MEDIEVAL MEDICINE (c1000- 1500)

Life in medieval Britain was 'nasty, brutish and short'. Life expectancy was 31 and infant mortality stood at 50%. The Catholic Church were the most important and powerful organisation in society, and they used their status to control knowledge, suppressing progress in medicine. When new discoveries were made, such as in the Islamic World, communication was limited and challenge to the old ideas were not welcome. Without an accurate understanding of the cause of disease, treatments, surgery and public health were all abysmal.

UNDERSTANDING OF THE CAUSES OF DISEASE

What was it like?	Examples of progress	Why was progress limited?
No accurate understanding of what caused disease. **Theories believed:** 1. **Four Humours-** Developed by Hippocrates/ Galen- Illness was the result of an imbalance in one of the humours (black bile, yellow bile, blood and phlegm). **Rational** and early scientific theory based on **clinical observation.** 2. **Miasma-** Disease was caused by bad smells. Rational theory based on observing the correlation between bad smell and illness. 3. **Sent from God-** most commonly held belief that illness was a punishment or test. **Supernatural** theory based on belief. 4. **Astrology**- illness was the result of the movement of the stars, planets and moon. Supernatural theory based on belief.	Four Humour/ Miasma were early scientific theories based on observation- they were better than relying on supernatural explanations or **superstitious belief**. Al- Razi disproved that humours were the cause of disease and published it in *Doubts About Galen*. Roger Bacon encouraged people to base knowledge on observation and experimentation.	Theories had to be accepted by the Church to be adopted. The Church only accepted theories that fit their world view, so new theories were never accepted in large enough numbers to create progress. Anyone who criticized the Church could be arrested (Roger Bacon). The Bible/ teachers of the Church were considered True Knowledge so basically no one looked for new knowledge. Faith in Galen was too strong for any challenge (e.g., Al- Razi) to be accepted.

TREATMENT OF DISEASE

What was it like?	Examples of progress	Why was progress limited?
Treatments included: 1. **Balancing humours**: e.g., bloodletting, laxatives, emetics, changes to diet. Administered by physicians and barber- surgeons. 2. **Removing miasma**: e.g., cleaning the streets 3. **Praying to God**: flagellants would whip themselves to show God they were sorry, monks, nuns and priests would pray for the sick 4. **Zodiac Charts**: Physicians used charts to understand the movement of planetary bodies and changed treatments according to this. 5. **Herbal remedies**: Administered by wise women based on knowledge passed down through generations.	Some herbal remedies were useful, e.g., honey. Efforts to manage miasma did make people healthier, e.g. Edward III ordered the streets of London to be cleaned in 1349. Ibn- Sina's *Canon of Medicine* contained hundreds of examples of herbal remedies and treatments.	All treatments were based on incorrect theories of the cause of disease. Even those that worked, e.g., cleaning streets and using honey on wounds provided limited progress because no knew why they worked.

SURGERY AND ANATOMY

What was it like?	Examples of progress	Why was progress limited?
Surgery was always a last resort, normally done on the battlefield. There was no control of blood loss, pain or infection so surgeries had to be fast, meaning they were always simple (e.g., amputations). Most surgeries resulted in death due to blood loss or infection. **Anatomical knowledge was restricted because:** 1. The Church banned **dissection** 2. Only the work of Galen was allowed to be studied 3. Galen got a lot of things wrong, because he dissected animals not humans.	John Bradmore removed an arrow from the head of the future King Henry V and treated the wound to prevent infection. Ibn- Nafis provided an accurate understanding of the circulatory system, disproving Galen. Mondino de Luzzi peformed public dissections and disproved Galen in his book *Anathomia*.	None of the problems of surgery were managed. Anatomical knowledge was restricted so no one knew how the human body worked or its exact structure. Challenges to Galen (e.g., Ibn- al Nafis, Mondino de Luzzi) were never accepted. Individual examples of progress (e.g., John Bradmore) did not become standard practice.

