming	*A British doctor who discovered that penicillin killed harmful bacteria.*
Howard Florey and Ernst Chain	*Scientists who developed penicillin into a usable treatment that was effective against a wide variety of diseases.*
Rosalind Franklin	*An English chemist, who was the first person to take x-ray photographs of DNA, allowing its structure to be studied.*
James Watson and Francis Crick	*Scientists working in Cambridge, who discovered the structure of DNA.*
National Health Service (NHS)	*Launched in 1948, it provides health services to all, free at the point of use.*

WHAT WERE THE KEY FEATURES OF LIFE IN MODERN BRITAIN?

The crown and government	*By 1928, all adults over the age of 21 could vote in Britain. This meant there were more people demanding changes from the government to improve healthcare. Furthermore, during the Second World War a belief developed that everyone should have access to good healthcare, not just the rich.*
The Church	*By the twentieth century, the Church had lost almost all the influence it had over healthcare in Britain.*
Attitudes towards science	*People now understood that disease could be caused by microbes. Scientists used this knowledge to experiment with ways of treating and preventing disease, as well as investigating causes of disease not related to microbes.*
Communication	*The development of mass media (e.g. newspapers, radio and television) meant that the government began to use and control advertising campaigns. The development of computers and the internet allowed teams of scientists from across the world to work together on scientific projects.*
Living conditions	*Considerable research has resulted in greater understanding of how different lifestyle factors (e.g. diet and smoking) can lead to different diseases. Nevertheless, reliance on the car, TVs, computers, desk-bound jobs, high-calories diets, smoking and drinking all contribute to high rates of certain diseases.*
Diet	*Despite regular campaigns, many people have diets that are too high in sugar or fat, contributing to widespread obesity in Britain; one in four British adults is obese.*

OVERVIEW OF HEALTH AND DISEASE IN MODERN BRITAIN

Average life expectancy	*Life expectancy for men is 79 years, and for women 83 years.*
Common diseases	• *Cancer* • *Heart disease* • *Diabetes (the body is not able to process sugar in the blood)*
Beliefs about the causes of disease	1. *Germ Theory* 2. *Genetic factors* 3. *Lifestyle choices*
Main types of treating disease	1. *Chemical cures* 2. *Antibiotics* 3. *Advanced surgery (e.g. transplants)* 4. *High-tech treatments (e.g. radiotherapy)*
Main methods of preventing disease	1. *Mass vaccinations* 2. *Government legislation* 3. *Government lifestyle campaigns*
Main source of treatment	*The NHS (through GPs or hospitals)*
Who ran hospitals?	*From 1948, the government ran hospitals through the NHS.*

MODERN BRITAIN (1900-PRESENT)
4.1: BELIEFS ABOUT THE CAUSE OF DISEASE

BELIEFS ABOUT THE CAUSE OF DISEASE	
Germ Theory	*People understood that illness and disease could be caused by microbes.*
The influence of genetic factors	*The discovery of the structure of DNA and the mapping of the human genome enabled doctors to identify the specific genes that cause hereditary diseases to be passed from parent to child.*
The influence of lifestyle choices	*There is better understanding of how choices (such as smoking, diet, drinking alcohol and tanning) can all contribute to illness and disease.*

DISCOVERING THE INFLUENCE OF GENETIC FACTORS	
Rosalind Franklin	*She was the first person to take x-rays photographs of DNA in 1950.*
1953	*James Watson and Francis Crick discovered the structure of DNA (the double helix) and showed how it passed on information from parents to children.*
The Human Genome Project	*Starting in 1990, scientists worked to decode and map human DNA. By 2003, they had identified the exact purpose of each gene.*
Breast cancer	*Scientists have identified a gene that is sometimes present in women who suffer from this.*

THE INFLUENCE OF LIFESTYLE FACTORS	
Alcohol	*Drinking too much can lead to liver disease & kidney problems.*
Diet: too much sugar	*Can lead to type 2 diabetes.*
Diet: too much fat	*This can lead to heart disease.*
Smoking	*This is linked to many diseases, including a variety of cancers (such as lung, throat and mouth) and heart disease.*
Tanning	*This has led to a rise in the number of cases of skin cancer.*

TECHNOLOGIES DEVELOPED TO IMPROVE THE DIAGNOSIS OF ILLNESSES	
Biopsy	*A sample of flesh is taken and examined in a laboratory.*
Blood tests	*Samples are tested in a laboratory to check for an enormous number of diseases.*
ECGs	*Track heart activity.*
Scans (CT, MRI and Ultrasound)	*Create a picture of the inside of the body → used to diagnose things like tumours and kidney stones.*
X-rays	*Help to see inside the human body without cutting into it → help diagnose problems such as broken bones.*

WHY DID UNDERSTANDING ON THE CAUSES OF DISEASE CHANGE IN THE 20TH CENTURY?

REASON	EXAMPLE	EXPLANATION: WHY DID THIS LEAD TO CHANGE?
Individuals: Franklin, Watson and Crick	• *Rosalind Franklin took the first x-ray photographs of DNA in 1950.* • *Watson and Crick discovered the structure of DNA in 1953. (See above for more detail)*	*Scientists began to research and break DNA apart to understand how it worked → scientists could map the purpose of each individual gene (e.g. Human Genome Project) → scientists have identified the genetic mistakes that cause many hereditary diseases.*
The role of technology	• **Electron microscropes** *were developed which enabled more powerful magnification (a clear image magnified up to 10,000,000 times).* • *Techniques to take high-power x-ray photographs were developed.*	*Scientists were able to identify and examine DNA → Watson and Crick were able to discover the structure of DNA and carry out research into hereditary disease.*
	• *The technology used to diagnose disease has become more advanced and accurate (see above for examples).*	*Doctors are able to get a better understanding of what may be causing an illness in a patient.*
The role of science and scientific research	• *Germ Theory had proved that microbes caused many common diseases.*	*Doctors had solid, evidence-based knowledge about what caused disease → stopped referring to miasma, the Four Humours or the supernatural.*
	• *Scientists from all over the world began working together on projects.*	*Scientists from 18 countries worked together on the Human Genome Project → the entire human genome was mapped by 2000 → led to greater understanding of hereditary diseases.*
	• *Research has been carried out which has looked into, and discovered, the influence of lifestyle factors on illnesses.*	*In 1950, evidence linking cigarette smoking to lung cancer was first published → led to a greater understanding of how lifestyle can affect the development of certain diseases.*

