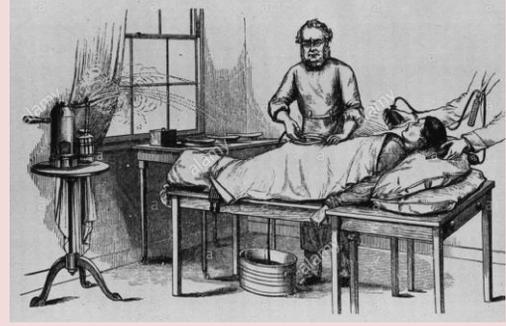


1500-1700: Medicine in Renaissance Britain



Medicine in Britain Module 3: Medicine in Britain between 1700-1900

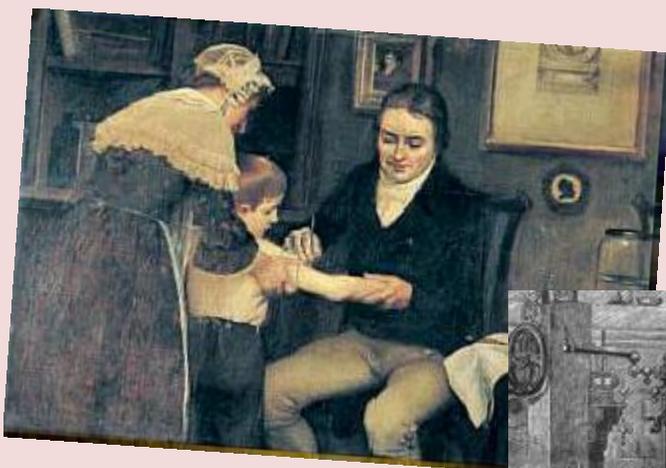
In this module you will revise;

Ideas about the cause of disease and illness (continuity and change in explanations of the cause of disease and illness. The influence in Britain of Pasteur's Germ Theory and Koch's work on microbes)

Approaches to prevention and treatment (the extent of change in care and treatment; improvements in hospital care and the influence of Nightingale. The impact of anaesthetics and antiseptics on surgery. New approaches to prevention; the development and use of vaccinations and the Public Health Act of 1875.

Module 3 case studies:

(Key individual; Jenner and the development of vaccinations. Situation: Fighting Cholera in London, 1854; attempts to prevent its spread, the significance of Snow and the Broad Street pump.)



3. c1700-c1900: Medicine in 18th- and 19th-century

Overview of changes to society c1700-c1900

In 1700, the influence of the **church** was not as great as it once was.

- Many people no longer believed that God was responsible for all worldly events.
- Instead they focused on developing scientific explanations.

Society was also changing with **cities** beginning to grow as people moved in search of jobs.

- The new cities were not planned and quickly became dirty and disease-ridden.
- Understanding the causes of disease and illness became more important.

The introduction of **democracy** meant that people believed that they had the right to good health.

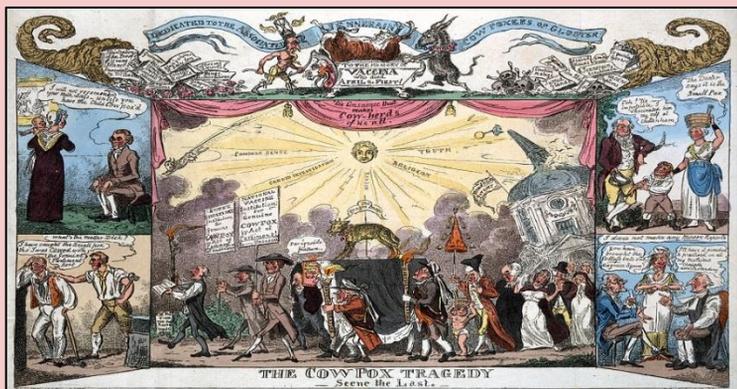
- The right to health was one of the 'rights of man' claimed by working people during the French Revolution which is why the medical revolution of the 19th century started in France.

Intellectual movements such as **The Enlightenment** made it fashionable to seek answers to questions about the world – including disease and illness.

- The **Scientific Revolution** saw developments across all branches of science which completely changed the way people lived and the ways they understood the world around them.
- Advances in **technology** also meant that new medical machines were invented.

Growth of **industry** and advances in **technology** meant that Britain became increasingly wealthy and had lots of money to spend on medical research and public health.

- Improved **communications** also allowed medical knowledge to spread with doctors gaining information from all around the world.



3.1 Ideas about the cause of disease and illness

Continuity and Change

There was not a lot of new ideas about the causes of disease in the 18th century.

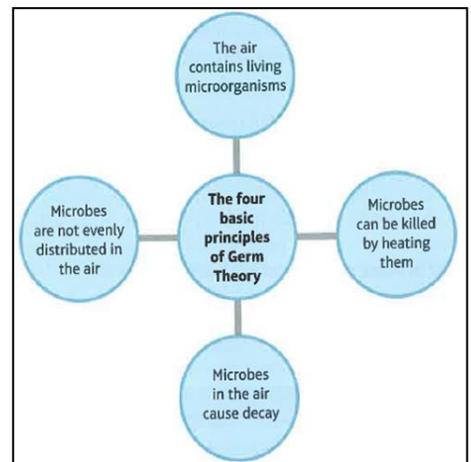
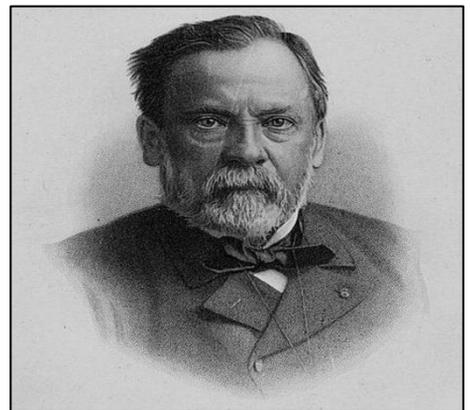
- Ideas such as the Theory of the Four Humours had been discarded.
- People still believed in **MIASMATA**, although this theory was becoming less popular.
- Scientists in the early 18th century developed the theory of **SPONTANEOUS GENERATION** as an alternative to theories like the Four Humours. This was not proven though.
- Improvements in the quality of glass lenses used in microscopes meant that scientists could see **MICROBES** present on decaying matter. Most people believed these microbes were the product of decay, rather than the cause of it.
- In the 18th century, this was just a theory, and scientists were unable to prove that **SPONTANEOUS GENERATION** was correct. It took until the 19th century for scientists to make a solid link between these microbes.

