20 Essential Questions and Answers… Medicine in the Middle Ages 1250-1500

Ideas about the cause of disease and illness

QUESTION	ANSWER
1. What did the Church teach about disease?	God made people ill because He was either displeased with them or was testing their faith.
2. How did this belief hold back medicine?	People believed that there was no need to search for other, rational explanations for disease so this belief held back medical research.
3. How else did the Church hinder medicine?	• The Church controlled learning and ran universities to train physicians • The Church discouraged dissection and people challenging ideas • Approved of traditional explanations for disease e.g. Galen's ideas
4. Did the Church help medicine at all?	The Church taught that people should follow Jesus' example and care for the sick. Many hospitals were in monasteries.
5. What was the theory of the 4 humours?	The Ancient Greeks had a theory that everyone had a mix of 4 humours in their body – phlegm, blood, yellow bile and black bile. People became ill if the humours were out of balance. Treatment was mainly bleeding or purging.
6. What was the theory of opposites?	Galen aimed to balance the humours by giving the patient the 'opposite' of their symptoms e.g. if you had too much phlegm (linked to water and cold) you should eat hot peppers.
7. Who was Hippocrates?	An Ancient Greek Doctor whose ideas and books were influential in medieval times. His treatments were based on diet and exercise but he also used bleeding and purging. He believed in clinical observation (study symptoms, make notes, diagnose and treat).
8. Who was Galen?	A Greek doctor working in Ancient Rome. He developed Hippocrates' ideas. He drew detailed diagrams of human anatomy and wrote over 300 books.
9. What was the miasma theory?	Idea that disease was transmitted by 'bad air'. This was related to God because bad smells indicated sin. This theory came from the Ancient world.

Approaches to prevention and treatment

QUESTION	ANSWER
10. Name 2 rational treatments connected to the 4 Humours.	Bloodletting: cut veins, leeches, cupping. Usually done by barber-surgeons. Purging: make patient vomit or go to toilet. Emetics and laxatives mixed by wise women.
11. How did they prevent and treat based on religion?	1.Live a Christian life (pray, go to church etc.) 2. Carry lucky charms, chant incantations 3. Self-punishment e.g. flagellation 4. Go on a pilgrimage.
12. Other rational methods of preventing disease?	Trying to keep the streets clean, washing, exercising, purifying the air, not overeating, bleeding and purging.
13. What did Barber-surgeons do?	Bloodletting, pulling teeth, lancing boils, amputation! Also cut hair. No training. Cost less than a physician.
14. What did an apothecary do?	Mixed medicines and ointments. Had training. Cost money (less than a physician). Most people treated at home by female family/local wise woman.
15. What did physicians do?	Diagnosed illness (observed symptoms, took pulse, checked urine) and gave treatments/sent patients to barber surgeons/apothecaries. Medically trained at university. Expensive so mainly used by wealthy.
16. What were hospitals like in the Middle Ages?	Places of recuperation (people with infectious diseases not allowed). Patients given fresh food, rest. Kept very clean. Many run by the Church. The number of hospitals increased during the Middle Ages.

Case Study: The Black Death

QUESTION	ANSWER
17. Black Death symptoms?	Buboes (swellings), fever, headache, vomiting.
18. What did people believe caused the Black Death?	Punishment from God, Miasma (bad air), astrology (position of Mars, Jupiter and Saturn was unusual), Four Humours imbalance
19. How did people try to avoid catching it?	Praying, punishing themselves, clearing up the streets, smelling 'bad smells' or carrying herbs to avoid breathing in the 'bad air'.
20. What treatments did they have for the Black Death?	Praying, cutting open the buboes, eating cool things and taking cold baths, holding bread against the buboes then burying it in the ground.

