

1250 90% of work was farming 1300 Less than 100 physicians in England 1350 The Black Death 1400 12 teams of rakers in London 1450 More than 500 hospitals in England 1500 Invention of the Printing Press



Greece/ Rome: Hippocrates & Galen 1300 Astrology used in doctors' training 1350 King Edward III orders Mayor of London to clean up 1400 13 communal privies in London 1500 c.50% of England could read

| Ancient Greece   | Ancient Rome   |
|--|--|
| Hippocrates:<br>Theory of the Four Humours<br>Clinical Observation<br>Hippocratic Oath | Galen:<br>Theory of Opposites<br>Pig experiment:<br>Brain controls the body<br>Many mistakes |

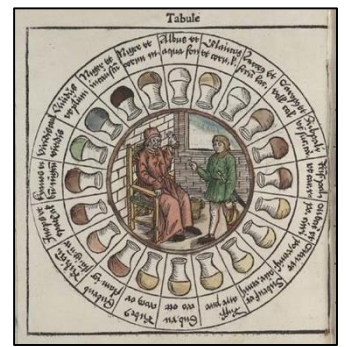


**The Black Death: 1348-1351** – Also known as the Bubonic Plague, or the Pestilence.  
**CAUSES:** Fleas on rats, who then bit humans. It would spread very quickly; killing victims in less than 5 days.  
**PERCEIVED CAUSES:** God, punishing people for their sins; Miasma (bad air); Superstition: Misalignment of the planets; Cats & dogs; Jews. Imbalanced Humours.  
**PREVENTION:** **Flagellants** came from Europe and would walk the streets, whipping themselves. They thought that if they punished themselves, God wouldn't need to. They also prayed and paid for special prayers to be said by the clergy. They burned candles. Killed cats & dogs and punished Jews. They burned barrels of tar and fired muskets into the sky to try to break up the 'bad air'.  
**TREATMENT:** Cures such as tying toads or chickens to buboes were common. More prayer, and candle lighting. King Edward III ordered that London was cleaned up (even though it was for the wrong reason: miasma). People would bleed; following Hippocrates' teachings on the Four Humours.

**Public Health:** Historians used to think that Medieval towns were filthy but more recent evidence suggests that in some places, they tried hard to keep their towns clean. They didn't know that germs caused disease so water sources were often dirty in towns (but much better in the country – especially in monasteries). London was the first town in Europe to have a piped water supply. In the hope to get into Heaven, many people left donations in their wills for improvements to latrines, or pipes. Medieval people began lining **cesspits** with stone or brick so that waste was less likely to seep into surrounding water supplies. Rakers were employed to sweep streets and laws were passed to make throwing waste into the streets and rivers illegal. Public toilets were introduced in major cities.

| Medieval Healers  |   |
|---|---|
| <b>Women</b><br>             | Wives and mothers treated a lot of things from home. Often the Lady of the Manor was called for her skills and knowledge. In some towns, midwives were licensed but not often. Women were not allowed to become Physicians but could become surgeons. |
| <b>Hospitals</b><br>         | First appeared in the 11 <sup>th</sup> century. Mostly cared for the infirm and were run by nuns and monks. They wouldn't treat the sick for fear of spreading disease. One of the most famous early hospitals was St. Bartholomew's in London.       |
| <b>Physicians</b><br>        | Trained for 7 years in universities, reading the likes of Hippocrates and Galen, along with Arab writers like Rhazes and Ibn Sina. Only the rich could afford their fees and there were less than 100 in England by 1300.                             |
| <b>Barber Surgeons</b><br> | Trained as apprentices and learned through practise. They often did simple surgery like bleeding, removing surface tumours and making splints for bones. There were no effective anaesthetics at this time.   |
| <b>Apothecaries</b><br>    | Mixed ingredients to make medicines and ointments for physicians. They sometimes mixed their own medicines to sell to the sick.   |

**Key Words**  
**Harvest** – Medieval England relied heavily on farming. Harvest was when the crops were chopped down to sell/eat.  
**Flagellants** – Christians who arrived from Holland. Whipped themselves as a punishment.  
**Pestilence** – A Medieval term for the Plague.  
**Superstition** – A belief in the supernatural (ie. Planets)  
**Miasma** – A belief that bad air caused illness  
**Latrines** – Medieval term for toilets.  
**Rakers** – Team of men cleaning the streets with rakes.  
**Cesspits** – Where the contents of the latrine would end up.  
**Physician** – Medieval term for doctor.