Louis Pasteur and the development of Germ Theory

Louis Pasteur discovered that germs cause disease. Before he made this discovery, doctors had noticed bacteria, but they believed it was the disease that caused the bacteria rather than the other way around. This was known as **SPONTANEOUS GENERATION**.

Pasteur published the results in 1861. He called his discovery **GERM THEORY**:

- Using improved microscopes which magnified substances to a much higher level, Pasteur was able to observe unwanted microbes in wine and vinegar, which turned both liquids 'bad'.
- He therefore proved the idea of **SPONTANEOUS GENERATION** was wrong because decay did not happen to sterilised matter that was left undisturbed.
- Pasteur also discovered the **PASTEURISATION** of milk, which prevented it from going sour by killing the germs and sealing it from the air.

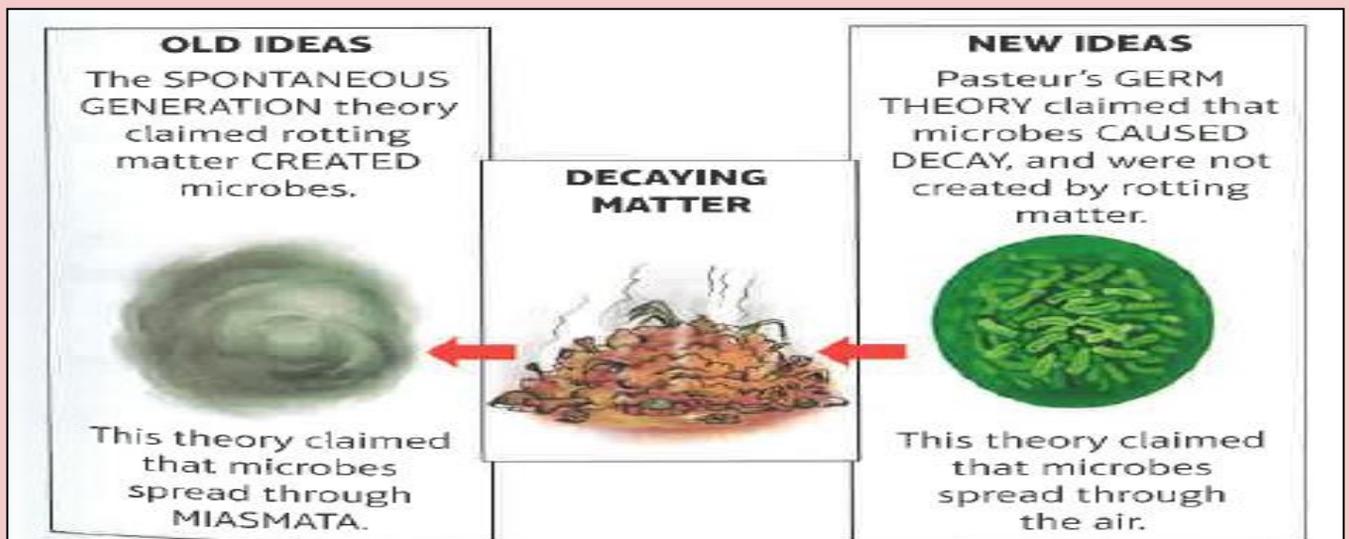


Pasteur's influence in Britain

| Had an impact | Did not have an impact |
|---|--|
| <p>Some scientists did start to look for a link between the <u>MICROBES</u> and disease.</p> <ul style="list-style-type: none"> One of these was Joseph Lister, who read Pasteur's <u>GERM THEORY</u> and linked it to the infection problems his surgical patients had experienced | <p>The theory of <u>SPONTANEOUS GENERATION</u> continued to be important until 1870s.</p> <ul style="list-style-type: none"> It was promoted by Dr Henry Bastian, who was one of the most powerful doctors in the country. Because he was so well respected, few people disagreed with him. |
| <p>Another scientist who promoted the link between <u>MICROBES</u> and disease was John Tyndall.</p> <ul style="list-style-type: none"> He had discovered that there was small organic particles in the air. In January 1870 he gave a lecture, lining his discovery with Pasteur's GERM THEORY and Lister's work on wound infection. Tyndall theorised that dust particles carried the germs that caused disease. | <p>Many doctors refused to listen to Pasteur.</p> <ul style="list-style-type: none"> Pasteur was not a doctor and his work focused on decay and spoiled food. not disease. Tyndall was also not a doctor: He was a physicist. The medical world trusted Bastian's beliefs rather than Pasteur's and Tyndall's theories. |

Overall Impact

Pasteur's theory had **limited impact** in Britain, **because attitudes among doctors** meant people refused to recognise the link between germs and disease – even though the link was correct!

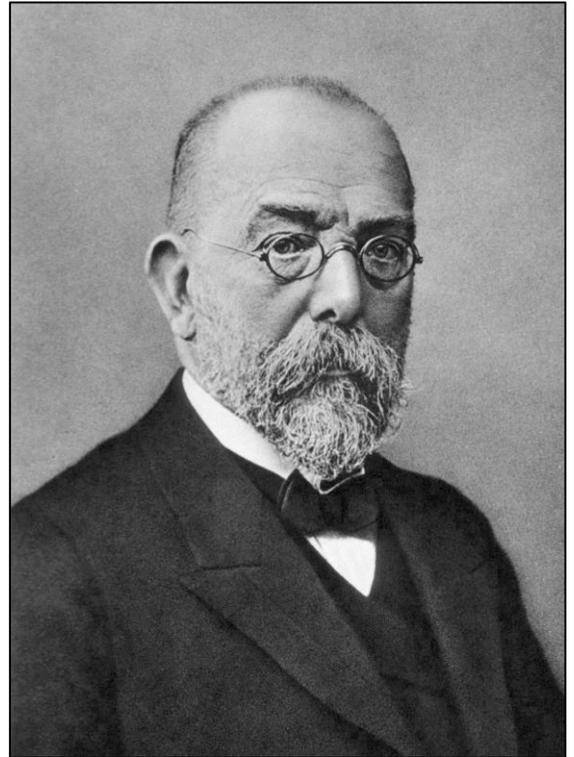


Robert Koch's work on microbes

Although Pasteur had been the first scientist to identify microbes and their role in decay, it was Robert Koch who successfully identified that different germs cause many common diseases.

Koch discovered the bacteria that caused tuberculosis, in 1882. He published his ideas on the methods that could be used to identify disease-causing microbes and continued to look for microbes causing different diseases.