MODERN BRITAIN (1900-PRESENT)
4.2: APPROACHES TO TREATMENT AND PREVENTION

TREATMENT OF DISEASE IN MODERN BRITAIN: NEW DEVELOPMENTS

TREATMENT	DESCRIPTION	EXAMPLE
'Magic bullets'	*Chemical cures that attack the microbes in the body causing disease, but leave the body unharmed.*	*In 1909, Dr Hata discovered Salvarsan 606 as a cure for syphilis. In 1932, Prontosil was discovered by Domagk as a cure for blood poisoning.*
Antibiotics	*Drugs made from bacteria that kill or limit the growth of other bacteria, and so cure an infection or illness.*	*Penicillin was the first antibiotic. It was discovered in 1928, and developed into a usable treatment for a wide variety of diseases in 1941.*
High-tech treatment: transplant surgery	*An organ is removed from the donor's body and placed in the patient's body, to replace a damaged or missing organ.*	*The first successful kidney transplant was carried out in 1956, the first heart transplant in 1967 and the first bone marrow transplant in 1980.*
High-tech treatment: keyhole surgery	*Surgeons use tiny cameras and small instruments to operate inside the body through tiny cuts, allowing quicker healing.*	
High-tech treatment: machines	*These treatments have become more widely available as machines have become smaller & portable.*	*Dialysis, where the blood of patients with kidney failure is washed by a machine.*
High-tech treatment: radiotherapy	*The use of x-rays to shrink tumours growing inside the body.*	*This is an effective treatment for many types of cancer.*

PREVENTION OF DIEASE IN MODERN BRITAIN: THE ROLE OF THE GOVERNMENT

AIM	METHOD
To prevent the spread of dangerous epidemic diseases.	**Mass vaccinations:** 1. *1942: The government introduced a national vaccination campaign against diphtheria, after fears that the cramped conditions of air raid shelters might lead to an epidemic. Infection rates fell drastically.* 2. *1956: Vaccination campaign against polio, a contagious disease causing paralysis. The last case in the UK was 1984.* 3. *1968: Availability of free vaccinations against measles on the NHS, and widespread advertising campaigns.*
To provide a healthy environment for the population.	**Government legislation:** 1. *The Clean Air Acts of 1956 and 1968 were passed to reduce air pollution, after bad smog in London.* 2. *Adding fluoride to the water supply to help prevent tooth decay.* 3. *The government made it illegal to smoke in enclosed workplaces from July 2007.*
To promote healthier lifestyles to help people reduce their risk of disease	**Government lifestyle campaigns:** 1. *Advertising campaigns warning against dangers to health, such as smoking, binge drinking and unprotected sex.* 2. *Events such as Stoptober, which encourage people to stop smoking for a month.* 3. *Campaigns to encourage people to eat more healthily and get more exercise (e.g. Change4Life).*

HOW SUCCESSFUL IS THE TREATMENT AND PREVENTION OF DISEASE?

IMPACT OF TREATMENT AND PREVENTION

IMPACT	EVIDENCE
Fewer people die from infectious diseases.	*By 1990, less than 1% of deaths were caused by infectious diseases, compared to 25% in 1900.*
More people have access to treatments.	*The NHS made medical services free for everyone at the point of use.*
Greater awareness of health risks.	*The government has run successful campaigns encouraging people to live healthier lives.*

PROBLEMS THAT REMAIN WITH TREATMENT AND PREVENTION

PROBLEM	EVIDENCE
Not all diseases have been vaccinated against.	*It is very difficult to develop a vaccine against some viruses, such as flu, as they change every year.*
Lifestyle factors have led to an increase in some illnesses.	*Heart disease and cancer have increased as a result of modern diets, alcohol consumption and smoking.*
Some bacteria have developed resistance to antibiotics.	*MRSA are drug-resistance bacteria.*
The development of new drugs has led to further problems.	*In the 1960s, thalidomide was given to pregnant women to treat morning sickness, but it caused birth defects.*

WHERE IS HOSPITAL CARE PROVIDED IN THE MODERN PERIOD?

HOSPITALS

Who provides medical care in modern Britain?	*The National Health Service (NHS) was launched in 1948 by the government, providing hospital care, primary care (i.e. GPs) and services like ambulances.*
How many hospitals were there in 1948?	*The government took over 1,143 voluntary hospitals and 1,545 city hospitals.*
How was the NHS funded?	*It was paid for by National Insurance contributions, taken from wages in the same way as tax.*
What was the aim of the NHS?	*Its aim was to provide medical care for the entire population, providing the same level of service for everybody in the country.*
Who was cared for?	*Everybody. Although some workers already had access to medical care, the NHS gave women and children access to medical care, often for the first time.*

IMPACT OF THE NHS

IMPACT OF THE NHS	EVIDENCE
Access to medical care improved.	*The NHS was available to all, and was free at the point of use.*
To begin with, the quality of medical care provided did not improve.	• *Many of the hospitals had been built in the 19th century, and there were more in London and the southeast than the rest of the country.* • *A quarter of GPs were unsatisfactory, with many behind the times.* • *Waiting times increased and appointment times decreased.*
The quality of medical care did improve from the 1960s.	*Hospitals were spread more evenly across the country, and GPs were given incentives to keep up with medical developments.*
Provision of high-tech medical and surgical treatments in hospitals.	• *Radiotherapy, dialysis, transplant surgery and keyhole surgery are all regularly carried out in NHS hospitals.*

