

	Medieval	Early Modern (16, 17, 18 C)	19th Century	20th Century
Advances in medical knowledge	Four Humours: Hippocrates (blood, black bile, yellow bile, phlegm) need to be in balance. Church supported ideas. Idea developed by Galen - 'Theory of Opposites' Anatomy - Galen's 'Pig Experiment' - proved brain controls body Astrology: movement of stars influenced diagnosis God: Caused disease to test faith or for punishment. Prayer & indulgences. Church funded universities taught Galen's ideas Alchemy - elixir of life, turn base metals into gold. Led to early Chemistry - e.g. discovery of antimony.	Andreas Vesalius dissected human bodies. Proved Galen wrong e.g. human jaw has 1 bone not 2. Used Renaissance artists - <i>The Fabric of the Human Body</i> (1543) Ambroise Pare - ointment for gunshot wounds instead of boiling oil, ligatures instead of cautery, prosthetics, Bezoar Stone - 1575 <i>The Collected Works of Surgery</i> William Harvey heart is a pump, blood flows in 1 way system, veins have valves. Galen wrong - said blood made in liver. <i>An Anatomical Account of the Motion in the Heart and Blood</i>. (1628)	Louis Pasteur - brewing industry - developed process of Pasteurisation (heating to 50 degrees). Proved Spontaneous Generation theory wrong. Publishes <i>Germ Theory</i> 1861. 1865 - Silkworm Disease - mulberry leaves Robert Koch - specific germs cause specific diseases: Anthrax 1875, Typhus 1880, TB 1882, Cholera 1883. Methodology - laid down technique for investigation, developed method for staining bacteria. Solid culture - easier to study Paul Ehrlich - Salvarsan 606 - chemical cure for syphilis	Wilhelm Rontgen - X-Rays 1895. 'X' = 'unknown'. Non-invasive surgery, study live patients not dead bodies. In most hospitals within 6 months. Mobile X-Ray units in WW1 Scanning Techniques - Ultrasound 1950s - high frequency sound waves 3 D images - babies in the womb MRI Scans 1977 - radio waves create images, brain/spinal cord - shows tumours PET Scans - 1970s radioactive chemical into veins - detects cancer tumours CT Scans - 1970s X-Rays from different angles - 3D images - shows tumours Crick & Watson: explain genetic causes of illness. Structure of DNA - double helix. Present in every human cell (a blueprint) Passes on information from parents to children. Genome Project. 1990s - Identified role of each gene. Benefits: Genetic Engineering, Genetic screening, Gene Therapy, Police work - forensics
Attempts to prevent illness & disease	4 Humours: keep in balance e.g. by bleeding. Alchemy: search for elixir of life, turn base metals into gold, medicines made patients sick Soothsayers: local 'wise-women', herbal remedies, prophesying. Mother Shipton - born 1488, died 1561. Knaresborough. Petrifying well - high mineral content. Prophesies first published 1641 the Black Death: role of church - punishment from God - flagellants, avoid sex, drink vinegar/urine, kill cats & dogs, clear filth off streets	Spa Towns e.g. Bath, drinking mineral waters beneficial Sea Bathing - salt made it a 'medicated bath' Cold water plunge pools Alexander Gordon - Childbed Fever - had 77 cases in 2 outbreaks (1789 & 92). Realised he was the link - started washing hands in chlorinated water. Ignored by other doctors Science: microscopes, stethoscopes, kymograph - blood pressure, James Lind - Scurvy	John Snow: 'On the Mode of Communication of Cholera' 1849 said disease enters body through the mouth. Cholera outbreak 1854 - plotted outbreak on map; disabled Broad Street pump. New science epidemiology - statistics Edward Jenner Smallpox - James Phipps given immunity using cowpox. 1798 'An Inquiry into the Causes & Effects of the Variolae Vaccinae'. £30,000 grants (1802 & 1807). Vaccination compulsory 1852. Smallpox eradicated 1977 Pasteur - vaccines: chicken cholera 1879, anthrax 1881, rabies 1882	Childhood Killers - vaccines developed for polio - 1955, measles - 1963, measles, mumps & rubella (MMR) - 1988, diphtheria - 1942 (killed 3,500 children per year before vaccination), whooping cough - 1950s. Infant mortality (death rate) drops from 150 per thousand in 1800 to 5 per thousand in 2020 MMR Controversy - linked to autism (untrue) but uptake of vaccines has been as low as 88% - well below 95% needed to prevent outbreaks by creating 'herd immunity'