- In 1883, he discovered **cholera**, and in 1884 he proved it was **spread in water supplies**.
- Koch made it easier for future scientists to study **bacteria** by developing a new method of growing them, using agar jelly in a petri dish. This made it easier to study bacteria under a microscope.



Koch's influence in Britain

- Before doctors had studied and treated symptoms, now they **studied the disease itself**. The medical profession had begun to recognise that the microbe created the symptoms of the disease, and it was the microbe that needed to be removed.
- In 1905, Koch received the **Nobel Peace Prize** for Medicine and is considered to be the father of **BACTERIOLOGY** (the study of bacteria).

Overall Impact

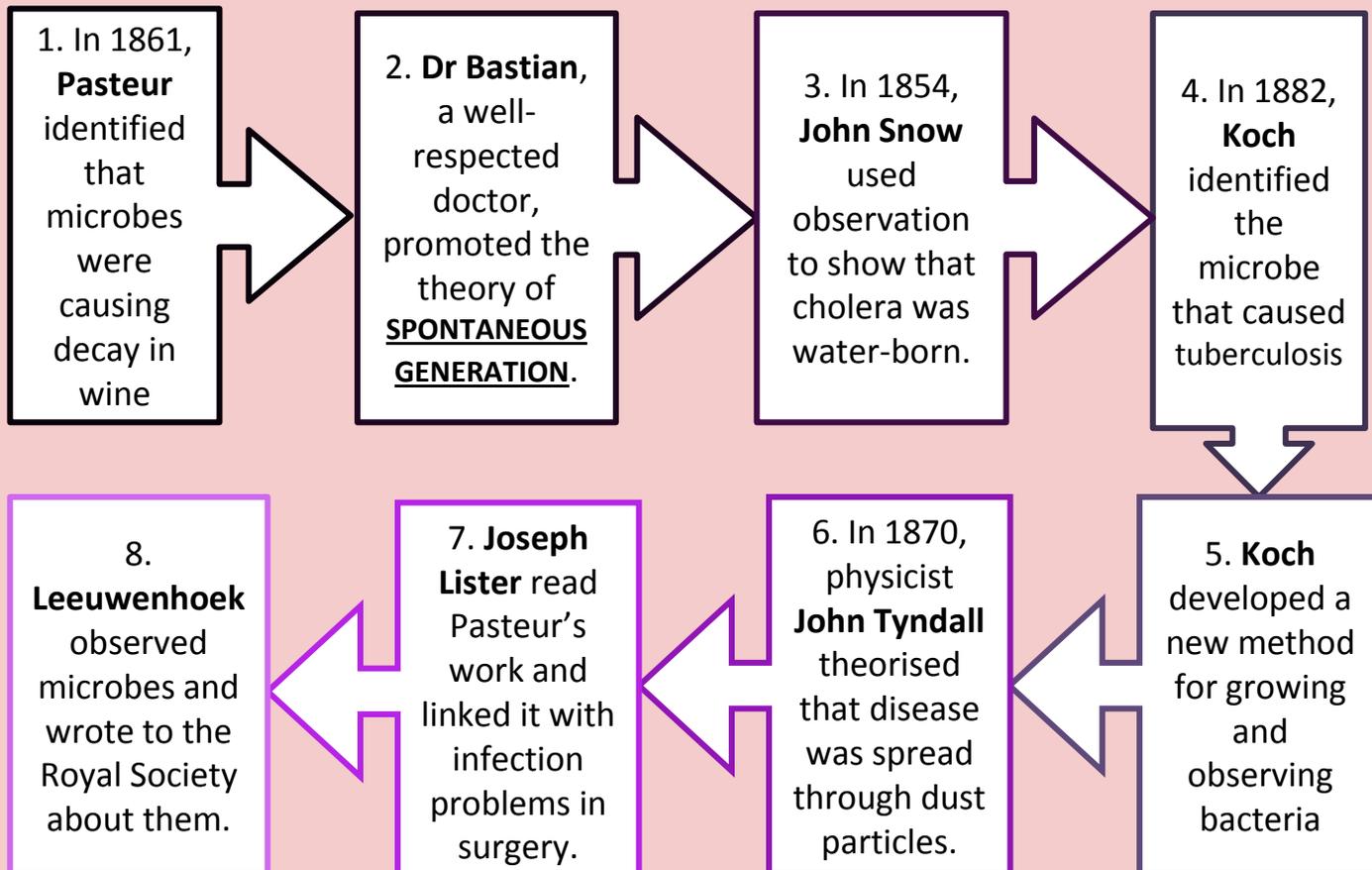
Koch's had a huge impact in Britain. Koch's research inspired other scientists. Over the next two decades, they went on to discover the microbes responsible for other diseases such as diphtheria, pneumonia, meningitis, the plague, tetanus and various other infections.

3.1 Ideas about the cause of disease and illness

Summary of ideas about the cause of disease and illness

- In the 18th and 19th centuries, scientists started to theorise about germs being produced by decaying matter, a theory named SPONTANEOUS GENERATION.
- In 1861, **Louis Pasteur**, a French chemist, published GERM THEORY. This proved that microbes in the air caused decay in substances such as wine and vinegar.
- Pasteur's work was picked up by some medical professions, quite quickly, particularly in Britain where **Joseph Lister** began attempting to remove microbes from his operations theatre. However, many doctors resisted the ideas.
- **Robert Koch**, a German scientist, began to look for specific microbes that caused disease. He identified lots of these, including the microbe that caused cholera.
- By 1900, the mystery of what caused illnesses and diseases had been solved – it was just that not everybody believed the solution yet.

The development of GERM THEORY



3.2 Approaches to prevention and treatment

The extent of change in care and treatment

By 1900, the way that sick people were treated and cared for had changed almost completely since 1700.

- By 1900, most people accepted that **germs caused disease** and that treatment needed to be **focused on removing the germ**.
- **Herbal remedies continued to be popular until 1900**. This is because treatments for everyday diseases such as syphilis and tuberculosis were not developed until after 1900.
- By 1900, the old belief that **prevention was the most important aspect became even more widespread**. People began to realise that infection was everywhere and that avoiding disease by keeping clean and following a sanitary regime was the best way to protect themselves.
- The biggest change by 1900 was in the **willingness of the government and the population to take steps to prevent disease from spreading**.

Improvements in hospitals and the influence of Florence Nightingale

Hospitals in the 18th century

Between 1550-1700, the country did not invest in new hospitals and by 1700, there were only five hospitals left in the country – and they were all in London. However during the 18th century, attitudes to hospitals began to change.