PUBLIC HEALTH

What was it like?	Examples of progress	Why was progress limited?
Towns were dirty, overcrowded, mismanaged waste and had no clean water. **Case study: Black Death (1347- 1351)** • Caused by *Yersinia Pestis*, caused plague (**bubonic** and pneumonic) • Killed 30-50% of Europe's population • Was significant as it led to food shortages, the Peasants Revolt 1381 and the end of the Feudal System.	Monasteries were isolated, monks had to keep clean, plumbing kept clean and dirty water separate. Some attempts were made to control miasma: The streets of London were cleaned in 1349, roads were paved in Newcastle, butchers were fined for not disposing of animals properly. **Quarantine** was used by some councils in the Black Death. In Exeter and aqueduct was built to provide clean water.	No accurate understanding of what caused disease so basically no effective way to manage public health. Examples of good practice were based on misguided understanding (miasma) and were not widely adopted, e.g., quarantine was not used widely or enforced.

HIPPOCRATES
Ancient Greek doctor who stressed the need for clinical observation. Developed the Four Humour theory and the Hippocratic Oath.

GALEN
Ancient Greek/ Roman doctor supported by the Church; his work on causes of disease and surgery/ anatomy was considered The Truth.

JOHN BRADMORE
Battlefield surgeon who successfully removed an arrow from the face of the future King Henry V and treated the wound to prevent infection.

IBN- AL NAFIS
Islamic surgeon who disproved Galen's theory that blood was burned up around the body.

IBN- SINA
Islamic doctor who published the Canon of Medicine, which became the most widely used textbook in Europe.

AL- RAZI
Islamic doctor who stressed the need for observation and disproved Galen's theories in a book entitled *Doubts About Galen*.

WHY WAS THE CHURCH SIGNIFICANT?

It stagnated medicine by:
- Everyone believed in God, so it was powerful
- It restricted knowledge by banning dissection and controlling access to books/ education
- It promoted Galen as The Truth

It progressed medicine by:
- Promoting Galen- who promoted a scientific approach
- Monasteries cared for the sick and were an example of good public health.

WHY WAS ISLAM SIGNIFICANT?

It was better than Christianity because:
- New discoveries and challenges to old ideas were welcomed
- Medicine was based on clinical observation, experimentation and sharing knowledge
- "For every disease, Allah has created a cure"
- Islamic scholars made significant discoveries, including disproving Galen.
- Bimaristans were far better than monastery hospitals.

BLACK DEATH An outbreak of bubonic and pneumonic plague caused by the bacteria Yersinia Pestis
BUBONIC PLAGUE A disease resulting in the growth of buboes (large pus- filled blisters)
CATHOLIC CHURCH Largest Christian Church in the world; almost everyone in Europe was Catholic in the medieval period and the Church was the most important and powerful organisation in Europe.
CLINICAL OBSERVATION Observing patients to work out what is wrong with them and how to treat them.
DISSECTION Cutting and examining a body
FOUR HUMOURS Blood, phlegm, yellow bile and black bile; the Humour Theory stated that these should be in balance and illness resulted when they were not.
MIASMA Meaning bad smell; the theory of miasma stated that bad smells caused illness.
QUARANTINE Separating healthy and unhealthy people.
RATIONAL knowledge based on observation and empirical evidence (evidence from the senses).
SUPERNATURAL The idea that illness is caused by a higher- power, e.g. God.
SUPERSTITION Any belief not based on evidence (e.g. religion, horoscopes).

FACTORS: INDIVIDUALS | RELIGION/ SUPERSTITION | GOVERNMENT | WAR | COMMUNICATION | SCIENCE/ TECHNOLOGY | CHANCE

RENAISSANCE AND EARLY MODERN MEDICINE (c1500-1800)

For the vast majority of people, life in the renaissance period was no different to the medieval. Day-to-day life was still controlled by the Church, who remained incredibly powerful. Most people understood disease the same as they always had, preventing any real improvements to treatments, surgery and public health. A few individuals however, made significant developments that laid the foundation of knowledge which were fundamental to progress in later periods, especially in surgery and anatomy.