20 Essential Questions and Answers… Medicine in the Renaissance 1500-1700

Ideas about the cause of disease and illness

QUESTION	ANSWER
1. How did ideas on causes of disease change?	People were still religious but they began to look for new explanations for the cause of disease. The Church had less influence and there was a more scientific approach to diagnosing illness.
2. In what ways was there continuity in ideas on causes of disease?	Theory of miasma still believed by many, especially during epidemics. The theory of the 4 Humours was still used, though by 1700 very few physicians still believed in it.
3. Describe the new scientific approach.	Physicians stopped using astrology charts for diagnosis; improved knowledge of digestion meant they stopped using urine charts. More direct observations and examinations.
4. Who was Thomas Sydenham?	English doctor in London in 1660s and 70s. He led the way in improving diagnosis of diseases by observation, examination etc.
5. What was so important about the printing press?	Invented in 1440 (hundreds of printing presses in Europe by start of Renaissance). It meant exact copies could be produced quickly and spread the ideas of scientists and doctors effectively. The Church no longer controlled ideas as it couldn't stop new ideas being published which it didn't approve of.
6. What was the aim of the Royal Society?	To further scientific understanding by carrying out experiments, sharing scientific knowledge and encouraging new theories and ideas. It sponsored scientists to carry out research.
7. How did the Royal Society spread their ideas?	From 1665 they published a journal called 'Philosophical Transactions' for doctors to share their work and ideas. Doctors could then study, challenge and build on each other's research.

Approaches to prevention and treatment

QUESTION	ANSWER
8. What happened to hospital care during the Renaissance?	1536 dissolution of the monasteries by Henry VIII caused most hospitals to close. Some free charity-funded hospitals were set up. More pest houses appeared where people suffering from a particular contagious disease could go for care.
9. What stayed the same about treatments and preventions?	As in medieval times, most ill people cared for at home by females. Physicians still too expensive. People still used traditional herbal remedies, bleeding and purging, prayer etc.
10. Why was there so little change?	Any new ideas had no direct use in improving treatment or preventing disease. Plus, the discoveries didn't improve understanding of what caused disease.
11. What did change though?	• More emphasis on removing miasma (remove sewage, rubbish) • New herbal remedies from newly discovered countries • Theory of transference led people to try to rub objects on themselves to transfer the disease to the object • Alchemy (chemical cures using metals or minerals) became popular
12. What changes were there in medical training?	<u>Apothecaries and surgeons:</u> Still not university trained but they had to be in guild systems (apprentice, journeyman, master) and have a licence. <u>Physicians:</u> Still trained at universities, mainly from textbooks not practical experience. But, better access to variety of medical books and detailed drawings (due to printing press). Some physicians, inspired by Vesalius, became more practical/experimental. Dissection legal but not commonplace.
13. Who was Vesalius?	Vesalius studied medicine in Paris and became a professor of surgery in Padua, Italy. He did lots of human dissections and made many discoveries on how the body worked. He wrote 'On the Fabric of the Human Body' in 1543.
14. How was Vesalius important?	He improved understanding of the human body, made the study of anatomy popular; he proved that some of Galen's work was wrong (making others question Galen too); encouraged others to do dissections.

Case Study: The Great Plague, 1665

QUESTION	ANSWER
15. What did people believe caused the Great Plague?	Mostly the same beliefs as for the Black Death. A few differences – miasma was most popular belief, fewer people thought it was imbalance in 4 Humours, people knew disease could be passed from person to person.
16. What treatments were there for the Great Plague?	Similar to Black Death. Many used herbal remedies. Some new treatments e.g. 'transfer' the disease to something else, especially birds. Also, sweating the disease out.
17. Differences between the government's reaction to the 1665 plague compared to the Black Death?	Much greater reaction – King ordered the local councils to try to stop it spreading e.g. banned large gatherings, killed dogs and cats, cleaned streets, boarded households in for 20 days if member of house caught the plague, burned barrels of tar in the streets.

Case Study: William Harvey

QUESTION	ANSWER
18. Who was William Harvey?	Studied medicine at Cambridge and Padua. Lecturer in anatomy in London. Discovered process of blood circulation. Published his book 'An anatomical account of the motion of the heart and blood' in 1628.
19. How did Harvey make his discovery about the circulation of blood?	He was influenced by Vesalius. He used dissected bodies and pumps to show blood only flowed one way. New technology e.g. mechanical water pumps made him think the human body worked in the same way. He discovered that arteries and veins were part of one system and that blood was pumped around the body by the heart.
20. How was Harvey important?	He proved that Galen could be wrong (Galen said blood was produced by the liver and absorbed into the body), improved knowledge about the body, his methods of observation and dissection worked which encouraged others to copy him and find out more for themselves.