WHY HAVE CHANGES TAKEN PLACE IN THE TREATMENT AND PREVENTION OF DISEASE IN THE MODERN PERIOD?		
FACTOR	**EXAMPLE**	**WHY DID THIS LEAD TO CHANGE?**
Institutions: The government	• *The Labour government launched the NHS in 1948, providing hospital care, primary care (i.e. GPs) and services like ambulances free at the point of use. This was funded by National Insurance contributions.* • *The US government funded the research of Florey and Chain.*	*More people were able to access medical care.* *The government invested money into improving the quality of medical treatment and care available to everyone in Britain (e.g. the availability of high-tech medical and surgical treatments).* *This meant that penicillin was mass produced → the masses could be treated for infections → lower death rates.*
Individuals: Fleming, Florey and Chain	• *Alexander Fleming discovered that penicillin killed harmful bacteria in 1928.* • *In the 1940s, Florey and Chain developed penicillin into a usable treatment for many diseases (see **4.3** for more detail).*	*Scientists and pharmaceutical companies have been inspired ever since to investigate other moulds and fungi in the search for more antibiotics → more antibiotics have been discovered (e.g. streptomycin in 1943, which was effective against tuberculosis).*
The role of science and scientific research	• *Scientists have a better understanding of the causes of disease (i.e. microbes, tumours or unusual genes), and can more accurately diagnose illnesses.* • *By the end of the 19th century, scientists understood that some diseases were caused by microbes, and vaccinations could help the body make antibodies to fight diseases.*	*Scientists are able to look for and test medicines and treatments that can treat a patient's disease most effectively.* *The government recognised that it could have an impact on reducing disease AND how to effectively preventing disease → the government took more action to improve the public's health (e.g. vaccinations).* *Doctors and scientists began looking for chemical antibodies, that would attack the infection without harming the body → discovery of the first 'magic bullet', Salvarsan 606, to treat syphilis.*
Technology	• *Technology has been developed to ensure that drugs can be mass produced.* • *Capsules have been developed, which dissolve in the stomach to release the drug.* • *Hypodermic needles have been developed.*	*Drugs can be more easily distributed, and treatments are widespread.* *Taking drugs to treat disease has become easier.* *The precise dose can be injected directly into the bloodstream, ensuring patients are effectively treated.*
Individuals: Ehrlich, Dr Hata and Domagk	• *Scientists in the 20th century were inspired to discover **chemical** antibodies that could fight diseases and worked the same way vaccinations did, without causing harm to the rest of the patient.* • *In 1907, Ehrlich tested over 600 chemicals to find a chemical cure for syhilis. He had no luck.* • *In 1909, Dr Hata (inspired by Ehrlich) discovered Salvarsan 606 as a cure for syphilis.* • *In 1932, Prontosil was discovered by Gerhard Domagk as a cure for blood poisoning.*	*"Magic bullets" were discovered → diseases which were previous untreatable could now be cured → less suffering / fatality from diseases, such as syphilis and blood poisoning.*

MODERN BRITAIN (1900-PRESENT)
4.3 CASE STUDY (A): FLEMING, FLOREY AND CHAIN, AND THE DEVELOPMENT OF PENICILLIN

ALEXANDER FLEMING AND THE DISCOVERY OF PENICILLIN	
Alexander Fleming	*A British doctor working in London. He focused on studying bacteria and how to fight infections.*
Mould in a petri dish	*This appeared to have killed off the harmful bacteria Fleming was growing. He tested this and discovered that it was penicillin.*
1928	*The year Fleming discovered that penicillin killed bacteria.*
Blood	*Fleming found that this made penicillin ineffective, so he did not investigate penicillin further.*

FLOREY AND CHAIN AND THE DEVELOPMENT OF PENICILLIN	
Howard Florey	*An Australian pathologist who worked in Oxford.*
Ernst Chain	*A German biochemist who had escaped Nazi Germany.*
Antibiotics and tackling infections	*Florey and Chain's area of research.*
Alexander Fleming	*Florey and Chain came across his findings and tested them further, growing mould and extracting penicillin.*
1940	*Florey and Chain tested their penicillin on infected mice, which appeared to kill the infection.*
1941	*Florey and Chain had produced enough penicillin to test the drug on a human patient who had developed septicaemia (blood poisoning). The patient showed signs of recovery.*
Large enough quantity of penicillin	*Florey and Chain did not have this to cure their human patient completely, as the drug was difficult to produce on a mass-scale.*
THE PRODUCTION OF PENICILLIN ON A MASS SCALE DURING THE SECOND WORLD WAR	
American pharmaceutical companies	*In July 1941, Florey and Chain persuaded them to begin penicillin production on a larger scale.*
10	*After a year, the US companies had only produced enough penicillin to cure this many people. Florey and Chain were able to prove the effectiveness of the drug.*
The US government	*Funded Florey's research for 5 years after they saw the benefits of the drug, and funded 21 pharmaceutical companies to begin mass-producing penicillin.*
1943	*British pharmaceutical companies also began to mass-produce penicillin.*
D-day	*By July 1944, there was enough penicillin to treat all Allied casualties during this event.*

FACTORS LEADING TO THE DEVELOPMENT OF PENICILLIN		
FACTOR	**EVIDENCE**	**EXPLANATION**
Individuals: Florey and Chain	• *Florey and Chain were interested in tackling disease and infection and decided to build on the findings of Alexander Fleming.* • *They tested their extracted penicillin on infected mice and eventually a human patient.*	*Florey and Chain proved the benefits of penicillin on a human → they approached pharmaceutical companies to develop the drug further → they proved the drug's effectiveness in curing humans from infection → penicillin received funding to be mass-produced.*
Institution: The US government	*The US government agreed to fund Florey's research for five years.* *The US government funded 21 pharmaceutical companies to mass-produce penicillin.*	*Florey and Chain were able to develop methods to mass-produce penicillin.* *Enough penicillin was produced to treat wounded soldiers during WWII.*
Technology	*New ways of mass-producing and storing penicillin were developed.*	*Penicillin was made available in vast quantities.*
Attitudes in society: The Second World War	*High numbers of casulaties during the Second World War made it important that a treatment was developed for simple infections.*	*There was a higher demand for treatments of infection → the government and pharmaceutical companies were more eager to develop, fund and trial new drugs, such as penicillin, on humans.*