UNDERSTANDING OF THE CAUSES OF DISEASE

What was it like?	Examples of progress	Limits to progress
Most people believed illness was caused by: • An imbalance in the humours • **Miasma** • Astrology • God There was no understanding of the cause of disease.	**Anthonie van Leuwenhoek** used a microscope of his own invention to discover "animalcules" (microbes). Some, like Nicholas Culpeper, were critical of the humour theory. People believed in 'transference' that illness was transferred from one person to another. The scientific method was accepted by many scientists. No accurate understanding of disease was uncovered, but they were now using the right method.	Most people still believed God, miasma and the humours were the cause of disease. Faith in Galen and the power of the Church silenced critics and ensured they were not believed. Transference was wrong and there was no idea how disease spread between people.

TREATMENT OF DISEASE

What was it like?	Examples of progress	Limits to progress
Blood- letting and purging to balance the humours were the most common treatments. Herbal remedies became incredibly popular. People received them from women, **apothecaries** and **quacks**. Scientists like Culpeper spent time detailing herbal remedies at great length. Many believed the 'King's touch' could cure diseases- 3000 people a year travelled to London to touch the King's robes.	**Jenner** discovered vaccination through clinical observation and experimentation in 1796. Nicolas Culpeper published *The Complete Herbal* (1653) containing many herbal treatments. He also criticized bloodletting and purging. Some treatments discovered in the 'New World' were useful: • Bark of Cinchona from South America contained quinine which treated malaria. • John Woodall used lemons and limes to treat scurvy in 1617. People now believed that illness could be treated, in particular through herbal remedies.	There was no accurate understanding of the cause of disease, so treatments were based on faulty understanding. Jenner didn't know why his vaccine worked. Quacks and apothecaries sold useless treatments.

SURGERY AND ANATOMY

What was it like?	Examples of progress	Limits to progress
Surgery was: • A last resort, • Mostly done on the battlefield Dissection was now allowed and a part of medical training. Surgeons were better regarded and by the end period it was considered a medical profession, after 1745 surgeons were no longer barbers.	**Vesalius** published *On the Fabric of the Human Body* (1543) accurately detailing anatomy and disproving Galen. **Pare** used an ointment of egg white, rose oil and turpentine which was less painful than cauterizing. He also develoed ligatures to prevent blood loss and devised artificial limbs. He translated Vesalius's work into French and helped professionalise surgery in *Surgery* (1575) **Harvey** detailed the circulatory system and disproved Galen's ideas that blood was burned around the body. He published his work in *De Motu Cordis* (1628). **Hunter** promoted the scientific method and taught many doctors such as Jenner. He infected himself with STIs and removed a 4kg tumour.	Faith in Galen was too strong, so new discoveries were not believed or widely accepted until late on in the period. Infection and pain were still fundamental problems, preventing any complex surgeries.

PUBLIC HEALTH

What was it like?	Examples of progress	Limits to progress
Towns were still overcrowded with no effective waste management or supply of sanatory water. Monasteries were shut after the reformation in the 1530s. The Great Plague 1665- 1666 killed 100,000 in London.	Attempts were made to prevent the spread of the Great Plague: • **Quarantine** was used: trade and gatherings were banned, victims had to place a red cross on their doors, watchmen enforced the rules • Streets were cleaned and animals were kept indoors to stop miasma There was a hospital boom in the late 18th century: • 8 hospitals built • Run by doctors and nurses with surgeries	There was no accurate understanding of the cause of disease, so public health didn't improve. Quarantine rules were not enforced in the Great Plague. Hospitals still focused on treating illness through the Four Humours and herbal remedies

ANDREAS VESALIUS
Belgian anatomist and author of *The Fabric of the Human Body* (1543) the first widely circulated accurate anatomy textbook. Disproved Galen's ideas.

AMBROISE PARE
Considered the father of modern surgery. Pioneered surgical techniques, translated Vesalius into French, and publish *Works on Surgery* (1575).

WILLIAM HARVEY
English doctor who discovered how blood circulated around the body, disproving Galen. Published *De Motu Cordis* (1628).

JOHN HUNTER
English surgeon and educator. Promoted the need for observation and the scientific method. Trained Edward Jenner.