24 Essential Questions and Answers… Medicine in the 18th and 19th Century 1700-1900

Ideas about the cause of disease and illness

QUESTION	ANSWER
1. Were there any new ideas about the cause of disease in the 18th century?	Not many new ideas. Some scientists thought germs came from decaying matter - called 'spontaneous generation'. Most people still thought miasma caused disease but this was less popular than it had been in the Renaissance.
2. Why were microscopes so important?	By 1850, microscopes had improved so that extremely tiny images could be seen clearly e.g. bacteria or germs. This technology was essential for scientific breakthroughs of the 19th century.
3. What did Louis Pasteur publish in 1861?	The Germ Theory: Showed that spontaneous generation was wrong and proved that microbes (bacteria/germs) in the air caused decay. He had an idea that germs also caused disease but he couldn't prove this.
4. What did Robert Koch do?	He read Pasteur's work and studied microbes too but was also able to identify the specific microbes causing some diseases e.g. TB (1882) and cholera (1883).
5. How influential were Pasteur and Koch?	Germ Theory had little impact to begin with as Pasteur wasn't a doctor and his work was more to do with food and drink, not disease. Koch's work had more impact as he inspired others to research other microbes. It took time for doctors and the government to accept the Germ Theory and there was no real immediate impact on medical treatment or prevention.

Approaches to prevention and treatment

QUESTION	ANSWER
6. In what ways did Florence Nightingale improve hospital care?	• She led a team of nurses at the military hospital in Scutari during the Crimean War (1854-56) • She believed that miasma caused disease so emphasised hygiene, fresh air, good supplies and training for her nurses. The death rate at Scutari hospital fell from 42% to 2%

	• She published books on nursing and hospital organisation • She set up a training school for nurses/midwives
7. How had hospitals improved by the end of the 19th century?	New hospitals (paid for by charities/local councils) were opened, first cottage hospital (GP surgery) opened in 1859, specialist hospitals e.g. for mentally ill; cleanliness improved, nurses were better trained/given a bigger role.
8. Main surgery problems?	Blood loss, pain and infection.
9. Which anaesthetic did James Simpson discover in 1847?	Chloroform. It was very effective with few side effects. But it was difficult to get the dose right. Simpson gave lectures and wrote articles to promote its use during surgery and childbirth. Deeper, more complex surgery possible.
10. What earlier anaesthetics had been used?	Ether. Made patients totally unconscious but it could make them cough and be sick afterwards. Laughing gas, alcohol and opium had also been used.
11. Why did some people oppose anaesthetics?	Worried about long-term effects. Plus, they were religious and thought God inflicted pain for a reason.
12. What did Joseph Lister do?	Pasteur's Germ Theory made him think to use carbolic acid to clean wounds and equipment and invent a spray to kill germs in the air. It took a long time for surgeons to believe in the Germ Theory and also to accept Lister's work.
13. What impact did Lister's development of antiseptics have?	He inspired others to search for methods to prevent spread of infection in hospitals. By 1900, operating theatres (and surgeons' clothing and instruments) were cleaned using aseptic techniques. Death rates decreased as infection was reduced.
14. Describe how vaccines were developed.	Pasteur used Jenner's work on smallpox to find more vaccines e.g. 1885, tested vaccine for rabies. Other scientists then developed vaccines to prevent other diseases e.g. 1896, typhoid.
15. Important 1875 law?	The Public Health Act.
16. How was this law different to before?	The government used to think it shouldn't interfere in people's lives (laissez-faire attitude). Several epidemics and scientific evidence (including Chadwick's report) showed that many diseases were caused by poor living conditions. People began to think it was the government's responsibility to improve city living conditions.
17. What did the Public Health Act say?	Cities had to provide clean water, sewers, public toilets. Had to check quality of new builds to stop damp and overcrowding. Employ a public health officer.