HOW SIGNIFICANT WAS THE DEVELOPMENT OF PENICILLIN?	
IMPACT ON MEDICINE	**EVIDENCE**
Penicillin is still effective in treating and preventing a wide range of illnesses.	*It is commonly taken by patients who have had teeth extracted.*
The development of penicillin encouraged scientists to look for other moulds that could be used to fight bacterial infections.	*An antibiotic was developed which was effective in treating tuberculosis.*
Confidence in medical treatments began to rise, and patients were more willing to be treated by doctors.	*Antibiotics became more common during the 1950s and the 1960s.*
LIMITED IMPACT ON MEDICINE	**EVIDENCE**
Some bacteria are now resistant to penicillin and cannot be treated using the drug.	*The first penicillin-resistant bacteria appeared in 1942.*

MODERN BRITAIN (1900-PRESENT)
4.3 CASE STUDY (B): THE FIGHT AGAINST LUNG CANCER IN THE 21ST CENTURY

LUNG CANCER STATISTICS	
19th century	*There were few cases reported of lung cancer in this century.*
1900	*From this year, lung cancer began to become more common, as smoking became popular.*
1950	*A British Medical Research Council publication linked the rise in lung cancer to smoking. Despite this, deaths related to lung cancer continued to rise.*
40,000	*The number of people diagnosed with lung cancer each year today.*
70-74 years	*The age range in which the diagnosis of lung cancer is highest.*
85%	*The percentage of cases linked to people who smoke, or have smoked.*
A third	*The proportion of people who live for more than a year after diagnosis.*

DIAGNOSING LUNG CANCER: TRADITIONAL AND ADVANCED METHODS		
METHOD OF DIAGNOSIS	**DESCRIPTION**	**PROBLEMS WITH DIAGNOSIS**
Traditional method: X-Rays	*This was how lung cancer was diagnosed before advancements in technology. A doctor would examine these for signs of a tumour.*	*These were not detailed enough to accurately diagnose cancer. Other lung conditions, such as lung abscesses, could be mistaken for cancer.*
Advanced method: CT scans *(Step 1)*	*This creates a more detailed picture of inside the body, and is used for patients suspected of having lung cancer. Often a dye is injected into the body before the scan, to help the lungs show up more clearly.*	
Advanced method: PET-CT scan *(Step 2; for cancer that is not very advanced)*	*If a CT scan shows cancer might be present in the lungs, a small amount of radioactive material, instead of dye, is injected into the body to help doctors identify cancerous cells.*	
Advanced method: Bronchoscopy *(Step 2)*	*If a CT scan shows cancer might be present in the lungs, a tool called a bronchoscope is passed down into the patient's lungs to collect a sample of cells for testing.*	

TREATING LUNG CANCER	
WHY IS LUNG CANCER DIFFICULT TO TREAT?	
EVIDENCE	**EXPLANATION**
Patients often mistake the symptoms of lung cancer for another illness.	*By the time lung cancer is detected, it is usually already advanced → survival rates are low.*
There is no national screening programme for lung cancer, as tests are not accurate enough and patients may experience negative effects from the screening (e.g. exposure to radiation during scans)	*People are not routinely tested to see if they have it → the cancer is more likely to be advanced when detected.*

THE USE OF SCIENCE AND TECHNOLOGY IN THE TREATMENT OF LUNG CANCER	
TREATMENT	**DESCRIPTION**
Surgery	*If the cancer is diagnosed early, doctors use this to remove the tumour and infected part of the lung. This can range from a small piece to the entire lung.*
Transplants	*It is possible to replace cancerous lungs with one from a healthy donor.*
Radiotherapy	*Waves of radiation are aimed at the tumour to try to shrink it. Small tumours can be treated this way instead of with surgery. This may also prevent large tumours from growing.*
Chemotherapy	*This has been used since the 1970s. Patients are injected with powerful chemical drugs that attack the cancer cells to either shrink the tumour, prevent the cancer from reoccurring, or provide relief from the symptoms of lung cancer.*
Genetic research	*Scientists have been studying the genes of lung cancer sufferers to help doctors treat the cancer more effectively.*

THE BRITISH GOVERNMENT'S ACTIONS TO PREVENT LUNG CANCER		
Why was the government slow at first to respond to the 1950 report that smoking was linked to lung cancer?	• *The government earned $4 billion from tobacco tax.* • *Thousands of jobs were related to the tobacco industry.*	
HOW HAS THE GOVERNMENT TRIED TO REDUCE SMOKING IN BRITAIN?		
AIM	**METHOD**	**EXAMPLES**
To change people's behaviour	*The government passed laws to force people to change their smoking behaviour.*	• *In 2007, the government banned smoking in all workplaces, so people could no longer smoke in pubs, cafes or offices. This was extended in 2015 to cars carrying children under 18 years old to stop second-hand smoking.* • *In 2007, the government raised the legal age to buy tobacco from 16 to 18 years.*
To influence people's behaviour	*The government controlled how smoking was communicated to people to influence them to stop smoking.*	• *In 1965, the government banned tobacco being advertised on TV. This was extended in 2005, when cigarette advertising was banned completely.* • *Government campaigns have advertised the dangers of smoking.* • *In 2015, a law stated that cigarette products in shops must be not be displayed.*

THE BRITISH SECTOR OF THE WESTERN FRONT, c.1914-18: Injuries, treatment and the trenches

PAPER 1 SECTION A
The British sector of the Western Front, 1914–18: injuries, treatment and the trenches

KO1.1 Conditions on the western front		
Condition	**Details**	**Consequence**
Terrain	• *Most of the ground on the western front was farmland. There were not many trees or hills, meaning that it was often possible to see for miles in every direction.* • *Fertilisers in the soil made it toxic, containing bacteria causing diseases such as gas gangrene and tetanus.*	• *There were very few places for soldiers to take cover, this lead to armies digging trenches to protect themselves from enemy fire.* • *As soon as soldiers were wounded on the Western front, they often became infected quickly and at serious risk of death, even from minor wounds.*
Weather	*During the summer, when the weather is warm and dry in France and Belgium. However, during the winter conditions were very cold, wet and occasionally snowy.*	*The weather affected the soldiers on Western front significantly, putting them at risk of illness and poor morale.*
Effects of the fighting on Terrain	*Shells and constant battle made the ground on the western front very irregular with large shell holes and abandoned trenches.*	*Traditional methods of transport such as Horses and cars could not cross battlefields or help evacuated wounded soldiers. In wet weather, the shell holes flooded and could be deep enough to drown horses and men.*