EDWARD JENNER
English doctor who used the scientific method to discover the first vaccination. Eradicated smallpox from his hometown of Berkley.

ANTHONIE VAN LEEWENHOEK
Dutch scientist who used a microscope of his own invention to discover 'animalcules' (microbes). Considered the father of microbiology.

REMEMBER

The Renaissance is best considered a starting point and the period when things *began* to change.

Some people began to question the 'Truths' they had been told, and science was born as some educated people began to prefer rational knowledge over superstition. However, during the time period day-to-day life didn't change, and progress made helped to build a foundation for the future.

For most people there was absolutely no difference and life expectancy and infant mortality didn't change.

APOTHECARY Someone who created and sold medicines, often with no medical training.
CAUTERISATION Sealing of wounds by burning with hot oil to prevent blood loss.
INNOCULATION Preventing disease by infecting someone with a weaker version of that disease.
MIASMA Foul smells and the theory that they cause disease
RENAISSANCE Meaning 'rebirth'
QUACK Travelling salesmen with no medical training that sold 'cure-all' medicines.
QUARANTINE The isolation of ill people to prevent the spread of disease

FACTORS: INDIVIDUALS | RELIGION/ SUPERSTITION | GOVERNMENT | WAR | COMMUNICATION | SCIENCE/ TECHNOLOGY | CHANCE

19th CENTURY/ INDUSTRIAL MEDICINE (c1800-1900)

The 19th century as a period of revolutionary change in British society. Technological change fuelled the industrial revolution leading to uncontrolled urbanisation. The majority of people lived short and difficult lives in overcrowded and cramped conditions, and disease was rife. This period, however, also saw a revolution in science and the birth of modern medicine with the discovery of germ theory, vaccinations, antiseptics and anaesthetics. By the end of the period disease could be accurately understood, treated and prevented, surgery was safe, and the government were passing laws to improve public health.

UNDERSTANDING OF THE CAUSES OF DISEASE

What was it like?	Examples of progress	Limits to progress
Disease was understood scientifically- germs were known about. Initially spontaneous generation and miasma were the dominant theories of disease. The French and German governments sponsored Pasteur and Koch in the 'Germ Race', fuelled by the Franco- Prussian War. By the 1880s Germ Theory had been accepted.	**1854**- John Snow's study of the Broad Street Pump proved that cholera was caused by water contaminated by germs, not miasma. **1861**- Louis Pasteur swan- neck flask experiments proved Germ Theory (that *infection* is externally caused by microbes) and disproved spontaneous generation and miasma. **1876**- Robert Koch applied Pasteur's work to disease. He injected a mouse with anthrax- it died, he had proven that *disease* is caused by microbes. John Tyndall promoted Pasteur and Koch's work in a series of lectures, helping Germ Theory become accepted in Britain.	Spontaneous generation and miasma were hard to disprove and well supported. Henry Charlton Bastian famously argued in favour of spontaneous generation, slowing acceptance of Germ Theory. **All solved by the end of the period.**

TREATMENT OF DISEASE

What was it like?	Examples of progress	Limits to progress
Jenner's work inspired others, namely Pasteur, to search for vaccines. Pasteur and Koch's work meant disease causing bacteria could be isolated and studied. Vaccines were developed in the late part of the century.	Louis Pasteur builds on the work of Edward Jenner and Robert Koch to develop vaccines: • **1879**- Chicken Cholera • **1881**- Anthrax • **1885**- Rabies (first man- made human vaccine) Pasteur inspired other vaccines: • **1882**- Cholera • **1888**- Diphtheria (antitoxin not a vaccine) • **1896**- Typhoid • **1897**- Plague	There were still no ways of treating already ill people. There was a reliance on home remedies and quack 'cure-alls'.