Case Study: Jenner and the development of vaccination

QUESTION	ANSWER
18. What did Jenner discover and why was he important?	First successful vaccination against smallpox (deadly disease). He proved that scientific methods could lead to a disease being wiped out BUT he didn't know how it worked and other diseases were still killing people.
19. How did he make this discovery?	He observed that people who'd had cowpox didn't get smallpox. He used scientific methods to carry out experiments to test this theory and observe and record the results. He paid to print his findings. In 1840 the government began paying for vaccinations (compulsory in 1852). Smallpox gone by 1979.
20. Why did some people oppose Jenner?	Thought it wrong to give people an animal's disease; thought it interfered with God's plan; some doctors didn't vaccinate properly so it didn't always work.

Case Study: Fighting cholera in London

QUESTION	ANSWER
21. What was cholera?	Epidemics in 1831, 1848-49 and again in 1854. Deadly disease causing severe diarrhoea, vomiting and dehydration. People thought it was caused by miasma so tried to keep homes clean etc.
22. John Snow's discovery?	Cholera caused by contaminated water not miasma.
23. How did Snow discover this?	In 1854, in Soho in London, he mapped all the deaths and found a link to one water pump on Broad Street. He removed the handle and the number of deaths fell. Later discovered a leaking cesspit near the pump.
24. How was John Snow significant?	Many didn't believe his theory as no scientific evidence and no Germ Theory yet so the government didn't follow Snow's recommendation to build a new sewer system until 1875. His work helped make the link between dirty water and disease leading to 1875 Public Health Act (forced to provide clean water).

22 Essential Questions and Answers… Medicine in Modern Britain 1900-present

Ideas about the cause of disease and illness

QUESTION	ANSWER
1. What advances happened in the 20th century to do with genetics?	New technology (electron microscopes, x-rays) helped scientists discover that every cell in the body has DNA – codes controlling genes. Team of scientists worked together e.g. Watson, Crick, Franklin and worked out the double helix structure of DNA (1953). In 1990, Watson led the Human Genome Project to identify and map every gene in human DNA.
2. How is the discovery of DNA important?	Better understanding of some genetic conditions e.g. Down's syndrome; predict if some people more likely to get certain cancers; discovery that stem cells can be grown into different cells. But, there's no cure/treatment/prevention for most genetic conditions/diseases yet.
3. Describe 3 lifestyle factors which can negatively effect health.	Smoking: linked to many diseases e.g. heart disease, cancer Drinking alcohol: drinking too much linked to cancer, liver and kidney disease Diet: eating balanced diet, limiting sugar and fat reduces chance of getting cancer or heart disease.
4. Which new technologies help doctors diagnose illness?	Laboratories to test skin/blood, x-rays, scans to 'see' inside the body e.g. MRI, CT and ultrasound scans, monitors e.g. blood pressure and blood sugar.

Approaches to prevention and treatment

QUESTION	ANSWER
5. What is a magic bullet?	A chemical compound to attack and kill microbe causing a specific disease.
6. Who worked on finding a magic bullet?	Paul Ehrlich led a research team trying to cure syphilis by testing compounds of Salvarsan. Dr Hata found the compound in 1909. In 1932, Domagk found the 2nd magic bullet, Prontosil, to cure some types of blood poisoning.
7. What was the key ingredient in Prontosil?	Sulphonamide. It could also cure pneumonia, scarlet fever and meningitis.
8. What do antibiotics do?	Destroy bacteria or prevent its growth. Penicillin was the first antibiotic.
9. What developments have happened since the discovery of penicillin?	Discovering the chemical structure of different antibiotics meant scientists could make antibiotics rather than having to grow them. Antibiotics have saved millions of lives but due to overuse, super-bacteria (resistant to antibiotics) have evolved.
10. Give examples of high-tech medical and surgical treatments.	Radiotherapy and chemotherapy, kidney dialysis, pacemakers, organ transplants, keyhole and microsurgery, robotic surgery.
11. What happened in 1948?	National Health Service (NHS). Free at the point of delivery.
12. What healthcare does the NHS provide?	GPs, hospital care and operations, ambulances, health visitors for pregnant women and young children, health care for the elderly.
13. How did the NHS improve access to healthcare?	All treatment free so everyone could access same care. But unequal across different parts of the country. Some types of healthcare still difficult to access e.g. not enough NHS dentists.
14. Which vaccinations has the government funded?	Diptheria (1942), Tetanus (1961), MMR Measles Mumps and Rubella(1988).
15. How has the government tried to prevent people getting ill?	Funding more testing and vaccinations, better rubbish and sewage disposal, laws reducing air and water pollution, laws banning smoking in public places, environmental health officers inspecting food outlets. Also, government funded campaigns to raise awareness e.g. Change4Life campaign to encourage healthy behaviour.