A Medieval Urine Chart

**Factors**

**RELIGION** – The Catholic Church was dominant. People paid **tythes**. Belief in Heaven & Hell affected how people led their lives. The Church controlled education and did not allow dissections.

**GOVERNMENT** – Kings were preoccupied with defending England in war. They didn't collect taxes so had little to do with medicine. King Edward III did order London to clean up.

**ATTITUDES** – Attitudes were **conservative**. They followed tradition and people didn't question the Church. There was a belief in superstition and new ideas spread slowly as the printing press wasn't invented until the 1470s.

**INDIVIDUALS** – Hippocrates (Ancient Greece) and Galen (Ancient Rome) were the main influencers. They both wrote many books and didn't challenge God so they were accepted.

1500 Printing presses being used throughout Europe  
 1543 – Vesalius publishes *Fabrica*  
 1550  
 1600 Throughout 1600s → Plague Orders introduced  
 1645 first meeting of the Royal Society  
 1650  
 1665 – First attempt at blood transfusion  
 1665 – Great Plague breaks out  
 1700

1628 – Harvey publishes *On the Motion of the Heart*  
 Thomas Sydenham begins taking the pulse  
 1666 The Great Fire of London  
 1660s → St Barts takes in sick patients

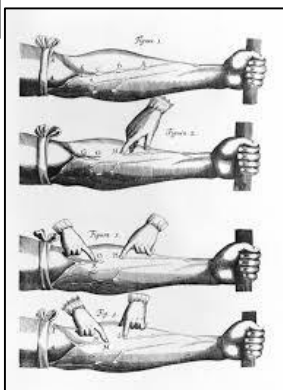
**Factors**

- RELIGION** – The Church was still dominant. Belief in Heaven & Hell affected how people lived. The Church controlled education but had begun to allow dissections.
- GOVERNMENT** – Kings began to think about how the country was running. Charles II joined the Royal Society and built an observatory on one of the palaces.
- ATTITUDES** – The majority of attitudes were still conservative. However new ideas were spreading as the printing press shared accurate knowledge discovered.
- INDIVIDUALS** – Harvey and Vesalius both moved medicine forward in this time period, as they began experimenting on the human body rather than animal dissections.

**Changes**

**Thomas Sydenham:** Sydenham was the first person to publicly believe that each disease had a different cause. He studied Scarlet Fever specifically. He used clinical observation to carefully note a patients’ symptoms and was the first to beginning taking a **pulse**. He was known as **English Hippocrates**.

The **Royal Society** were established in London in the 1600s who met to discuss big questions an new ideas. Charles II joined in 1662 and supported the group by building laboratories & observatories. Richard Lower attempted the first blood transfusion in 1665 between a sheep and a student.



**William Harvey:** Before Harvey, Galen had suggested that blood travels across the heart and is burned off. He said it was reproduced in the liver. Harvey, in 1628, proves that it flows in a one-way system around the body. He shows that the heart is a pump. He does this using metal rods to prove the existence of valves, dissecting cold blooded animals & looking to the water pump for inspiration.

**Key Words**

**Observation** – Looking at a patient’s symptoms (or signs of disease).

**Quarantine** – Where infected people were kept away from healthy people, locked in their house.

**National government** – Orders which had come from the King.

**Local government** – Orders coming from individual towns (like a local council).

**Miasma** – A belief that bad air caused illness.

**Enquiry** – Being curious and questioning traditional beliefs.

**Anatomy** – The make up of the human body (bones, muscles).

**Dissection** – Cutting something apart to understand how it works.

**The Great Plague 1665**

The Plague killed around 20% of the population in London throughout the 1600s. In 1665 alone, 100,000 died in London.