1. Wealthy people began to donate money to create hospitals all across England.

- Some doctors also offered their services free of charge to these new hospitals.

2. Hospitals increasingly became places where sick people were treated, as opposed to places where people could rest and pray.

- Doctors visited patients regularly and there was a surgeon on site for daily treatments.



3. Hospitals were still not places that people chose to be treated.

- Patients in hospitals were generally the 'deserving poor'.
- Rich received medical treatment in their homes, which was much safer.

4. As more people started to attend hospitals, they became less sanitary.

- They became less strict at turning infectious patients away.
- Doctors went from patient to patient without washing their hands. This meant that disease spread quickly.

5. By the middle of the 19th century, there were a lot more hospitals. However hospital conditions were very poor.

Florence Nightingale

Florence Nightingale was a nurse in the 19th century who helped to overhaul army and civilian healthcare and transformed nursing and hospitals in Britain.



1800

1820-1840

Florence was born into a wealthy family and when she was 17, she experienced a religious vision telling her that her mission was to serve mankind.

1850-53

Florence convinced her parents to allow her to train as a nurse

- She first trained in Germany and then in Paris.
- In 1853, she became the first superintendent of nurses at King's College Hospital in London.

1854

In 1854, Britain went to war with Russia in the Crimea.

- Nightingale convinced the government to send her and 38 other nurses to improve hospitals in the Crimea for the wounded soldiers.

1856

When Florence returned to Britain in 1856, she was a national hero.

- There had been a lot of bad publicity about the conditions in war hospitals and she became famous for having made a big difference.
- This gave her credibility and helped her to make a difference in British hospitals as well,

1854-56

When Florence was in the Crimea, she made changes to the care of the wounded soldiers in many different ways:

- Demanded 300 scrubbing brushes to get rid of any dirt where the patients were being treated.
- Nurses were organised to treat nearly 2,000 wounded soldiers.
- Clean bedding and good materials were provided.

Within 6 months the mortality rate had dropped from 40% to only 2%.

1856

The impact of Florence Nightingale in British hospitals

Following her return from the Crimea, Nightingale's experience and popularity meant that she was able to have a big impact on hospital care in Britain in two different ways:

1. The way hospitals were designed

2. The way nurses were trained



I wrote *Notes on Nursing* in 1859, setting out the key role of a nurse and the importance of thorough training.

In 1860, I set up the Nightingale School for Nurses at St Thomas' Hospital, London. Here, nurses were trained mainly on sanitary matters.

On my recommendations, new hospitals were built out of materials that could be easily cleaned. I believe dirt spreads disease, so tiles on the floors and painted walls and ceilings made it possible to wash down all surfaces and get rid of this dirt.

I made nursing seem like a respectable occupation. 'Nightingale nurses' were more often middle-class women. Previously, nurses had been from working-class backgrounds, and had a reputation for being drunk, flirtatious and uncaring.

I promoted 'pavilion style' hospitals, where separate wards were built in hospitals to ensure infectious patients could be kept separate.

Rigorous training turned nursing into a profession, rather than a simple, unskilled job. This encouraged more women to sign up, and so the number and skill of nurses grew rapidly.

Hospitals in the 19th century

Hospitals by 1900 were very different from the few that were originally in Britain in 1700

- **Many different wards split up infectious patients from those needing surgery.**
 - **Operating theatres** and **specialist departments** for new medical equipment provided spaces for certain procedures.
- **Cleanliness was now of the utmost importance:**
 - Hospitals first focused on cleaning up germs using **ANTISEPTICS**, and by 1900 they were focused on preventing germs.
- **Doctors** were a common sight. **Trained nurses** lived in nearby houses provided for them.
- **New ideas were adopted quickly.**
 - Everyone wanted to have the most modern hospital to attract the best doctors and donations.
- **The function of hospitals had completely changed.**
 - Instead of being places for the sick to rest, hospitals had become places where the sick were treated.
 - This change in role had forced a change in the way that hospitals were built and run.

The impact of Anaesthetics and antiseptics on surgery

In the 18th century, surgery was dangerous and usually fatal. The three big problems that surgeons faced were: *bleeding, pain* and *infection*. In the 19th century, significant developments occurred that tackled two of the three problems of surgery.

| | 18 th Century problems | 19 th Century solutions |
|-----------------------------|--|---|
| Problem 1: Bleeding | | |
| | Problem: As blood transfusions hadn't been invented yet, surgeries had to be performed quickly so patients didn't bleed to death on the operating table. | Not Solved: When William Harvey had discovered the circulation of the blood, the first blood transfusions were attempted. Early blood transfusions often ended disastrously because blood groups had not been discovered, they could not prevent the blood from clotting and infection could be passed on. |
| Problem 2: Pain | | |
| | Problem: Although substances like opium had been used to calm patients with severe injuries, without <u>ANAESTHETIC</u> there was no way of preventing excruciating pain which sent patients into shock and stopped their heart. | Solved: <u>ANAESTHETICS</u> were developed to enable surgeons to put patients to sleep before operating on them which helped with the pain. |
| Problem 3: Infection | | |
| | Problem: As operations were not performed in germ-free environments, infections quickly set in. Without cures for these infections, many patients died. | Solved: The development of <u>GERM THEORY</u> led to an understanding of the importance of cleanliness in the operating room, and <u>ANTISEPTIC SURGERY</u> was developed which helped to stop infection. |

Problem - Tackling pain: the development of anaesthetic

Doctors had been experimenting with pain relief for their patients for centuries to try and keep them still and quiet long enough to perform operations.

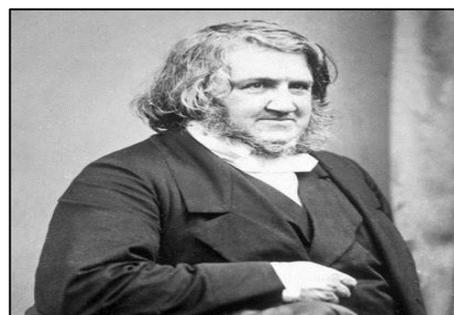
- **Laughing gas (1795)** and **ether (1842)** had been used as anaesthetics however neither of them were that effective:
- **Laughing gas wasn't strong enough** to make patients unconscious and **ether was so strong** it caused patients to vomit and was very flammable.

A more effective type of ANAESTHETIC was therefore needed.

James Simpson and chloroform

James Simpson was a British scientist who discovered that chloroform was an effective anaesthetic and the first person to be knighted for his services to medicine.