Attempts to treat illness & disease	Herbal medicines - some did work e.g. honey for infection, plantain a natural antibiotic. Books called 'Herbals' Urine Charts - diagnose illness Zodiac Charts - Valemecum book - zodiac charts: position of stars to decide how and when to treat Barber Surgeons - trepanning skull to let out demons, teeth extraction, minor surgery, basic antiseptics like wine, dirty tools - infection, no knowledge of anatomy Venesection - blood letting, leeches, purging	Housewife physicians e.g. Lady Joanna St John - kept recipe book of cures. Books published e.g. William Turner's 'Names of Herbs'. Doctrine of Signatures - if plant looked like a part of the body then it was used to treat that part New ingredients e.g. tobacco - smoking a pipe used to keep plague at bay. Rhubarb - a wonder drug. Scientific approach - some focus on lifestyle e.g. taking fresh air, improving diet, new studies on mental illness (melancholy) and midwifery	James Simpson - before : pain(shock), speed (mistakes), bleeding, infection. Ether - irritated the lungs. 1847 - used chloroform. more complicated surgery but 'Black Period' - incorrect doses, over confident surgeons Joseph Lister - Early work - Ignaz Semmelweis 1847-1849. 45% death rate after surgery due to blood poisoning. 1867 - carbolic acid spray - death rate - 15% Aseptic Surgery - 1881 Charles Chamberland steam steriliser, 1886 Gustav Neuber - sterile room, William Halstead - surgical gloves 1889, Berkeley Moynihan - gowns	Marie Curie - 1898, discovered 2 new elements in the periodic table: polonium. and radium. Developed a way to measure radiation. Radioactivity can be beneficial - can destroy cancer tumours. Mobile X-Ray vehicles in WW1 Fleming - 1928 antibiotic mould (natural) which kills many different bacteria. Wonder drug but research not funded Florey & Chain - 1943 mass production of antibiotics. 1945 US army used 2 million doses per month. Used after WW2 for pneumonia, meningitis, syphilis, wounds etc Christianian Barnard - 1967 heart transplant - Louis Washkansky. Lived 18 days - died from pneumonia (immune system ineffective because of anti-rejection drugs) Led to other transplants- lungs, liver. immunosuppressive drugs - cyclosporine 1974. Led to Donor Card system. Other Treatments Cancers- radiotherapy, chemotherapy, surgery e.g. mastectomy. AIDs - AZT, heart treatment - pacemakers, microsurgery, procedures using an endoscope

Developments in patient care	Role of the Church - 1100 infirmaries as part of church building - main concern was for health of the soul not treatment e.g. Tintern Abbey. Some large e.g. St Leonards in York - 225 patients Other Hospitals - By 1350 - 350 leper hospitals - 31% of care Offered 'care not cure', built on outskirts of towns. Almshouses - 47% of care for the elderly & poor. Christian hospitals - set up by church. care for the poor & sick (not seriously ill). Few doctors e.g. St Leonards in York. Prayers to save 'souls' not medical care	Closure of Monasteries 1530s. church care had to be replaced by royal funds or local authorities. e.g. 5 Royal Hospitals in London such as St Thomas' 1551 (sick & poor), St Bartholomew's 1546 (poor), Christ's Hospital 1553 (fatherless children) Outside London endowments by town councils e.g. Norwich 1547 Endowed Hospitals 18th Century New knowledge - e.g. Royal Society 1662 & Industrial Revolution - increased need for help. Voluntary hospitals funded by wealthy individuals e.g. Guy's 1724. 