Traditional beliefs reigned about the causes of Plague: a punishment from **God**, **miasma**, the **Four Humours**, the **supernatural**. However, people were beginning to recognise the effects of **contagion**.



Following **Plague** Orders councils began painting crosses on the doors of plague victims and **quarantining** them. They were usually quarantined for 40 days with a **watchman** posted outside. A **searcher** would then check to see if the family had died or recovered. **Pest houses** were also used to house the homeless.

The **Printing Press** helped scientists to share their ideas quickly, which meant that many previous mistakes could be corrected.

**Individuals**







**Andreas Vesalius:** Prior knowledge of anatomy had mainly come from Galen’s books and his work on dissecting animals. This meant that he made many mistakes such as thinking the jaw was made up of two bones.

Vesalius begins to do public dissections on humans where he corrects many of Galen’s mistakes. Because these dissections are public, he is able to share this information quickly. He publishes his book **Fabrica** in 1543 which contained many ‘muscle men’ to show people what the human body looked like.

**Healers & Treatments**

Some physicians were trained at **St. Barts** where they would train on the job. **Microscopes and thermometers** were invented & improved. Training began to take a **scientific** approach. People began to **dissect** more. Women and apothecaries still provided the cheapest way to receive medical help.

|   |  |
|---|--|
| <b>Bleeding &amp; Purging</b>  | The majority of the population still believed in the Four Humours and wanted to rebalance them by bleeding or purging the patient.   |
| <b>Herbal</b>                  | Herbal remedies were still handed from mother to daughter. Often they were successful eg. Using garlic (which has antibacterial properties). Often these were discovered through trial & error.        |
| <b>God/ the King</b>           | In 22 years over 92,000 people visited King Charles II. They believed that if he touched them he could cure them as he was chosen by God.  |
| <b>Folk remedies</b>           | People still used cures based on magic. There us a treatment recorded for malaria advising people to put hair and nails of the patient in a hole in an oak tree and then plug the hole in the tree up. |



1750 ← 1798 – Edward Jenner developed the Smallpox vaccine 1800 1813-32 Cholera 1824 – Chadwick writes his report 1831-32 Cholera 1847 – Simpson: chloroform 1848 1850 1842 – Chadwick writes his report 1848 1850 1854 – John Snow's work on cholera 1853-54 1861 – Pasteur's Germ Theory 1867 – Lister: Carbolic Acid 1876 – Koch's work on bacteriology 1900

Factors

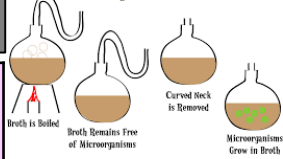
**SCIENCE & TECHNOLOGY** – With improving microscopes and an ever-advancing field of Science, work of people like Pasteur and Koch were helped greatly by new technology.

**GOVERNMENT** – The government had a mainly l'aissez faire attitude towards matters of public health. As time passed and the working class could vote, this changed.

**COMMUNICATION** – With ideas spreading quickly, competition between scientists spread up progress in medicine as rivalries like Koch & Pasteur's developed.

**INDIVIDUALS** – It's undeniable that most of the work in the Industrial Revolution happens because individuals begin to question and experiment more than before.

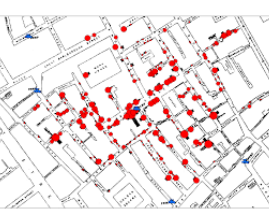
Pasteur's Test of Spontaneous Generation



In 1876 **Koch** begins experimenting with anthrax and uses agar and an industrial purple dye to pinpoint this exact bacteria which causes **anthrax**.

Pasteur continues building upon Koch's work and finds treatments for anthrax, chicken cholera and eventually rabies.

