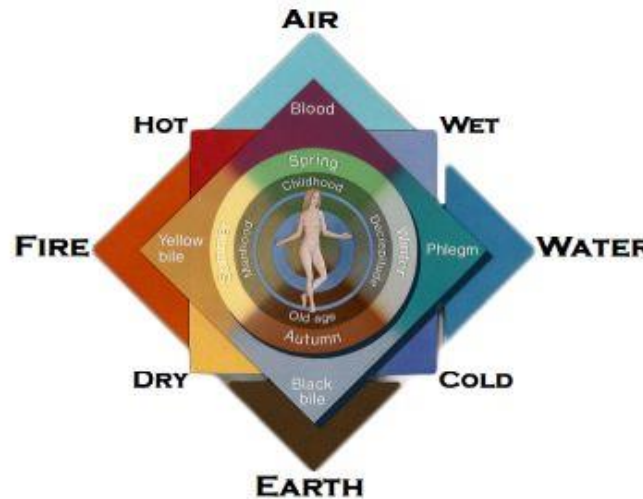


Avicenna and Islamic Medicine

- **Canon of Medicine:** Comprehensive medical textbook widely used in Europe and the Islamic world.
- **Herbal treatments:** Listed **760 drugs**, detailing their uses for different illnesses.
- **Dietary guidance:** Recommended specific foods based on the **theory of humours** to maintain health.
- **Impact:** Standardised medical knowledge, guided doctors in both herbal remedies and diet-based treatments.

Key:

- Red box=** Medieval medicine
- Purple box=** Renaissance and 17th/18th Century medicine
- Green box=** Industrial medicine
- Blue box=** Modern medicine



CARE NOT CURE

Treatment types

1. **Herbal Remedies:** Plants and herbs were extensively used for medicinal purposes. While some were effective, many were based on superstition rather than scientific evidence.
2. **Bloodletting:** This practice involved deliberately causing bleeding in a patient, based on the belief that it would balance the body's humors. However, it often did more harm than good.
3. **Leeches:** Used in a similar manner to bloodletting, leeches were thought to extract "bad blood" from the body.
4. **Charms:** Magical and religious items were often worn or ingested in the belief that they could protect against illness or promote healing.
5. **Prayer and Pilgrimage:** Religion played a significant role in medieval medicine, with prayer and visits to holy sites seen as potential cures for various ailments.
6. **Astrology:** Medical practitioners often consulted astrology to diagnose and treat illnesses, believing that the positions of the stars and planets influenced health.

Hippocrates and Galen

Hippocrates (c.460–370 BC)

- Believed illness came from **natural causes**, not punishment from the gods.
- Emphasised **observation, diagnosis, and prognosis**.
- Introduced the **Hippocratic Corpus** and **Hippocratic Oath**, stressing ethical care.
- **Treatment approach:**
 - Rest, diet, and exercise to restore balance in the body.
 - Use of **herbs and natural remedies** for symptoms.
 - Focused on **preventive measures** rather than just curing illness.

Galen (c.129–c.216 AD)

- Built on Hippocrates and applied ideas to **anatomy and physiology**.
- Believed **the body worked according to the Four Humours:** blood, phlegm, yellow bile, black bile.
- **Treatment approach (Theory of Opposites):**
 - **Bloodletting or leeching** to reduce excess blood.
 - **Purgatives** to remove excess bile.
 - **Dietary changes** to restore humour balance.
 - Herbal remedies to counteract symptoms (e.g., cooling herbs for fever).
- Galen also advocated **surgery only when necessary**, as most treatment was aimed at restoring humour balance.

Renaissance Treatments

Continuity with Medieval Treatments

- **Bloodletting**
 - How it was used: Cutting a vein or using leeches to remove blood.
 - Purpose / Effect: Believed to balance the humours, especially excess blood, and restore health.
- **Purging**
 - How it was used: Taking emetics to vomit or laxatives to purge the bowels.
 - Purpose / Effect: Thought to remove excess bile or phlegm, restoring humoral balance.
- **Herbal remedies**
 - How it was used: Herbs prepared as teas, powders, poultices, or ointments.
 - Purpose / Effect: Used to relieve symptoms such as fever, coughs, digestive issues, and minor wounds; effects depended on the herb.