The Trench System	
Frontline Trenches	• *Frontline trenches were closest to the enemy, where soldiers would fire on enemy attacks or travel into no-man's land.* • *Soldiers would spend up to 10 days on the frontline in good conditions; however, if the weather was bad, rotations could be a short as 24 hours.* • *They were often built in zigzag patterns to keep them safe from enemy explosives.*
Support trenches	• *80 metres behind the frontline.* • *The supply trench was often empty and used as a fall back if the frontline trench was destroyed by shells.* • *Troops could retreat to the support trench there if they were attacked to receive medical attention or wait for reinforcements.*
Reserve Trenches	• *100metres behind the support trench.* • *Reserve troops could be used to counter attack.* • *Underground* **dugouts** *were built into reserve trenches to provide cover from shells and bad weather.*

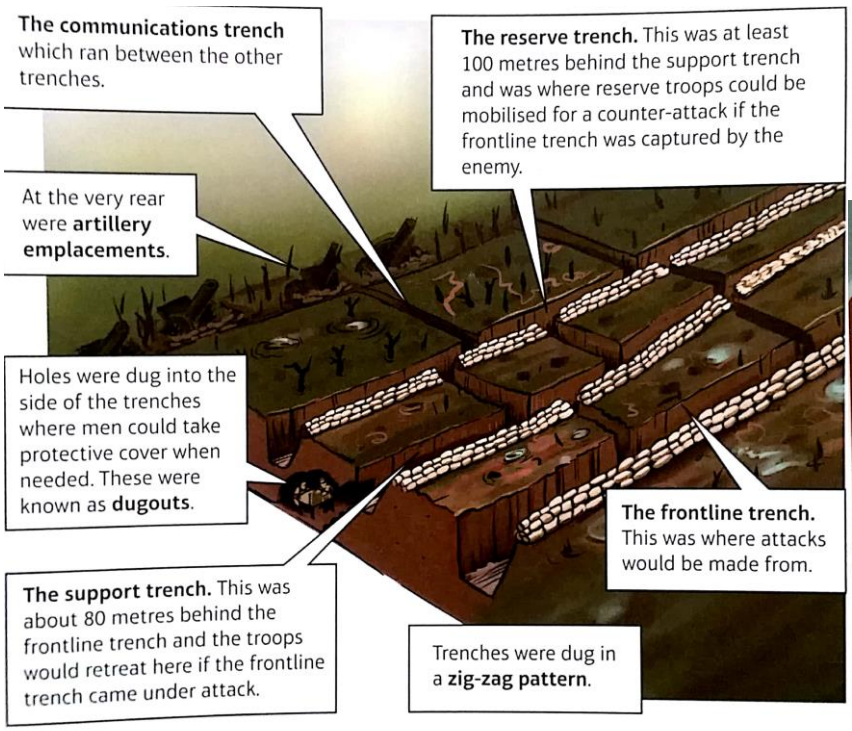


Figure 5.3 The trench system during the First World War.

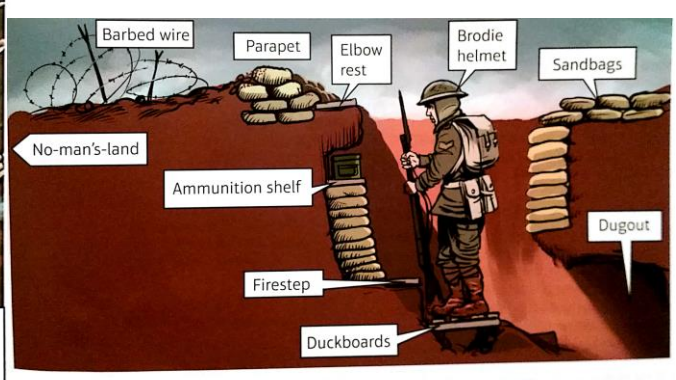
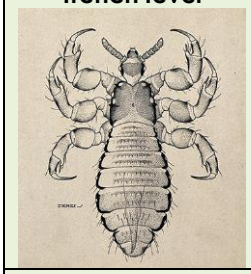
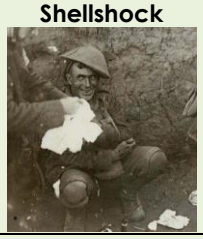
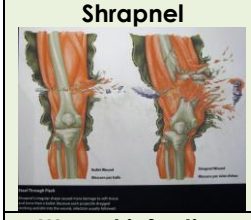


Figure 5.4 Cross section of a trench.

KO1.2 Key Battles of the British Sector of the Western Front				
Date and Name		**Deaths/Casualties**	**Key Details**	**Key image**
1914	***1st Battle of Ypres***	*The BEF Suffered heavy losses of over 50,000 soldiers.*	*British troops tunnelled under Hill 60, a key strategic point and demolished using mines.*	
1915	***2nd Battle of Ypres***	*The BEF Suffered heavy losses of about 59,000 men.*	*Chlorine gas used for the first time by German army of British soldiers.*	
1916	***The Battle of the Somme***	• *20,000 deaths and 57,000 casualties on the first day of fighting.* • *400,000 British casualties overall.*	*The British used tanks for the first time.*	 
April-May 1917	***The Battle of Aras***	*160,000 British and Canadian casualties.*	*The chalky ground near the town of Arras was easy to dig through. The BEF created a network of tunnels including an underground hospital.* *The British advanced about eight miles underground towards the German lines.*	
July - November 1917	***The 3rd Battle of Ypres/Battle of Passchendaele***	*245,000 casualties*	*The weather was very wet during this battle. Many men drowned in the muddy conditions.* *The British moved the frontline back by about seven miles.*	
October 1917	***The Battle of Cambrai***	*40,000 British casualties*	• *Nearly 500 tanks were used effectively by the British army.* • *The first ever blood bank was set up and used to perform blood transfusions during the battle.*	

PAPER 1 SECTION A
The British sector of the Western Front, 1914–18: injuries, treatment and the trenches