In 1854 **John Snow** discovered that **cholera** was waterborne by plotting the deaths around the Broad Street Pump. He had the handle removed and people stopped dying immediately when forced to use a different pump.



Surgery & Hospitals



In 1854 Nightingale led a party of nurses out to **Scutari** hospital in the Crimea. There she worked on improving hygiene and drastically reduced the death rate. When she returned home she wrote **Notes on Nursing** and set up a nursing school in 1860.

The first half of the 1800s was bad for surgery. Infection, blood loss and pain were all big killers, with solutions being sought.

Key Words

- Inoculation** – Physicians took a portion of a disease and put it into healthy patients to protect them from the disease.
- Spontaneous Generation** – The belief that microbes appeared out of nowhere and caused decay to occur.
- Public Health** – Concerning housing, water and waste. The conditions that the public are living in.
- Anaesthetic** – Something to slow the heart and send a patient to sleep.
- Antiseptic** – Used to kill bacteria and prevent infection.
- L'aissez faire** – The belief that the poor should be 'left well alone'. That the rich shouldn't help the poor.

Causes of Disease



**Edward Jenner** was investigating smallpox in 1798. He noticed that milkmaids didn't get smallpox but did get cowpox. He took some cowpox pus from Sarah Nelmes, a milkmaid and placed it into a cut on a healthy boy James Phipps. When Phipps was later infected with smallpox he didn't catch it.

Many people **opposed** vaccination through the Antic Vaccine Society, as they thought it was ungodly, Jenner couldn't explain it and the **inoculators** were losing money!

**Louis Pasteur** discovers that germs cause disease when he is investigating why beer & wine was turning bad. He disproves the theory of **spontaneous generation**. He uses a **swan necked flask** to prove this. He couldn't prove, though, which specific bacteria caused which disease.



Public Health

In 1842 **Edwin Chadwick** was commissioned by the government to investigate the **Sanitary Conditions of the Labouring Population**. In his report he highlighted the poor conditions and suggested that the rich should sort the housing, water and waste and appoint a Medical Health Officer. In **1848** the government introduced the **voluntary Public Health Act**. Roughly 1/6<sup>th</sup> of local councils acted upon it. The ratepayers had a l'aissez faire attitude and didn't want to spend their money on the poor.



In **1875** a new Public Health Act was introduced which was **compulsory**. This saw local councils forced to improve the conditions in their towns, regardless of the cost. They had to appoint sanitary inspectors to check improvements were made.

In 1847 **James Simpson** discovered that **chloroform** could be used as an **anaesthetic**. This solved the problem of pain and blood loss. Many objected to the use of anaesthetic because they thought that pain was sent from God. However when **Queen Victoria** used it in childbirth she declared it was "blessed chloroform" and many began using it afterward.



In 1867 **Lister** discovered that Carbolic Acid could be used to fight infection which was one of the biggest killers within surgery. He had noticed it being used on sewers and began to spray it on his patients, equipment and himself. In 3 years he reduced his death rates from 46% to 15%. Other surgeons objected because it cracked their skin, was expensive and took additional time.

In 1867 the government introduced the **Reform Act**. This gave working class men the vote. It meant that the government had to address some of the concerns of the poor, in order to get their votes.



# History Knowledge Organiser: 20<sup>th</sup> CENTURY MEDICINE

|   |                               |                                     |                                     |   |  |                           |                    |  |                               |  |                                     |                                       |                    |
|---|-------------------------------|-------------------------------------|-------------------------------------|---|--|---------------------------|--------------------|--|-------------------------------|--|-------------------------------------|---------------------------------------|--------------------|
| 1901 Landsteiner discovers blood groups | 1909 – Salvarsan 606 invented | 1928 – Fleming discovers Penicillin | 1931 – Electron microscope invented | 1938 – Florey & Chain begin mass production of Penicillin | 1941 – Casualties from D-Day are treated with Penicillin | 1942 – Beveridge's report | 1948 – NHS created | 1953 – Crick & Watson discover DNA structure | 1967 – First heart transplant | 1970s – chemotherapy starts to be used | 1986 – Human Genome Project started | 2001 – Human Genome Project completed | 2007 – Smoking ban |
|---|-------------------------------|-------------------------------------|-------------------------------------|---|--|---------------------------|--------------------|--|-------------------------------|--|-------------------------------------|---------------------------------------|--------------------|