Case Study: Penicillin

QUESTION	ANSWER
16. Who discovered penicillin?	Alexander Fleming, 1928. He noticed that bacteria in a petri dish was being killed by a penicillium mould. He tested it on other bacteria and discovered that mould produced an antibiotic (penicillin). He published his findings but had no funding to continue his research.
17. Who developed penicillin?	Howard Florey, Ernst Chain and their team continued Fleming's research.

	Penicillin proved effective on mice in 1940, so they tested it on humans. It killed bacteria and thus the infection so was a miracle drug. But huge amounts needed to treat just one person so still wasn't used for medical treatment.
18. How did penicillin become mass produced?	Florey asked UK and US drug companies and factories to help (some US ones agreed to but only on a very small scale). It wasn't until USA joined WW2 that the US government saw the need for more penicillin to treat casualties and funded 21 companies to mass produce it in 1942. British drug companies began mass production in 1943.

Case Study: Fight against lung cancer

QUESTION	ANSWER
19. What are the symptoms of lung cancer and how is it diagnosed?	Persistent cough, coughing up blood, breathlessness, tiredness and weight loss. Cancer is often very developed when these symptoms show up. CT scan used to show a mass and then a sample of cells are collected and tested.
20. How is lung cancer treated?	Surgery to remove the tumour or carry out a lung transplant, radiotherapy and/or chemotherapy to shrink the tumour and prevent the cancer returning.
21. What is the main cause of lung cancer?	Smoking or passive smoking.
22. What has the government done to reduce the number of people smoking?	All advertising for cigarettes banned, tax on tobacco products regularly increased to make smoking more expensive, in 2007 smoking in public places banned and legal age for buying tobacco products raised to 18, cigarette packaging has graphic warnings of the dangers.