SURGERY AND ANATOMY

What was it like?	Examples of progress	Limits to progress
Nitrous Oxide had been discovered to numb pain in 1796. The discovery of anaesthetics before antiseptics led to increased deaths due to infection ('Black period') By the end of the period all the major problems of surgery were solved- complex internal surgery was now possible.	**1842**- William Clark uses ether as an anaesthetic during a tooth extraction **1844**- Horace Wells uses Nitrous Oxide as an anaesthetic during a tooth extraction **1847**- James Simpson discovers the anaesthetic properties of chloroform whilst experimenting **1848**- John Snow invents an inhaler to safely dose chloroform. **1867**- Joseph Lister, inspired by Pasteur's work developed antiseptic surgery by spraying wounds and instruments with carbolic acid **1896**- First heart surgery- possible due to anaesthetics and antiseptics.	Chloroform was initially hard to dose leading to Hannah Greener's death. Some in the military and church believed pain was natural. Lister initially faced criticism from Bastian. **All solved by the end of the period.**

PUBLIC HEALTH

What was it like?	Examples of progress	Limits to progress
Industrial Revolution led to: • Overcrowding (40 in one room in Liverpool; back- to backs) • Pollution (1000 killed by smog in 3 days in London) • Life exp. in Liverpool- 15 **Rivers still used for waste, sewage and drinking water.** **People knew that water was a problem but didn't know exactly why until after 1861** **Cholera outbreaks:** • 1831- 50,000 deaths • 1837 • 1854- studied by Snow	**1842** Edwin Chadwick's *Report on Sanitary Conditions of the Labouring Population of Great Britain* published. Encouraged the government to increase tax to clean towns, provide sewers and clean water **1848**- Public Health Act recommended councils set up boards of health to manage waste and provide clean water. **1854**- John Snow studies the Broad Street pump and proves that cholera is waterborne; also develops epidemiology. **1858**- Joseph Bazalgette given £3million by the government. Built 83miles of sewers by 1866. Cholera never returned. **1861**- Pasteur's Germ Theory disproves miasma. **1867**- Working men given the vote forcing the government to abandon laissez- faire. **1875**- Artisan Dwelling Act forced homeowners to keep properties in good order. Allowed the government to buy and demolish poor housing. **1875**- Public Health Act made it compulsory for councils to appoints a medical officer, provide clean water and sewers.	Snow was initially ignored as he couldn't prove it (7 years before Germ Theory) People knew water was a problem but thought it was miasma until late in the 1860s. **All solved by the end of the period.**

LOUIS PASTEUR
Proved germs cause infection (Germ Theory) in 1861, disproving spontaneous generation and miasma. Invented the first man- made vaccine used on humans (rabies, 1885)

ROBERT KOCHE
Proved germs cause disease in 1876. Isolated 21 bacteria and pioneered staining and photographing bacteria, making them easier to study.

JAMES SIMPSON
Discovered chloroform as an anaesthetic and began using it on mothers in childbirth. Became accepted after Queen Victoria's use.

JOSEPH LISTER
Developed antiseptic surgery using carbolic acid, saved Jamie Greenlees. Responsible for deaths from infection dropping 46-16% in 6 years.

JOHN SNOW
Invented a chloroform inhaler in 1848 and proved cholera was waterborne studying the Broad Street Pump outbreak in 1854. Father of epidemiology.

JOHN TYNDALL
Lectured in support of Louis Pasteur and Robert Koch, against Henry Bastian. Helped Germ Theory replace spontaneous generation

HENRY CHARLTON BASTIAN
Famous doctor who supported spontaneous generation and slowed down progress by arguing against Pasteur and Koch.

EDWARD CHADWICK
Published '*Report on Sanitary Conditions*' in 1842. Recommended the government abandon laissez- faire to improve health for the poor.

JOSEPH BAZELLGETTE
Given £3million by the government in 1858 in response to the Great Stink. Built 83 miles of sewers in London, completed in 1866. Cholera never returned.