1891-1903 – Booth & Rowntree's reports

1911 – National Insurance Act

## Factors

**SCIENCE & TECHNOLOGY** – Advances in technology move rapidly in the 20<sup>th</sup> century with keyhole surgery, radiotherapy & chemotherapy all making huge advances.

**GOVERNMENT** – The government has taken a huge role since 1900, to the extent that it is sometimes referred to as a 'Nanny State' because it's now too involved in lives.

**COMMUNICATION** – Communication has led to huge developments in the 20<sup>th</sup> century – Florey & Chain's mass production of Penicillin being a key example.

**INDIVIDUALS** – Many individuals contribute to progress eg. Fleming, Ehrlich, Domagk, Florey, Chain, Bevan. However, it also sees individuals working together more.

## Penicillin

In 1928, Fleming left a pile of petri dishes on his lab bench before going on holiday. When he returned there was mould on one of them and around the outside, the staphylococci bacteria had disappeared. He found it hard to create enough Penicillin to treat anything with so his discovery didn't evolve much.



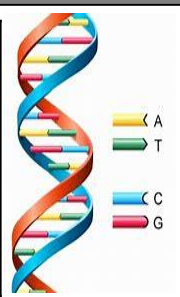
In 1938, Florey & Chain were investigating how germs could be killed and found Fleming's research papers. The American government recognised the importance of their work and funded them for 5 years' research. They proved that the Penicillin could treat infections in mice but needed 3000 times more Penicillin to treat a human. They began growing it in whatever they could.



They eventually used Penicillin to treat Albert Alexander who had septicaemia and successfully treated the infection before running out. By 1941 with WWII killing soldiers, the American government started releasing interest-free loans to companies to buy equipment to mass produce Penicillin. By D-Day in 1944, over 2.3 million doses were used to treat allied troops. It is estimated that it saved nearly 15% more men than would have survived.

## DNA

During the 1900s scientists were able to take the first photographs of human cells due to improving electron microscopes. In 1953 Crick & Watson discovered the structure of DNA and showed how it passed on information from parents to children. They worked with a huge team of experts to do this & the government funded their expensive research.



The complete set of genes in a living thing is called a **genome**. In 1986 the **Human Genome Project** began which set out to map the purpose of every gene in the human body. This task was completed in 2001 and used scientists from 18 countries. This work helps scientists to treat genetic illnesses like **Diabetes, Down's Syndrome & Cystic Fibrosis**.

## Technology

Improvements in microscopes, endoscopes, & scans have led to huge improvements, alongside x-rays, radiotherapy & chemotherapy, transplants and blood transfusions.

## Lifestyle

Between 1899-1901 **Booth & Rowntree** wrote reports about London & York suggesting that around 1/3<sup>rd</sup> of people there were living in extreme poverty. After discovering this the government began to take some action. **Liberal Reforms** in the early 1900s saw the introduction of **Free School Meals, National Insurance & the Nursing Act**.

After the Wars, there was a call for the government to look after people who fought for England. In 1942 Beveridge wrote a report which suggested that the government should provide health care for its' people. In 1948, Bevan introduced the NHS after a long fight against the BMA. This was the epitome of the **welfare state**.

The government have offered advice on a variety of things, including HIV/AIDS and lung cancer. Lung cancer has increased greatly and over 90% of cases are attributed to smoking. The government has introduced things like the **smoking ban** in 2007 & changed laws on advertising & packaging to deter people from smoking.