KO2 Conditions requiring treatment on the Western Front

Condition	Cause	Symptoms	Attempted solutions	Details
Trench foot 	*Standing in cold mud and water for too long without drying feet.*	• *Painful swelling of the feet.* • *Gangrene*	*Trench foot could easily be prevented by keeping feet dry and replacing socks often. Medical officers inspected soldier's feet regularly to prevent soldiers catching trench foot.*	*At the start of the war, trench foot was a major problem, causing soldiers to be out of action for long periods of time but by the end, it was mostly prevented.*
Trench fever 	*Trench fever is an infection spread by lice, although this was only discovered in 1918.*	• *High temperature* • *Fatigue* • *Headache and aching muscles*	*Once the cause had been identified,* **delousing stations** *were set up to clear soldiers of lice. This significantly reduced the amount of cases.*	*It is estimated that half a million soldiers were killed by Trench fever.*
Shellshock 	*Shellshock was caused by constant exposure to bombardments and gunfire.*	• *Tiredness* • *headaches* • *Nightmares* • *Loss of speech* • *Shaking* • *Mental breakdowns*	• *Shellshock was very poorly understood at the time of World War One.* • *Patients were given time to recover in Base Hospitals or in Britain.* • *Some soldiers affected were shot for cowardice.*	*It is thought that over 80,000 soldiers experienced shellshock.*
Rifle and explosive wounds 	*Bullets were fired from machine guns and rifles during battles on the Western Front.*	• *Fractured bones* • *Damaged organs* • *Bleeding* • *Head injuries*	• *At first, many soldiers died from bleeding or infection, however this was reduced, as medical skills progressed (see Developments in Medicine on the Western Front).* • *The introduction of the* **Brodie Helmet** *reduced the amount of fatal head injuries by 80% in 1915.*	*Bullets were responsible for 39% of wounds on the Western Front.*
Shrapnel 	*Shrapnel fragments of metal which fly out when a bullet or a bomb explode.*			*Shrapnel was responsible for over 58% of wounds on the Western Front, mostly from exploded shells.*
Wound infection 	*The earth on the Western front contained bacteria such as gas gangrene and tetanus which would infect soldiers' wounds while they were on the battle field.*	• *Gas gangrene spread through the body and could be deadly within a day.* • *Tetanus caused fever and was often deadly.*	• *Infection was a major cause of death from wounds, however, as medical skills progressed (see Developments in Medicine on the Western Front); many infections could be brought under control.* • *Doctors developed a Tetanus vaccine in 1914 which was given to soldier and reduced the amount of tetanus infection.*	

Gas attacks

- *Poisoned Gases were used for the first time on the Western front.*
- *At first, medical services did not know what to do to help soldiers who were affected.*
- *In July 1915, gas masks were given to all British Troops*
- *Although gas attacks terrified soldiers, they caused 6,000 deaths on the Western Front, far less than by other means.*

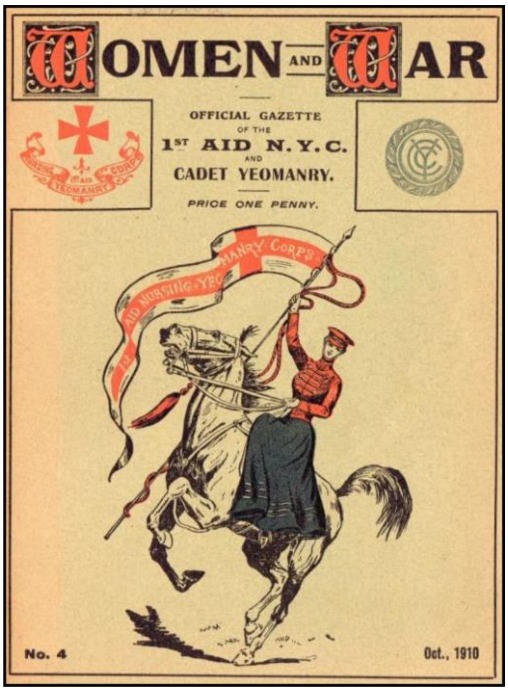
Gas	First used by German Army	Effects
Chlorine	*The Second Battle of Ypres in 1915*	*Soldiers died by suffocation as the gas closed up their airways.*
Phosgene	*Near Ypres in 1915*	*Phosgene had similar effects to Chlorine although it acted much faster.*
Mustard	*1917*	*Mustard Gas caused blisters to form on a person's skin and inside their body. It could pass through clothing and directly affect the skin.*

PAPER 1 SECTION A
The British sector of the Western Front, 1914–18: injuries, treatment and the trenches

KO3.1 The RAMC and FANY

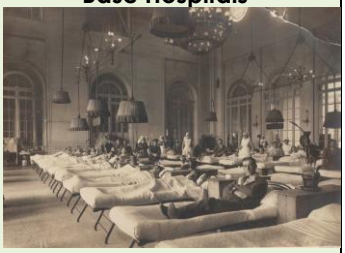
- *To cope with the injuries, almost half the doctors in England were called to serve on the western front.*
- *By 1918, there were 13,063 medical officers in the Royal Army Medical Corps (RAMC)*

Organisation	Members	Duties
RAMC	*The RAMC included Surgeons, Doctors, Nurses, Medical officers and the Field Ambulance (see below).*	
The Field Ambulance	*The Field ambulance was dedicated to transporting injured soldiers off the battlefield. Their members were ambulance drivers and stretcher bearers. There were four stretcher bearers per company.*	*The stretcher bears would locate injured soldiers on the battlefield and use their knowledge of first aid and the terrain to transport patients for treatment. Stretcher bearers were often injured themselves as they worked on the battlefields.*
FANY (First Aide Nursing Yeomanry)	*Women volunteered to join FANY. Many groups such as the Suffragists and the Suffragettes encouraged their members to join.*	*At first, FANY provided nurses for the RAMC. Gradually; these nurses became essential parts of the work of the RAMC. In 1916, FANY were also given the role of driving ambulances, assisting the over-stretched RAMC.*