20 Essential Questions and Answers… The Western Front 1914-1918: injuries, treatment and the trenches

QUESTION	ANSWER
1. What was the Western Front?	The line of trenches that stretched through Flanders and northern France, from the English channel to Switzerland.
2. Name 4 main battles and a notable point about each.	2nd Battle of Ypres (April-May 1915): First time chlorine gas was used (by the Germans). Battle of the Somme (July-November 1916): new strategies of creeping barrage and also first use of tanks. Battle of Arras (April-May 1917): Underground tunnels used to launch the battle. High number of casualties on both sides. 3rd Battle of Ypres (July-November 1917): awful weather left ground waterlogged and many drowned in the mud. Also known as the Battle of Passchendaele.
3. Describe the trench system.	Front line trench (where attacks were launched), support trench and reserve trench. All 3 rows of trenches linked by communication trenches. Trenches in a zig-zag pattern.
4. Problems with the terrain?	Trenches could be muddy and crowded. Could be deep mud and waterlogging, craters and holes from explosions.
5. What were the main injuries from weapons?	High-explosive shells and shrapnel were the cause of most deaths and injuries, removing limbs and causing major internal injuries. Head injuries were common and caused by shrapnel mainly (helmets introduced in 1915), bullets from machine guns and rifles could penetrate organs and break bones. Gas was feared but not a major killer – mainly caused temporary blindness, coughing, burns (gas masks given in July 1915).
6. Why was infection such a major problem?	Soil on the Western Front contained tetanus and gas gangrene bacteria – these would enter the wound. Tetanus injections given but no prevention for gas gangrene.
7. What specific injury problems were there?	Major blood loss, especially from explosions. Bullets and shrapnel had to be located and removed. Head wounds required brain surgery and/or facial reconstruction.
8. What were the main illnesses caused by the conditions?	Trench fever: flu-like symptoms which could last months. Caused by lice. Trench foot: Could lead to gangrene and amputation. Duckboards added to trenches, spare socks given and foot inspections made. Shell shock: NYD.N (Not Yet Diagnosed.Nervous). Could lead to total mental breakdown. Some called cowards.
9. Name the 4 stages of the chain of evacuation.	1.Regimental Aid post: close to the front line. Medical officer helped by stretcher bearers to give first aid. Sent more serious injuries to next stage. 2. Field Ambulance: (mobile medical unit of the RAMC) set up dressing stations about a mile back from the front line. Could look after men for a week. Serious cases sent straight to next stage. 3. Casualty Clearing Stations: Larger, better equipped (in buildings several miles from the front line). Doctors and nurses treated life-threatening injuries. 4. Base hospitals: Situated near ports, many medical staff including specialist doctors.
10. What were the RAMC and FANY?	RAMC = Royal Army Medical Corps FANY = First Aid Nursing Yeomanry
11. What was at Arras?	Underground hospital. It was very close to the front line in the tunnels underneath the town. Space for 700 beds, operating theatre.
12. What transport problems were there?	• Difficult terrain meant that in some places only stretcher bearers could be used • Many roads and railway lines had been destroyed • Constant shelling made recovery of the injured very difficult • No motor ambulances to start with and not enough horses to cope (though by November 1914 had 250 motor ambulances)
13. What 3 important medical developments were useful for treatment in WW1?	X-rays: invented by Roentgen in 1895 but large machines were too heavy to be moved easily. Blood transfusions: Landsteiner discovered blood groups in 1901 and worked

	out that transfusions would only work between people of the same blood group. But they didn't know how to store the blood. Aseptic surgery: thanks to work of Lister operating theatres and wards were thoroughly cleaned, sterilised clothing, surfaces and equipment.
14. How did the conditions on the Western Front lead to new techniques for dealing with infections?	Antiseptic and aseptic surgery not possible in Dressing Stations and Casualty Clearing Stations and the wounds were often already infected. 1917, Carrel-Dakin method was used (sterilised salt solution moved through the wound using tubes). But when infections were deep, surgery was developed to remove infected tissue and all traces of bullet/shrapnel. If that didn't work then had to amputate.
15. How did blood transfusions develop?	Used from 1915 but limited as couldn't store blood. 1915, Lewisohn added sodium citrate to blood to stop it clotting and Weil used refrigerators so it could be stored for longer. 1916, Rous and Turner added citrate glucose to store blood for even longer.
16. At which battle was the first 'blood depot'?	Battle of Cambrai, 1917. 22 units of blood were stored and used on Canadian soldiers.
17. Which invention reduced death from broken legs?	The Thomas Splint, 1915. Splint kept leg rigid which reduced blood loss (previously, 80% of soldiers with broken legs died).
18. What were x-rays useful for and how did they develop?	Locating bullets and shrapnel before operating. Mobile x-ray units used closer to the front and numbers increased as the war went on.
19. How did surgery advance?	Number of brain injuries led to the development of new surgical techniques and improved success rate. Large number of facial injuries led to huge improvements in plastic surgery (led by Harold Gillies in Queen's Hospital, Kent).
20. Which sources might be useful to find out about medicine on the Western Front?	• photos • articles in newspapers • army records e.g. service records of individuals • hospital records e.g. records of Casualty Clearing Station about admissions and cases • medical articles written by doctors during the war • statistics of different types of injuries and operations • recollections by medical staff or soldiers written after the war ended • diaries and letters written by soldiers/medical staff during the war