## Medicine

The 1900s saw the rise of **pharmaceutical** companies like Boots. They funded research into specific medicines. In 1909, Ehrlich discovers the first **magic bullet**. A manmade drug which killed specific bacteria – in this case, the bacteria which caused **syphilis**. He called it **Salvarsan 606** because it took him 606 attempts to crack it. In the 1930s Domagk then discovered **Prontosil** which killed the bacteria causing septicaemia. These drugs were based on **sulphonamides**.

## Key Words

**Radiotherapy & Chemotherapy:** Used to treat various cancers.

**NHS:** National Health Service. Health care paid for through taxes, introduced in 1948.

**Welfare:** The health and happiness of a group.

**Sulphonamides:** Chemical in early magic bullets, used to treat specific bacteria.

**Genome:** The complete set of genes in a living creature.

**Genetics:** The study of genes and inherited traits.

**Antibiotics:** A medicine which kills infection-causing bacteria.

**Liberal Reforms:** Series of laws introduced in the early 1900s which were designed at improving the welfare of Britain.

Other improvements included the use of plastic surgery during WWI, dialysis machines & pacemakers. Ground-breaking research into the use of gene therapy (for example, using stem cells) to regrow damaged nerves. Anaesthetics have been improved in this century, meaning we can now be injected straight into the blood stream & can sedate patients for much longer.





|      |                                     |                                       |      |                                   |      |      |                                   |  |  |
|------|-------------------------------------|---------------------------------------|------|-----------------------------------|------|------|-----------------------------------|--|--|
| 1914 | Aug-Sept 1914<br>First trenches dug | Oct-Nov 1914<br>First Battle of Ypres | 1915 | August 1915<br>Gallipoli Landings | 1916 | 1917 | April-May 1917<br>Battle of Arras | July-Nov 1917<br>Third Battle of Ypres | Spring 1918<br>German Spring Offensive |
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|                            |  |                                      |                                     |                                   |                                       |
|----------------------------|--|--------------------------------------|-------------------------------------|-----------------------------------|---------------------------------------|
| August 1914:<br>War begins | April-May 1915<br>Second Battle of Ypres | July-Nov 1916<br>Battle of the Somme | April 1917<br>America joins the war | Nov-Dec 1917<br>Battle of Cambrai | 11 <sup>th</sup> Nov 1918<br>War ends |
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**The Battles**

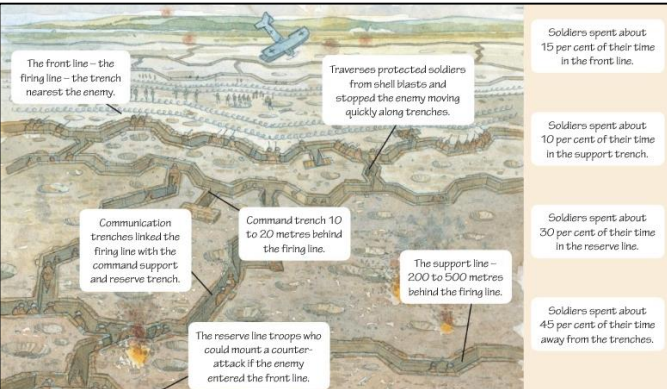
**Ypres** – Called ‘Wipers’ by the British. Most direct route to Calais/Dunkirk. Ypres Salient (‘bulge’) was vulnerable as Germans could fire down on it. Became waterlogged. Second Battle saw the first use of gas.

**Somme** – Huge casualty rate: over 60,000 on day one. By the end of the battle, over 400,000 Allied casualties and 450,000 Germans. Casualties overwhelmed the medics.

**Arras** – Soldiers from New Zealand had dug tunnels in the chalky ground. These rooms were fitted with electricity and running water. The hospital had over 700 beds. It also allowed secrecy and shelter.

**Cambrai** – This battle saw the first large-scale use of tanks (over 450). No preliminary bombardment so it was a surprise. Not backed up by the infantry so eventually they lost ground

**The Trench System**



**Illness & Injury**

**Trench Fever** AKA PUO (Pyrexia of Unknown Origin). Caused by lice in the seams of men’s uniforms. Bath houses were introduced to combat but with limited success.