11 such hospitals in London & 46 across the country Changing Role - improvements in treatment, doctors' had training Dispensaries e.g. Finsbury 1780	Hospitals increase in demand: 1800 - 3000 patients, 1851 - 7619 patients. Conditions: poor- dirty, drunken untrained nurses. Specialist hospitals e.g. Royal Marsden Cancer Hospital 1851 Florence Nightingale: Crimean War 1853-1856, took 38 nurses to Scutari 1854. Support from Sydney Herbert Minister of War Supplies. 1700 soldiers in filth. Nightingale cleaned the wards - death rate dropped from 42%-2%. 1860 School of Nursing, Book 'Notes for Nurses'. 1880 - 7,000 trained nurses, 1900 - 68,000. Consulted on hospital design - e.g. large windows, pavilion principle Mary Seacole - 1854 - Set up British 'Hotel' in Crimea.- treat wounded Betsi Cadwaladr - worked in Crimea until 1855 - Balaclava	Liberal Reforms 1906-1914: abandoned laissez-faire - the beginning of the Welfare State 1906- free school meals for poor children - by 1924 14 million served. 1907 - School medical inspections. Pensions: 1909 old age pensions. five shillings per week (25 pence in today's money) to people over 70 whose incomes were less than £21 per year. National Insurance Act 1911: compulsory health insurance was provided for workers earning less than £160 per year. free medical treatment . (but not their families) 1942 Beveridge Report - five 'Giant Evils': Want, Disease, Ignorance, Squalor and Idleness. National Insurance Act 1946 (benefits for unemployed, pregnant women, elderly, sick, widowed), 1946 & 1949 Housing Acts, Education Act 1944. School leaving Age Act 1947 (raised to 15), 1948 NHS: Regional Health Authorities set up; doctors received salaries and treatment was 'free at the point of delivery' Benefits: 1949 - 7million prescriptions issued, 1951 - 19 million issued. 1949 - 8.5 million had free dental care, 5.2 million pairs of glasses had been issued Changes: e.g. 1990s Trusts (money managed by GPs), NHS Direct - 1998 - 24 hour health advice over the phone
Developments in public health	Dirty Towns design (houses close together) sanitation - night-soil men dumped waste into rivers. Some laws to control disposal of waste e.g. Coventry. Internally houses were dirty, few windows etc. Animals roamed the streets, industrial processes e.g. tanning contaminated the water The Problems - Outbreaks of plague - 1563 -17000 dead in London. Other outbreaks in 1575, 1584, 1589, 1603, 1636, 1647 & 1665	Attempts To Improve Public Health Henry V11 - illegal to have slaughterhouses within towns or cities, Henry V111 - 1532 - towns had power to raise taxes to build sewers. Cleanliness - Elizabeth 1 had a bath every month of her life After The Fire of London laws regulating wider streets, different building materials (stone etc which wouldn't burn)	Growth of Towns towns grew rapidly e.g. Manchester's population grew from 75,000 in 1801 to 645,000 in 1901. No regulations, back to back slum housing. Edwin Chadwick: 1842 'Report on the Sanitary Conditions of the Labouring Population' - argued that disease was the main reason for poverty. Cholera epidemic 1848 - killed 52,000. led to Public Health Act 1848 but voluntary. 1858 - The Great Stink. Foul condition of Thames led to Bazalgette building new sewer system. 1000 miles of sewer. 1866 Cholera epidemic killed 20,000. Parliament passed Sanitary Act 1866 - compulsory sewers, clean water and street cleaning. 1875 - Public Health Act - drew together all previous Acts e.g. appointment of medical officers Titus Salt - Saltaire 1853. Bradford 1850 - life expectancy - aged 20. New mill employed 3,500; 800 houses, school, library, running water Joseph Chamberlain - Municipal Socialism 1873-76 Gas & water socialism" The Council borrowed £2 million in 1875 to buy the gas companies. Forced the takeover of the water company in 1876. Death rates per 1000 dropped from 25.2% - 20.7%	Housing: Housing Act 1919 government offered local authorities grants to build homes for low income families. 1919-1933 25% of all new homes built were council houses with gardens, a bathroom and an inside toilet. Post 1945 - government gave grants to councils to build new homes. 1.25 million built by 1951 1960s Slum Clearance - new towns built e.g. Milton Keynes Air Pollution 1952 - the 'Great Smog' - 12,000 die. Clean Air Act 1956. Introduced 'smokeless zones', encouraged use of cleaner fuels. Clean Air Act 1968 - by 1971 smoke pollution reduced by 65%. Environmental Protection Act 1990 and Clean Air Act 1993 reducing greenhouse gas emissions