- He gathered a group of friends together and they inhaled the vapours of various chemicals to see what might work. After sniffing chloroform, the entire group passed out and were discovered some time later.



Simpson's influence in Britain

| | Positive effects | Negative effects |
|--------------------------|---|---|
| Chloroform itself | <ul style="list-style-type: none">• Chloroform began to be used as a solution to pain in surgery.• After Queen Victoria used it during the birth of her son in 1853, chloroform became even more popular in Britain. | <ul style="list-style-type: none">• Chloroform could be fatal however. The dose had to be carefully controlled, as it was easy to overdose a patient and kill them.• The chemical also sometimes affected the heart, which caused some healthy and fit people to die shortly after inhaling it. |
| More surgeries | <ul style="list-style-type: none">• More surgeries could now take place because of chloroform.• Lengthier and more complex surgeries could also now be attempted. | <ul style="list-style-type: none">• Because chloroform allowed for deeper surgery to be attempted, infection and bleeding became even bigger problems. |

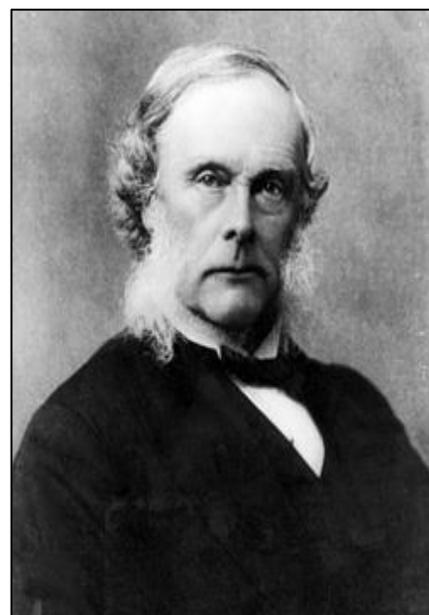
Problem - Tackling infection: the development of antiseptic surgery

Due to a lack of understanding about germs, surgeons did not make an effort to keep their surroundings, instruments or even themselves, clean when they operated on patients. Because of this, many patients survived operations but then died shortly afterwards from infections.

Joseph Lister and Carbolic acid

Joseph Lister was an English surgeon who discovered the use of CARBOLIC ACID as an antiseptic in 1865.

- Lister studied infected wounds and realised that the **flesh was rotting**. Basing his ideas on Pasteur's GERM THEORY who had identified **germs** as being responsible for decay, Lister found that MICROBES in the air was what caused flesh to rot.
- Lister started to look for a chemical that would clear bacteria from wounds. He found that the uses of CARBOLIC ACID during operations ensured that wounds did not become effective.
- Lister developed a **series of steps** to ensure that wounds did not become infected. These included spraying CARBOLIC ACID in the air during operations.



Lister's influence in Britain

| Short Term | Long Term |
|--|--|
| <p>In the short term surgery did not change very much because of initial resistance from medical professionals:</p> <ul style="list-style-type: none">• Because lots of surgeons did not fully understand the science behind the new method they were not willing to use <u>CARBOLIC SPRAY</u>. They did not believe the air was full of germs.• <u>CARBOLIC SPRAY</u> dried out the skin and left behind an odd smell. Some surgeons argued that, since it made their hands sore, it would not do the patient any good.• Lister himself stopped using <u>CARBOLIC ACID</u> in 1890. | <p>In the long term attitudes changed. New antiseptic methods were developed and introduced to improve surgery.</p> <ul style="list-style-type: none">• The key change here wasn't that doctors started using <u>CARBOLIC ACID</u>, what was important was that surgeons finally understood that performing safe surgery was not only possible – it was their duty.• From 1890 onwards, the beginnings of <u>ASEPTIC SURGERY</u> began to be developed thanks to this change in attitude. Surgeons started to boil their instruments to sterilise them as well as wearing rubber gloves and face masks when performing operations. |

New approaches to prevention: the development and use of vaccinations

By 1900, people still believed that the best way to avoid dying from a disease was not catching it at all. As cures for diseases were still not effective, scientists continued to focus on prevention and developed the idea of a VACCINATION.

Timeline of the development of VACCINATIONS

1700

In 1700, people knew about INNOCULATION (Giving people a mild dose of a disease to protect them from getting the disease badly) but scientists could not explain why this worked as they did not know about germs. Inoculation therefore worked sometimes but not always.

1700

1796

Edward Jenner was the first doctor to vaccinate people against smallpox. He found that if you inoculated a person with cowpox, they would not catch smallpox. In 1798 he published his findings and named the technique 'VACCINATION' after the Latin word for cow '*vacca*'

1861

Pasteur publishes his GERM THEORY which identified germs as being responsible for disease.

1878

Pasteur presents his case for GERM THEORY of infection. He theorised that microorganisms were responsible for disease. Pasteur realised that that vaccines could only be developed once the germs causing that specific disease had been identified.

1879

Pasteur discovered that injecting chickens with a weakened form of chicken cholera gave them immunity to the disease. Pasteur could now explain how and why the vaccine worked and discovered the principle of INNOCULATION.

1884

Inspired by Pasteur's vaccinations of animals, **Koch's** work isolated MICROBES that caused specific diseases. This led to other scientists being able to develop vaccinations.

1890

Thanks to the work of Pasteur and Koch, **Emil von Behring** developed a vaccine for tetanus and diphtheria.

1900

3.2 Approaches to prevention and treatment

The Public Health Act 1875

Alongside the new scientific methods of prevention, a great deal was being done to improve the living conditions in Britain, Particularly in larger cities.

| Government attitudes to public health | | |
|---|---|--|
| 1700 | 1800 | 1860 |
| <p>In 1700, the government had little interest in improving conditions in cities.</p> <p>They had a <u>Laissez-faire</u> attitude. This describes governments who do not get involved in the day-to-day lives of their population.</p> <p>The government believed it was not their responsibility to interfere in the way that people lived.</p> | <p>During the beginning of the 1800s, this attitude began to change. More men had the right to vote, so the government began passing laws that appealed to working class men so that they would vote for them to stay in power.</p> <p>Cholera also arrived in Britain during the 1800s. The epidemic led to the deaths of thousands of people. John Snow proved that cholera spread because of dirty drinking water.</p> | <p>From the 1860s, the government began to take more action to improve the living conditions for people in cities.</p> <ul style="list-style-type: none">• In London, 1,300 miles of sewers were built by 1865.• In Birmingham, slums were demolished.• In Leeds, a local business obtained a court order to prevent sewage from being drained into the river from which they got water, |

By 1870, there had been a change in the way people felt about public health.