KEY STATS (EVIDENCE OF PROGRESS)

Life expectancy in 1800- 30
Life expectancy in 1900- 50

Deaths per 1000 in 1800- 39
Deaths per 1000 in 1900- 18

Population in 1800- 10million
Population in 1900- 38million

ASEPTIC translates to 'without germs'. Surgery is aseptic if no germs have been allowed to enter the environment at all.
ANTISEPTIC translates to ' against germs'. In surgery, antiseptics kill infection.
ANAESTHETIC something which numbs or blocks pain.
GERM THEORY the theory that infection and disease are caused by germs.
LAISSEZ- FAIRE from the French meaning 'leave alone', the idea that the government should not interfere in people's lives, or the running of businesses.
MICROBE/ GERM an organism that can only be seen with a microscope, especially one that causes disease.
SPONTANEOUS GENERATION The belief that infection occurs out of no where and is the cause of new life. For example, maggots appear from within rotting meat.

FACTORS: INDIVIDUALS | RELIGION/ SUPERSTITION | GOVERNMENT | WAR | COMMUNICATION | SCIENCE/ TECHNOLOGY | CHANCE

MODERN MEDICINE (1900- Present Day)

By 1900 disease was accurately understood, and vaccines prevented many from spreading. Surgery was now pain and infection free, and complex internal surgeries were possible. The government abandoned the laissez- faire approach, leading to rapid improvement in public health. Following the First and Second World War rapid progress was made across all areas of medicine. Most importantly, the birth of the NHS led to significant nation-wide improvements in general health. Today, disease is no longer an ever present in life, and even the most complex cases can be understood and treated.

UNDERSTANDING OF THE CAUSES OF DISEASE

What was it like?	Examples of progress	Limits to progress
The cause of disease is known in almost all cases- there is a general belief that all will eventually be known. **Genetic** as well as infectious disease is known.	**1953**- Crick and Watson discover the double- helix structure of DNA. Made genetic screening possible to understand genetic diseases. **1973-** Geoff Hounsfield invents CAT scans, used to create 3D scans of the inside of a body. **1975-** Endoscopes (thin cables with cameras) are invented, allowing doctors to see inside the body. **1987-** MRI scanning enables mapping of brain activity can be used to find brain tumours and detect stroke damage. **1990**- The Human Genome Project is launched by the USA, Britain, Japan, China, France and Canada **2003**- The Human Genome is mapped. Genetic disorders, such as cystic fibrosis are better understood.	There are some diseases that the cause is not yet known- e.g., Alzheimer's, Schizophrenia.

TREATMENT OF DISEASE

What was it like?	Examples of progress	Limits to progress
Almost all diseases can be treated- there is a general belief that all will eventually be treatable. **Gene therapy** is now possible to solve genetic disorders.	**1928-** Alexander Fleming discovers penicillin kills staphylococcus while studying bacterial infections. Penicillin becomes the first **antibiotic**. **1941**- Florey and Chain treat Albert Alexander with penicillin and travel to the USA who fund mass production. **1961-** Contraceptive pill available on the NHS. **1978-** IVF fertility treatment used for the first time on Louise Brown. **1990**- First successful gene therapy is performed by French Anderson on a 4-year-old with 'bubble boy disease'. **2020**- COVID-19 vaccine produced in record time using mRNA technology- mass vaccinations rolled out.	Some diseases cannot be cured, e.g., AIDS Antibiotic resistance is on the rise due to misuse of antibiotics. Some people believe in and use alternative medicines like Homeopathy.

SURGERY AND ANATOMY

What was it like?	Examples of progress	Limits to progress
All 3 problems of surgery are solved. Surgery is now a cornerstone of medicine. Most are preventative (e.g. removing tumours). Complex surgery is possible thanks to technology.	**1950**- William Bigelow performs the first open heart surgery to repair a hole in a heart. **1960**- First pacemaker fitted to a heart in the UK to prevent heart attack. **1968**- First heart transplant performed in the UK. **1970**- Roy Calne developed cyclosporine, an anti- rejection drug enabling transplants. **1984**- Lab grown skin used in a skin graft in the USA. **1984**: A child codenamed 'Baby Fae' was given a baboon's heart- she survived for 21 days **1986**- Davina Thompson receives the first heart, lung and liver transplant. **2008**- Full face transplant completed. **2011**- Lab grown tissue used to reconstruct a windpipe. **2013**- A liver is grown using stem cells.	Hospital infection still poses a threat post- surgery.