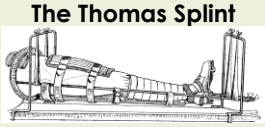
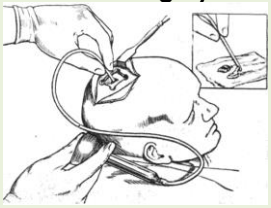
KO3.2 The Chain of Evacuation and methods of transport

- *To deal with the large numbers of casualties on the Western front, the RAMC needed a system to get wounded soldiers away from the fighting for treatment.*
- *Depending on how seriously injured a soldier was, they could treated as close to the fighting as possible, allowing them to return to their post as quickly.*
- *The Chain of evacuation was a series of different stations, where soldiers could be taken to receive treatment.*
- *Although it worked well, the Chain of evacuation was often disrupted due to bad weather heavy casualties and lack of stretcher Bearers.*

Stage	Details	Types of treatments	Transport for wounded
Regimental Aid Post (RAP) 	• *Built within 200m of the frontline.* • *RAPs were built in communication trenches and deserted buildings.* • *RAPs were staffed by one RAMC officer.* • *Soldiers would often return to the fighting within an hour of treatment.*	*Immediate first aid and treatment for trench foot and other illnesses. RAPs also looked after the general health of the soldiers.*	*If possible, soldiers were expected to make their own way to RAPs and Dressing Stations* **on foot**, *sometimes with help from another soldier. If a soldier could not walk, they were* **transported by stretcher bearers.** 
Dressing Station (ADS,MDS) 	• *Advanced dressing stations (ADS) were about 400m from the fighting and Main Dressing Stations (MDS) were often about a mile behind the frontline trenches.* • *Where possible, Dressing stations were located in abandoned buildings and underground dugouts for protection. In some cases, tents were used.* • *Dressing stations were staffed by 10 medical officers plus stretcher bearers and nurses. They could treat 150 men at a time.* • *The maximum stay in a dressing station was a week. If soldiers needed to stay longer, they were transported to a Casualty Clearing stations or a Base Hospital.*	*Nurses and Doctors could perform minor surgery and treat serious but not life-threatening wounds.*	
Casualty Clearing Stations (CCS) 	• *CCSs were located far enough from the fighting to be safe from enemy bombardments but still close enough to the fighting for ambulances to reach.* • *CCs were often set up in schools, churches and factory buildings and were often located close to railway lines to evacuate patients to Base hospitals.* • *A system known as* **triage** *was used to decide which patients needed urgent treatment, which could wait and which could not be saved.* • *Soldiers could stay in CCs for extended stay while they recovered from injuries; however, if a soldier needed a several months to recover, they were often transported to base hospitals.*	*CCSs specialised in operating on serious injuries to the head and chest and on providing relief for soldiers suffering from serious cases of shell shock.*	*Patients were usually brought to CCSs by* **motor ambulances.** 
Base Hospitals 	• *Base Hospitals were located close to the French or Belgian coast, far from the fighting and close to ports where soldiers could be returned to England.* • *During the war, CCSs became highly effective at emergency surgery and most patients had already been operated on. This meant that Base Hospitals became places where new techniques were experimented with and specialist treatments were given.* • *In Arras, the British army created a network of tunnels under the trenches and created a base hospital within 800m of the fighting. This hospital had space for 700 wounded soldiers. The hospital was hit by a shell in the Battle of Arras in 1917 and abandoned.*	• *Base hospitals gave specialist treatment such as brain surgery and plastic surgery.* • *Base Hospitals were also places where soldiers recovered from serious wounds before returning to the frontline or back to England.*	*Patients arrived at Base Hospitals by* **train**. *If doctors decided that patients should be evacuated back to England, they would be loaded onto* **boats nearby**. 

PAPER 1 SECTION A
The British sector of the Western Front, 1914–18: injuries, treatment and the trenches

KO4 Developments in Medicine on the Western Front

Development	Situation at the start of WWI	Developments during WWI	Impact
Treatment of infection 	• *Gas gangrene, a bacteria common in the earth of the battlefields killed many soldiers.* • *Although aseptic surgery was possible in hospitals, the Casualty clearing stations were too dirty and crowded to for it.*	• *Doctors started to use a technique called* **debridement** *to remove infected tissue before stitching up the wound to avoid more infection* • *Antiseptics were not effective against gas gangrene so doctors used the* **Carrel-Dakin method** *which used sterilised salt solution.* • **Amputation** *of damaged and infected limbs was very common. By 1918, 240,000 men had lost limbs.*	*New techniques in treating infection reduced the amount of death of the western from and allowed soldiers to return to the fighting quickly in many cases.*
The Thomas Splint 	*In 1914-1915, men from suffered a gunshot or shrapnel wound to the leg only had a 20 percent chance of survival. Fractures could damage major blood vessels and lead patients to bleed to death, especially during travel when the injured leg was moved around a lot.*	*Robert jones and Hugh Thomas developed the* **Thomas Splint** *a new method of keeping the leg still during transit. In December 1915, the trained the RAMC in how to use it.*	*The New Thomas Splint increased survival from leg wounds from 20% to 82% in 1915.*
Mobile X-ray units 	*X-rays were commonly used to find shell fragments in wounds. Although quite successful, the machines were slow, fragile and unreliable. Machines would overheat quickly especially when they were expected to operate for long hours during the battles on the western front.*	• *American technology improved the reliability of X-ray machine by 1917 and the RAMC used up to three machines in rotation to find bullets and shrapnel deep inside patient's bodies without machines overheating.* • *While base hospitals and casualty clearing stations had x-rays, the RAMC developed mobile x-ray units to increase the speed patients could access it.*	*The quality of mobile x-ray units was not as good as with static machines but the RAMC was able to treat soldiers closer to the point of injury than ever before. This improved the quality of its response to serious wounds.*
Blood Transfusions 	*Although blood transfusions had been successfully carried out by James Blundell in the Early 1800s, there was no way of storing blood over long periods of time after it had been removed from the donors body as it would clot. Another issue was that many patients died of shock once they had received the blood.*	• *Canadian doctor Lawrence Robertson made huge improvements to blood transfusion techniques in the Boulogne Base Hospital, almost eliminating the problem of patients dying of shock.* • *In 1915, Richard Lewison discovered that Blood could be prevented from clotting and* **stored for up to two days when mixed with sodium citrate.** • *Oswald Hope Roberston used blood stored in glass bottles to set up a* **blood bank** *during the Battle of Cambrai. It took Robertson 26 days to collect enough blood to treat 20 severally wounded soldiers, 11 of whom survived.*	*After Hope Robertson's use of the Blood Bank at Cambrai, blood was routinely stored in CCSs and giving to severally ill patients, often making a huge difference to their chances of survival.*
Brain Surgery 	*At Injuries that affected the Brain were almost always fatal. This was because men with head injuries were hard to evacuate from the battlefield and doctors were inexperienced at operating on the brain.*	• *Harvey Cushing, an American Neurosurgeon made huge improvements to brain surgery during WWI by using* **magnets** *to remove shrapnel and bullets from the brain.* • *Doctors recognised that operating quickly made patients more likely to survive and created* **specialised Brain surgery units** *in CCSs close to the fighting.*	*Harvey Cushing's pioneering surgery techniques lead to improved survival rates for brain surgery. In 1917, Cushing carried out 45 operations with a 71% survival rate.*
Plastic Surgery 	*Very few patients with injuries to the face were treated and spent the rest of their lives disfigured from their wounds.*	*Harold Gillies, a New Zealand born surgeon revolutionised plastic surgery when he was sent to the western front to join the RAMC.* • *Gillies persuaded the British Army to give him a specialised Hospital in Britain in 1917 called the Queen's Hospital.* • *By the end of the War, Gillies and his team had carried out 12000 operations on patients with facial injuries.* • *Gillies recorded the progress of each patient with photographs and detailed drawings*	*Harold Gillies is widely considered a pioneer of plastic Surgery. Gillies invented many new techniques which are still used by surgeons toady and operated on many soldiers with life changing injuries.*