More people began to recognise that it was now everybody's responsibility. In the response to this change in attitude. The government passed the **Public Health Act in 1875.**

City authorities had to follow the rules it set out. The responsibilities included:

- Providing **clean water** to stop diseases that were spread in dirty water.
- **Disposing of sewage** to prevent drinking water and washing water becoming polluted.
- Employing a **public officer of health** to monitor outbreaks of diseases.
- Ensuring **new houses were of better quality**, to stop damp and overcrowding.
- Building **public toilets** to avoid pollution.
- Providing **public parks** for exercise.
- **Inspecting lodging houses** to make sure they were clean and healthy.
- Creating **street lighting** to prevent accidents.
- **Checking the quality of food** in shops to make sure that it didn't cause somebody harm.

The government had taken solid steps to prevent the spread of disease – and it worked.

Summary of approaches to prevention and treatment

By 1900, the treatment and prevention of disease had changed. This was due to an improved understanding of the cause of disease.

- More **hospitals were built**, making treatments more widely available.
- Hospitals were **cleaner** and built to provide space for recovery, thanks to the work of **Florence Nightingale**. Nursing had also become a respected profession.
- **Herbal and plant remedies were still popular** for common illnesses, because few new treatments had been developed.
- **Surgical procedures had become a more effective** method of treatment as a result of the development of anaesthetics and antiseptics. However, blood loss was still a problem, so surgeons still had to work quickly.
- Scientists had developed a **method for vaccinating people against diseases** and had begun to develop vaccines for particular illnesses.
- In the 19th century, the **government began to take action to improve public health in cities**. This was a result of a better understanding of the link between dirty conditions and disease and it led to a healthier population.

| Developments in understanding... | Factors 1700-1900 | Factor |
|----------------------------------|--|--|
| CAUSE | <ul style="list-style-type: none"> • <u>GERM THEORY</u> • The development of work on identifying <u>MICROBES</u>. | <ul style="list-style-type: none"> • Role of technology (microscopes). • Role of science of chemistry. • Role of individuals. |
| TREATMENT | <ul style="list-style-type: none"> • Better hospitals and nursing thanks to the work of Florence Nightingale • Improvements in surgical treatment, because of <u>ANAESTHETICS</u> and <u>ANTISEPTIC SURGERY</u>. | <ul style="list-style-type: none"> • Role of individuals. • Role of science of chemistry. |
| PREVENTION | <ul style="list-style-type: none"> • Development of <u>VACCINATIONS</u>. • Improved water supply and drainage with the Public Health Act 1875. | <ul style="list-style-type: none"> • Role of individuals. • Role of government |

3.3 Case Studies

Key individual: Edward Jenner and the development of the vaccination

Smallpox was a terrible threat to the health of the population of Britain.

- There were nationwide epidemics in 1772, 1723 and 1740-42.

At this time people were still unaware of the cause of the disease, but they did have some ideas about to avoid catching it.

- It had been noticed that people who had caught a mild form of smallpox and then recovered did not catch it again.
- However in the 18th century there was not enough scientific knowledge for people to understand how this worked.

**Small pox
in 18th
century
Britain**

The problem of smallpox was particularly bad in London.

- There were 11 epidemics in the 18th century.
- In 1796, 3,548 people died.
- By this time, the population of the city was almost 1 million, so the disease spread quickly and easily from person to person.

Inoculation was seen by many as the best chance of surviving smallpox but the procedure was very expensive.

- Many doctors made a fortune carrying out inoculations for wealthy people.

Some people attempted to INOCULATE themselves against smallpox by catching a mild dose of the disease.

- Pus from a smallpox scab would be rubbed into a cut on the patients body.
- This did not always work and many patients died from the INOCULATION as the disease affected people in different ways.

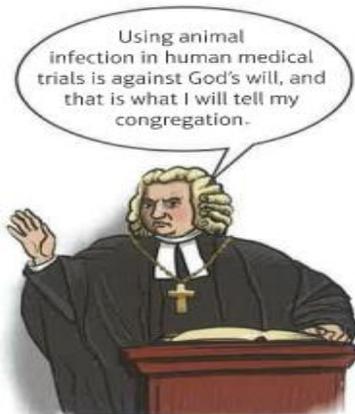
Edward Jenner

Edward Jenner was the first doctor to VACCINATE people against SMALL POX.

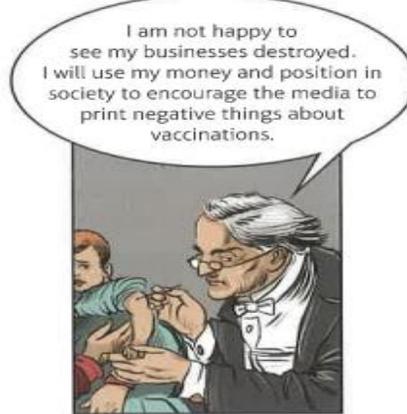
- Edward Jenner was a British general practitioner (GP) who was particularly interested in INOCULATIONS.
- Jenner regularly treated dairy maids for COW POX and noticed that, when there was a smallpox epidemic, those who had previously suffered from COW POX did not catch SMALL POX.
- In 1796, he infected a boy with COW POX. Six weeks later he attempted to infect the boy with SMALL POX, but he did not catch it.
- Jenner published his findings in *An Enquiry into the Causes and Effects of the Variola Vaccinae*. He named the technique 'VACCINATION' after the Latin word for cow, *vacca*.



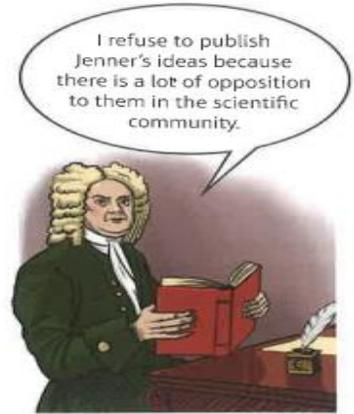
Reactions to the new vaccinations



THE CHURCH



INOCULATORS



THE ROYAL SOCIETY

The British government

The British government however favoured the new vaccination.

- It was a **safer** and **more reliable** alternative to **INOCULATION**.
- It was also **cheaper** because recipients of vaccines did not need to be put into quarantine, whereas those receiving the inoculation were in danger of spreading small pox to other people.
- The government therefore **provided funding** and set up a **society to promote vaccination** (1840). Later they made **small pox vaccinations compulsory** (1852).