Causes of illness & disease	Real Causes: Poverty - 40% had no land, Warfare - more wars e.g. 100 Years War, bigger armies, sieges, looting Famine -1315/1317 - 13% die, Accidents-animals, drowning Towns- no sewers or clean water, waste from animals/work Black Death- 1348/1352 50%+ dead. Incorrect Beliefs: God - illness as punishment, Miasma - bad air, Supernatural - witchcraft, stars, 4 Humours - out of balance The Jews - poisoned wells	General Illnesses: consumption (tuberculosis) infant deaths, smallpox, teeth infections 1665 Great Plague 100,000 dead in London (25% of population). Rich fled, burial of dead at night, quarantine	The effects of industrialisation: Work Hazards: chimney sweeps - scrotal cancer, Matchmakers - fussy jaw, Accidents - Manchester 1833 40% hospital admissions Diseases cholera - 1848 - 60,000 dead. typhoid - Prince Albert dies 1861	Pandemic - Spanish Flu - 1918/19 - 500 million affected, 20-50 million dead, 228,000 in UK. Rapid development, 20-30 year olds vulnerable Pandemic - AIDs - 40 million living with HIV; 100,000 in UK. Destroys immune system. Spread by exchange of bodily fluids (sex, childbirth, drugs). Life expectancy - rich countries - normal, poor countries - low survival rates

How did 'Static Warfare' lead to high casualty rates	Conditions requiring treatment on the Western Front	The impact of the Western Front on Medicine After WW1	How were wounded treated (tended) on the Western Front
Impact of terrain Design of Trench System Difficult to move around - 3 lines of defence (front-line, reserve line & support line - all linked by communication trenches.) Wounded had to be collected at night & was dangerous. Communication was difficult, Stretcher bearers found it difficult to move around corners and transport of the wounded was difficult because of this. Living Conditions: Trenches were very dirty and unhygienic as there was no running water or flushing toilets. In summer sewage, dead bodies & heat led to horrific smell and disease everywhere, In winter bad weather led to flooding, frostbite Technology Hard to attack as soldiers had to cross no-mans land under rapid gunfire: this led to huge casualties e.g. 1916 Battle of the Somme - 60,000 British casualties on first day. Weapons of war: Rifles: fired one at a time but loaded from cartridge case creating rapid fire. Machine guns: Fired 600 rounds a minutes. Pierced organs and fracture bones. Artillery: Bombardments were continuous, Artillery fire caused half of all casualties. Chlorine Gas: Led to death by suffocation. : 1915 second Battle of Ypres - Germans use chlorine gas - 59,000 losses. Phosgene Gas: Faster acting than Chlorine but with similar effects. Could kill within 2 days. Mustard Gas: Odourless gas, worked in 12 hours. Caused blisters, burn the skin easily.	Illness & Disease Trench fever: caused by body lice and included flu-like symptoms Treatment: Passing electric current through infected area was effective. Prevention: Clothes disinfected and delousing stations were set up. Affected 0.5 million. Trench foot: caused by soldiers standing in mud/waterlogged trenches. Treatment: soldiers advised to keep clean but worst cases, amputation. Prevention: Changing socks + keeping feet dry and rubbing whale oil into feet. Affected 20,000 in winter of 1914-1915. Shell-shock: caused by stressful conditions of war and symptoms included tiredness, nightmares, headaches and uncontrollable shacking. Treatment: Not well understood. Prevention: rest and some received treatment in UK. Affected 80,000 and some were shot! Frostbite - (6000 cases in December 1914 & 21,000 in 1917). Treatment: amputation. Prevention: difficult to prevent Wounds: Rifle, Bayonet & Machine Gun Wounds: bullets - more pointed tip so would penetrate more deeply. 