PAPER 1 SECTION A
The British sector of the Western Front, 1914–18: injuries, treatment and the trenches

KO5 Sources

KEY WORDS	
Source	*Anything that remains from the past.*
Enquiry	*A specific question e.g. What was the system for dealing with injured soldiers on the Western Front?*
Provenance	*Information about where the source comes from (its nature, origin and purpose).*
Content	*What information you can get from the source.*
Context	*Links you can make from the source to your own knowledge about the topic.*

Provenance of a source	
Nature	*What type of source it is e.g. photograph, diary, RAMC records etc.*
Origin	*When the source was made and who made it*
Purpose	*Why the source was made e.g. to inform doctors of medical advances / to boost morale etc.*

Different types of sources	
Written Sources (Private / official/ non- official)	*National newspapers, poems, fiction, letters, diary entries, medical records, government documents, birth/ death certificates*
Oral Sources	*Speeches, interviews*
Non- Written sources	*Archaeology, landscape, buildings, artefacts, photographs/ paintings*

What makes a source useful	
Authoritative	*If the author of a source is in a position to know what they are talking about, we say that they speak with authority, and that their source is authoritative. This makes the source useful.*
Balanced	*When a source gives both sides of an issue, it can be described as balanced. If a source is balanced, this would suggest that the author has adopted a relatively neutral standpoint, and this makes the source useful.*
Representative / Typical	*If the evidence of a source matches our own knowledge about what generally happened then it can be described as representative or typical of the past. This makes the source useful.*
Unrepresentative / Atypical	*The opposite of representative and typical. We cannot say this is what generally happened but if a source does not tell us what we would expect then it can still be useful because it tells us that different people had different experiences in the past which can make the source useful.*
One-sided	*If a source provides only one perspective on an event/issue, and does not consider other points of view, it can be described as one-sided. Such a source may well provide useful evidence of one perspective, though it may be of only limited use to the historian interested in evidence of what actually happened.*
Objective	*If a source is objective then it is not giving any personal opinion which can make the source useful because it is not trying to show a particular side.*
Subjective	*The opposite of objective. If someone presents a view that is subjective then it has been affected by their personal opinion or experience. If something is described as subjective, then it is a matter of opinion, rather than fact. This might be useful for learning about somebody's individual experience but it might not be typical.*

Sources from the British sector of the Western Front	
Diaries and first-hand accounts	*Many people who were on the Western Front wrote diaries to record their experiences. This give an first-hand insight into the experiences of people who were at the front-line, but are subjective.*
Newspapers	*Generally provided accurate information but they were sometimes one-sided and often focused on positive developments to try to keep morale high.*
Reports written by doctors	*Many doctors published their observations of war injuries or new techniques used during the First World War and these provide evidence of the medical developments of the time. Such sources tend to be very factual in focus.*
Photographs	*Developments in photography by 1914 meant that the First World War was heavily photographed. These sources are generally accurate but only provide a snapshot of the time.*

Example source

How useful are Sources A and B for an enquiry into the system for dealing with injured soldiers on the Western Front?

↑

Enquiry

Nature	Origin	Purpose
It is a photograph and therefore should be an accurate impression but we do not know if more wounded men are out of sight.	*It was taken during the Battle of Arras, 1917 so might not show a typical situation – this could be just after a battle and therefore shows an unusually large number of wounded soldiers.*	*We do not know for certain but it might have been taken to show people in Britain that injured soldiers were being dealt with efficiently.*

Source B: A photograph showing soldiers on stretchers outside a dressing station on the Western Front during the Battle of Arras, 1917. They are waiting to be transported to a casualty clearing station.

Content	Context
• *It shows the way injured soldiers were transported – the wounded are on stretchers and there are motor and horse-drawn vehicles ready to transport them.* • *It highlights the challenges of dealing with injured soldiers – this amount of men could not be transported by the vehicles that are visible in the photograph* • *It indicates the number of wounded men which the system needed to deal with.*	• *There were 160,000 British and Canadian casualties at the Battle of Arras.* • *The system for dealing with injured soldiers could be very efficient; the severely wounded were taken to the coast by train for subsequent transport back to Britain.* • *The photograph does not clearly show the medical people involved in the transport of and care for the wounded, such as the RAMC and the FANY nurses.*