Jenner's influence in Britain

Short Term

In the short term, although the smallpox vaccine saved many lives overseas, the vaccine was slower to become popular in Britain.

- The **anti-Jenner propaganda campaign** promoted by **INOCULATORS** meant that many people did not trust the **VACCINATIONS**.
- Sometimes **people still contracted small pox or died of infection**, because doctors carrying out the procedure mixed up small pox and cow pox samples, or reused needles. This discouraged people as well.

Long Term

In the long term attitudes changed and by the end of the 19th century, vaccination against smallpox had become normal.

- Opposition continued throughout the century, but the **number of people saved** made it clear that the method worked.
- The **number of small pox cases fell dramatically** from 1872, when the government started to enforce compulsory vaccinations (this meant that everyone had to be vaccinated for small pox).
- In the very long term, it could be argued that **Jenner was responsible for the end of small pox**. In 1979, the World Health Organisation announced that the disease had been completely wiped out.

Overall Impact

Jenner had shown that a **vaccine could be used to stop small pox from spreading**. His work inspired other scientists, like **Pasteur** and **Koch**, to search for vaccinations for other diseases. However, there were no other vaccinations discovered that worked in the same way as the small pox vaccination. **This was a one-off so scientists were unable to develop other vaccines based on Jenner's method.**

Fighting cholera in London, 1854

CHOLERA was a terrible disease that arrived in Britain in 1831. It spread quickly across the country. It arrived in London in 1832 and there were 5,275 deaths in the city by the end of the year. **CHOLERA** mainly affected the poorest people in the poorest areas, however wealthier districts were not immune.

Attempts to prevent the spread of cholera:

- Some steps were taken to try to **clean up the filthiest areas of the cities** and prevent the spread of cholera.
- The belief of **MIASMATA** and rotting material caused disease was still widespread, so the government encouraged cities to set up boards of health.
- **This did not have a great effect on people's living conditions.**

CHOLERA:

A disease that caused diarrhoea and sickness that became so bad, the victim would not have enough water in their body to keep their organs working properly.

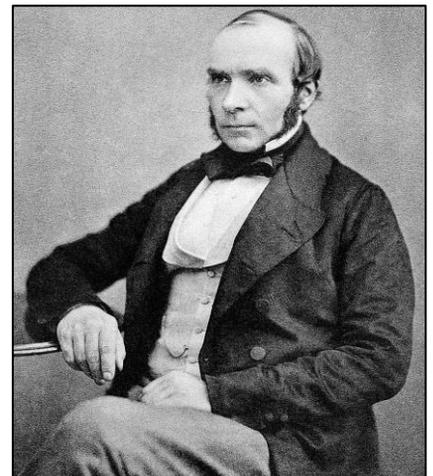
As the sufferer became dehydrated, the blood would become thicker, rupturing blood vessels under the skin.

John Snow

John Snow was a popular and well-respected surgeon who lived in London. He observed cholera during the epidemic of 1848-49 and concluded that cholera was transmitted by dirty drinking water.

The 1854 epidemic and the Broad Street Pump

- In August 1854, cholera broke out in **Soho**, where Snow lived. Snow decided to investigate 93 deaths in his local area.
- Snow created a **spot map** where he drew spots on a street map to **show where the deaths had occurred** in the area.
- After looking at the map, John Snow realised there was a pattern: the **number of deaths seemed to be centred around the water pump on Broad Street.**
- Snow believed that the **water pump was the source of the infection.** He removed the handle from the pump which stopped the locals from using it and the cholera outbreak went away.
- Later inspections of the well underneath the water pump revealed that it was **very close to a cesspit** and it was **leaking waste** into the well and **spreading cholera.**



Snow's influence in Britain

| Had an impact | Did not have an impact |
|--|--|
| <p>Snow had a lot of practical evidence to show that Cholera was spread in water.</p> <ul style="list-style-type: none"> His work had an immediate impact on the residents of Soho Square, many of whom avoided cholera thanks to his removal of the pump handle. | <p>Many people rejected Snow's work as he had no scientific evidence to show what caused Cholera.</p> <ul style="list-style-type: none"> Other scientists pointed out that cases would still occur among people who lived further away from the pump. The General Board of Health rejected Snow's findings, instead still believing the theory of MIASMATA. Admitting that cholera was present in the water would mean having to take steps to provide clean water which would be very expensive. |
| <p>In 1855, Snow presented his findings to a House of Commons Committee proving that cholera was transmitted by dirty water.</p> <ul style="list-style-type: none"> The government agreed to follow his recommendation that a new sewer system should be built. It was begun in 1860 and completed in 1875. | <p>In 1858, an unusually hot summer had caused 'The Great Stink' in London.</p> <ul style="list-style-type: none"> The Thames was low and the stench of the exposed sewage on the riverbank s heating up became terrible. This is what really forced the government to work on the new sewers in 1860. |

Overall Impact

In the short term Snow's work meant that the spread of cholera in the Soho Square area was stopped, saving hundreds of peoples lives.

However his impact outside of the area was very limited.

- It would be another seven years before **Pasteur** published his **GERM THEORY** – three years after Snow died – and another 30 years until **Koch** finally isolated the **BACTERIUM** that caused the disease.
- It was not until later that the importance of clean water was accepted.**



3. Knowledge Organiser

SUMMARY OF THE PERIOD

Significant changes in medicine occur in this period.

- By 1900, there was a **better understanding of how germs cause disease** and work was being done to **develop new vaccines and treatments**.
- The **government**, which started out with a **laissez-faire** attitude to public health, began to **become more involved**, with compulsory small pox vaccinations and the Public Health Act 1875.
- **Hospitals developed into clean, modern institutions** thanks to the work of Florence Nightingale and more surgery became possible through the use of anaesthetics. Fewer people died as a result of Joseph Lister's pioneering work with antiseptics.