60,000 injuries to head & eyes. 41,000 amputations. Prevention: head wounds led to the steel Brodie Helmet being introduced, it reduced fatal head wounds by 80%. Gas Attacks: Gas caused great panic as soldiers were unprepared for it but it wasn't a major cause of death, only 6000 soldiers died during WW1. Prevention: Gas masks given to all British soldiers.	Changes in medicine, driven by the battlefield, would lead to improved treatment after the war LIFE SAVING TECHNOLOGY The Thomas Splint: Stopped joints moving; movement caused blood loss and infection. Increased survival rates from 20 to 82%. X-rays: Developed in 1895, X-rays used to diagnose issues before operations. Ideal to locate shrapnel but too large. Mobile X-rays: 20 operated on the front line, used to locate shrapnel and bullet wounds. Transported around in a truck and By 1916 most CCS had this facility.. Blood Transfusions: Blood loss = major problem. Blood transfusions used at Base Hospitals by a syringe and tube to transfer blood 'arm to arm'. Extended to CCS from 1917. Refrigeration - 1917. Geoffrey Keynes designed a portable blood transfusion kit to support transfusions closer to the front line. Blood bank at Cambrai: Adding Sodium Citrate stopped blood clotting & to be stored for longer. NEW SURGICAL TECHNIQUES Brain surgery: Harvey Cushing developed magnets to remove metal fragments from the brain. Local anaesthetic. Survival rates increased by over 20%. Plastic surgery: Harold Gillies developed new techniques e.g. rebuild noses using rib bones, skin grafts. Queen's Hospital Kent 1917 - 1000 beds. Amputations: Done to prevent gangrene. Better artificial limbs with moving joints PREVENTING INFECTION Typhus - from 1915 vaccinations available - reduced death rate from 32 in every 1000 deaths to 2 in every 1000. Aseptic Surgery - sterile conditions used in British hospitals not possible on the battlefield. Some improvement - cutting away all infected tissue and using saline solution.	Royal Army Medical Corps (RAMC) needed a quick and efficient system to get the wounded from the frontlines to a safe area where they could be treated. Men operated on quickly were more likely to survive. 1914 – 0 motor ambulances but by 1915, it was 250. Ambulance trains, ambulance barges used along River Somme. By the end of the war, 67% of men treated sent back to the front again. Stretcher bearers: Collect wounded, 16 in each battalion; 4 for each stretcher. Regimental Aid Post (RAP): Located within 20 metres of front line in communication trenches staffed by a Medical officer - selected those who were lightly wounded/needed more attention. Dressing Station: Advanced Dressing Station was usually within 400 metres of the RAP and a Main Dressing Station within half a mile. Sometimes in tents or bunker to give protection from enemy shelling. Staffed by medical officers, stretcher bearers and nurses. In total each MDS could deal with about 50 men but large battles e.g. Ypres (1917) saw 1,000 casualties in 2 days at Hooge. Casualty Clearing Station: 7 miles from the front, close to the railway and ambulance wagons. Had operating theatres, X-Ray machines and wards. Third Battle of Ypres (1917) CCS treated over 200,000 casualties with only 4% dying. Injured divided into 3 categories: walking wounded – patch them up and send them back to the front, dying – make them comfortable, needing hospital treatment – send to Base Hospital. Base Hospitals: X-rays, operating theatre and areas to deal with gas poisoning. Specialist doctors. Underground hospital at Arras: Running water, 700 beds and operating theatre. Those needing longer recovery time sent back to Blighty' RAMC: Involved medical officers and learnt about wounds never seen before. FANY: Volunteer nurses, who helped the wounded and also drove ambulances.