PUBLIC HEALTH

What was it like?	Examples of progress	Limits to progress
Governments accept responsibility for public health. The **welfare state** provides healthcare, childcare and state benefits (e.g., sick pay) The NHS and government focus on preventative medicine (e.g., smoking ban, sugar tax)	**1901**- Seebohm Rowntree report *Poverty, A Study of Town Life* found that 28% of York lived in absolute poverty. Showed that poverty was hurting industry as workers were too ill. **1906**- School Meals Act. By 1914 158,000 kids were given a meal a day. **1911**- National Insurance Act. Introduced sick pay, unemployment benefit and healthcare insurance paid for by the government, employers and workers. **1941-** The US government fund mass production of penicillin. It becomes a standard treatment for bacterial infections saving millions. **1942-** William Beveridge publishes his report suggesting the government introduce a welfare state paid for by general taxation to combat the 5 giants. 100,000 are sold. **1948-** The NHS is founded to provide 'cradle-to-grave' healthcare to all citizens, free at the point of need, funded by general taxation. **1954-** Diphtheria, whooping cough and tetanus introduced. **1955-** Polio vaccine introduced. **1964-** Measles vaccine introduced. **1969**- Rubella vaccine introduced. **1980-** Smallpox is eradicated globally after a World Health Organisation campaign. **1988-** MMR (measles, mumps and rubella) vaccine introduced on NHS. **2007-** Smoking ban. Smoking in public places is illegal. **2008-** HPV vaccine rolled out to all girls in schools. **2016**- Sugar tax introduced. **2020**- COVID-19 vaccine produced in record time using mRNA technology- mass vaccinations rolled out.	Public health is incredibly expensive. The NHS struggles with underfunding, staff shortages and long waiting lists. The NHS has been eroded over time. Prescriptions, dental and optical are no longer free.

ALEXANDER FLEMING
Discovered penicillin killed staphylococcus while studying bacterial infections in 1928. Published his findings but did not attempt it as a treatment.

HOWARD FLOREY & ERNST CHAIN
Treated Albert Alexander with penicillin in 1941, proving it worked. Convinced the US Government to fund production of penicillin, saving hundreds of thousands of soldiers.

FRANCIS CRICK & JAMES WATSON
Discovered the double- helix structure of DNA in 1953 making gene therapy, genetic screening and genetic engineering possible.

HAROLD GILLIES
Pioneered skin graft surgery during WW1. Treated 5000 soldiers by 1921, based at Queen's Hospital, Kent.

ARCHIBALD MCINDOE
Cousin of Harold Gillies, continued to refine plastic surgery during WW2. Used penicillin on wounds and during surgery to prevent infection.

WILLIAM BEVERIDGE
1942 report stated the government needed to provide care 'from cradle to grave' to deal with the 5 giants (disease, want, ignorance, idleness and squalor). Sold 100,000 copies in the first month.

CHARLES BOOTH
Published *Life and Labour of the People in London*, 1889. Found 30% were too poor to eat, despite being employed.

SEEBOHM ROWNTREE
Published *Poverty, A Study of Town Life*, 1901. Found 28% of people in York were too poor to live. Showed that poverty was hurting industry.

ANEURIN BEVAN
Minister of Health and founder of the National Health Service. Withstood criticism from Winston Churchill and the Conservative Party.

KEY STATS (EVIDENCE OF PROGRESS)

Life expectancy in 1800- 30
Life expectancy in 1900- 50
Life expectancy in 1948- 66 for men 77 for women
Life expectancy in 2025- 82

ANTIBIOTIC A drug that treats bacterial infections.
GENETIC DISEASE Diseases that are inherited.
GENE THERAPY Editing a person's DNA to treat/ prevent genetic conditions.
WELFARE STATE A society in which the government is responsible for protecting the wellbeing of the population. Healthcare, education and benefits are provided through taxation.

FACTORS: INDIVIDUALS | RELIGION/ SUPERSTITION | GOVERNMENT | WAR | COMMUNICATION | SCIENCE/ TECHNOLOGY | CHANCE