Key Events

| | |
|-------------|---|
| 1798 | Edward Jenner developed the first vaccine for Smallpox |
| 1847 | James Simpson developed chloroform as an anaesthetic |
| 1848 | First Public Health Act (ineffective). |
| 1848 | Smallpox vaccination made compulsory |
| 1854 | Jon Snow proved cholera spread through water |
| 1859 | Florence Nightingale wrote her book Notes on Nursing. |
| 1861 | Louis Pasteur's germ theory was published |
| 1867 | Lister used antiseptic to prevent infection |
| 1875 | The Public Health Act. Local councils had to provide sewers, drainage and fresh water as well as medical officers(effective). |
| 1881 | Pasteur develops anthrax vaccine. |
| 1882 | Robert Koch identified bacteria that caused specific diseases. |

Key People

| | |
|-----------------------------|--|
| Edward Jenner | Pioneered the smallpox vaccine |
| Louis Pasteur | Disproved spontaneous generation with his germ theory; developed vaccines for anthrax and rabies; pioneered pasteurisation. |
| Robert Koch | Using Pasteur's germ theory to identify which germs caused anthrax. He developed a way of dying germs to find out which diseases they were responsible for. |
| Florence Nightingale | Helped establish nursing as a respectable profession for women; improved sanitation and standard of care at military hospitals in the Crimea; founded the school of nursing at St Thomas hospital. |
| John Snow | Proved that cholera is spread by water, not miasmata. Made chloroform and ether safer to use by working out correct dosage. |
| James Simpson | Discovered the anaesthetic properties of chloroform. |
| Joseph Lister | British surgeon who pioneered antiseptic surgery using Carbolic Acid spray. |

3. Knowledge Organiser

Key Words

| | |
|-------------------------------|--|
| Anaesthetic | A substance that makes you unable to feel pain. |
| Antibodies | Particles that the body creates when it first encounters the germ, so that it can fight off the same disease more easily if it comes back. |
| Anti-septic surgery | Use of antiseptics in the performance of operations and dressing of wounds. |
| Aseptic surgery | Surgery where microbes are prevented from getting into a wound in the first place, as opposed to being killed off with an antiseptic |
| Bacteriology | The study of bacteria |
| Carbolic acid | A type of disinfectant. |
| Cowpox | A disease causing red blisters on the skin, similar to smallpox. It can be transmitted from cows to humans. |
| Germ Theory | Theory that diseases are caused by the presence of micro-organisms within the body. |
| Inoculation | Deliberately infecting oneself with a disease, in order to avoid a more severe case of it later on. |
| Laissez-faire | The French terms means 'leave be'. It is used to describe governments who do not get involved in the day-today lives of their population. |
| Miasmata | An unpleasant or unhealthy smell or vapour. |
| Microbes | A microbe is a tiny living organism that is too small to see without a microscope. Microbes include bacteria. |
| Pasteurisation | A way of preserving food or drink by heating to 55 degrees C and killing the bacteria. |
| Small pox | A highly contagious and fatal disease with fever and pustules that usually leave permanent scars. |
| Spontaneous generation | The theory that decaying matter turns into germs. |

3.1 Practice Exam Questions

3.1. Ideas about the cause of disease and illness

Q: Explain one way in which society was different in the seventeenth and eighteenth centuries. 4 marks

You could choose from: *The influence of the church, democracy, where people lived, industry, science.*

Q: Explain one way in which the belief about the cause of disease was similar in the eighteenth and nineteenth centuries. 4 marks

You could choose from: *Miasmata, Spontaneous Generation.*

3.1 Practice Exam Questions

3.1. Ideas about the cause of disease and illness

Q: Explain why there were changes in the understanding of what caused disease and illness during the eighteenth and nineteenth centuries. 12 marks

Dr Bastian and Spontaneous Generation

Louis Pasteur and the development of Germ Theory

Robert Koch's work on microbes

3.1 Practice Exam Questions

3.1. Ideas about the cause of disease and illness

Q: *'There was little progress in explaining the cause of disease and illness during the 17th and 18th century (c1700-1900)'* How far do you agree with the statement? **You may use the following in your answer; Louis Pasteur, Robert Koch plus your own knowledge. 16 marks**

Agree that there was little progress
(Pasteur and Bastian little progress)

Disagree that there was little progress
(Pasteur and Koch made progress)

Your opinion about how far you agree with the statement that *'There was little progress in explaining the cause of disease and illness during the 17th and 18th century (c1700-1900)'*

3.2 Practice Exam Questions

3.2. Approaches to prevention and treatment

Q: Explain one way that government attitudes to public health were different in the sixteenth and nineteenth centuries. 4 marks

You could choose from: *Laissez-Faire, Voting rights, Cholera, Public Health Act 1875.*

Q: Explain one way in which surgeons problems with surgery were similar in the seventeenth and nineteenth centuries. 4 marks

You could choose from: *Bleeding, pain, infection.*

3.2 Practice Exam Questions

3.2. Approaches to prevention and treatment

Q: Explain why there were changes in hospital care during the eighteenth and nineteenth centuries. 12 marks

The role of Florence Nightingale

The Crimean War

Changing attitudes of society

3.2 Practice Exam Questions

3.2. Approaches to prevention and treatment

Q: *'The development of anaesthetics had the biggest impact on surgery in the eighteenth and nineteenth centuries'* How far do you agree? **You may use the following in your answer: chloroform, carbolic acid and your own knowledge. 16 marks**

Agree that anaesthetics had the biggest impact

(Chloroform / Antiseptic surgery)

Disagree that anaesthetics had the biggest impact

(Germ theory / Carbolic acid / Aseptic surgery)

Your opinion about how far you agree with the statement that *'The development of anaesthetics had the biggest impact on surgery in the eighteenth and nineteenth centuries'*

3.3 Practice Exam Questions

3.3. Case Studies

Q: Explain one in which government attempts to prevent the spread of cholera were different from the beginning to the end of the nineteenth century. (4 marks)

You could choose from: *Belief in Miasmata, New sewer system.*

Q: Explain one way in which prevention of small pox was similar in the seventeenth and nineteenth centuries. (4 marks)

You could choose from: *Inoculation, Cow Pox, Vaccination.*

3.3 Practice Exam Questions

3.3. Case Studies

Q: Explain why John Snow was significant in the prevention of the spread of cholera in the nineteenth century. 12 marks

The Cholera epidemic of 1848-49

The Broad Street Pump

House of Commons Committee 1855

3.3 Practice Exam Questions

3.3. Case Studies

Q: *'Jenner's vaccination against smallpox was a major breakthrough in the prevention of disease in Britain during the period c1700-c1900'* How far do you agree? **You may use the following in your answer; cowpox, cholera and your own knowledge. 16 marks**

Agree that Jenner's vaccination was a major breakthrough

(Edward Jenner - cowpox)

Disagree that Jenner's vaccination was a major breakthrough

(John Snow – Cholera, Pasteur – Germ Theory, Koch - Microbes)

Your opinion about how far you agree with the statement that '*Jenner's vaccination against smallpox was a major breakthrough in the prevention of disease in Britain during the period c1700-c1900*'