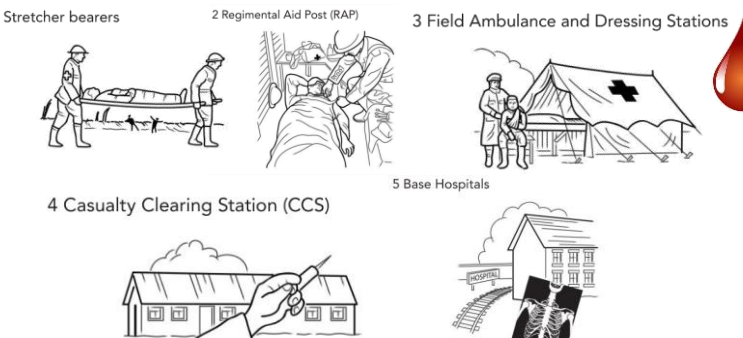
**Trench Foot** Due to waterlogged trenches, men’s feet began to rot and quickly turn to gangrene which often led to infection. In 1915 one division lost 12000 men to trench foot.

**NYD.N** Not Yet Diagnosed. Nervous. (Shell shock). A huge rise in cases during the Somme, men were often considered cowardly and treated poorly by the Army.

**Infection** New weapons carried shrapnel deep into the body which caused infection. Also being led on No Man’s Land for extended periods in the mud.

**Gas** Chlorine gas suffocated its’ victims. Although fewer than 5% of British soldiers died in gas attacks it still caused blindness, coughing and burns.

**Evacuation Route**



**Nurses and Doctors**

**RAMC:** Royal Army Medical Corps. All medical staff belonged from doctors to ambulance drivers. 9000 staff in 1914, increased to 113,000 by 1918.

**VAD:** Volunteer Aid Detachment. Middle & upper class women who did a lot of cleaning. By 1917 they had more medical duties like nursing and dressing wounds.

**FANY:** First Aid Nursing Yeomanry. Founded in 1907 by a soldier who wanted women riding in to help wounded soldiers. Many were ambulance drivers & nurses.

**Medicine in the War**

**Aseptic Surgery-** Moving to remove bacteria from the theatre, altogether,  
*In WWI: Hygiene in surgery is poor. To combat problems of infection the Carrel-Dakin method was introduced: The wound was continually flushed with chemicals to stop infection & often made deeper to remove affected tissue.*

**X-rays:** Rontgen discovered xrays in 1895. This helped with identifying shrapnel in wounds during WWI.  
*In WWI: Mobile x-rays were introduced. Initially there were only 2 but soon every CCS & hospital had one.*

**Blood Groups:-** Karl Landsteiner discovered blood groups. Transfusions were possible as long as donor & patient were in the same room.  
*In WWI: Storing blood was problematic. It was discovered that if sodium citrate was added & it was chilled, it would last longer. Mobile blood banks were also introduced.*

**The Thomas Splint:** 80% of men who had been shot in the femur died. The two sharp ends of broken bone caused more blood loss. The Thomas Splint pulled the bones apart to stop them grinding on the flesh. The death rate reduced from 80% to 20%. People were trained to use it in R.A.P.s.

**Key Words**

**Nature:** WHAT is the source?  
**Origin:** WHO made the source?  
**WHEN** was it made? **WHERE** was it made?  
**Purpose:** WHY was it made?

**Provenance/Attribution:** The bit which tells you where the source has come from (sometimes in *italics*).

**Utility:** How useful a piece of evidence is.

**Inference:** A historical guess using the evidence and your knowledge.

**Medicine Continued**

**Plastic Surgery-** Skin grafts developed during WWI. Over 11000 plastic surgeries were carried out – mostly on the face.

**Brain Surgery** – In 1914 head injuries received little surgery; doctors didn’t really know how to do it. Eventually, blood transfusions reduced the number of deaths and x-rays allowed surgeons to better anticipate problems inside the skull. A magnet was invented to draw out bullets!