Key points: Treatments were mostly symptom-based rather than curative, and physicians observed patients but rarely challenged Galen's ideas.

2. New Treatments and Innovations

- **Cinchona bark (quinine)**
 - How it was used: Bark dried and made into powder or infusion.
 - Purpose / Effect: Treated fevers and malaria, reducing shivering, high temperature, and weakness.
- **Tobacco**
 - How it was used: Smoked, chewed, or applied as a poultice.
 - Purpose / Effect: Used for wounds, colds, headaches, and infections; thought to have stimulant and antiseptic properties.
- **Sassafras**
 - How it was used: Made into teas or powders.
 - Purpose / Effect: Believed to purify the blood and treat fevers, infections, and skin problems.
- **Other New World herbs**
 - How they were used: Various preparations such as infusions, powders, or ointments.
 - Purpose / Effect: Introduced new remedies for digestive issues, fevers, and general health improvement.

Key points: New herbs were used alongside traditional treatments. While still influenced by humour theory, experimentation with new remedies was growing.

Ambroise Pare

Paré is known for his improvements in wound treatment. During his time, the traditional practice for treating gunshot wounds involved cauterisation with boiling oil. Paré introduced a more humane and effective method by using a mixture of egg yolk, rose oil, and turpentine. This was a departure from the harsh and often harmful practices of the day.



Ambroise Paré (1510-1590)



Edward Jenner and Smallpox Vaccination

Background / Aim:

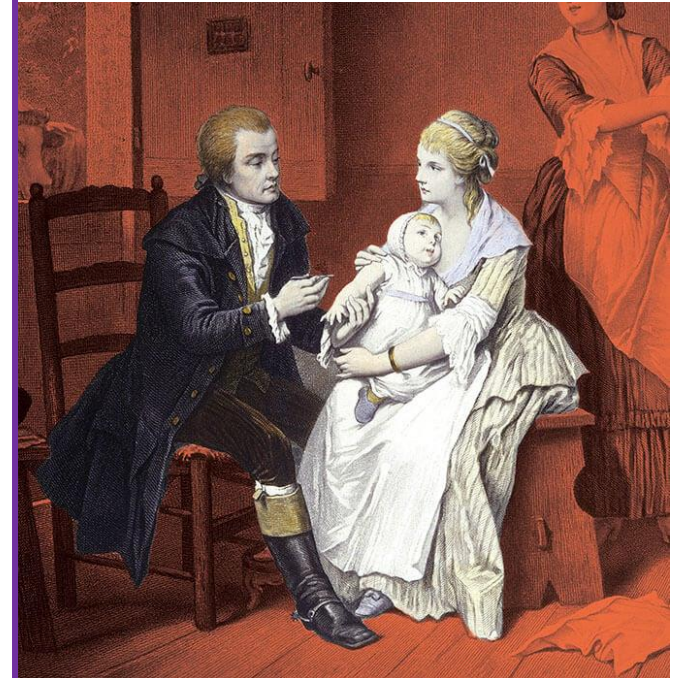
- Smallpox was a deadly disease, and the common prevention method **inoculation with smallpox material**, carried serious risks, including death.
- Jenner aimed to **find a safer alternative** that could protect people without causing severe illness.

Scientific Method:

1. **Observation:** Jenner noticed that milkmaids who had previously had **cowpox**, a much milder disease, never caught smallpox.
2. **Hypothesis:** Exposure to cowpox could provide immunity to smallpox safely, without the dangers of variolation.
3. **Experiment (1796):**
 - Jenner took material from a cowpox sore on milkmaid **Sarah**.
 - Inoculated **eight-year-old James, his gardeners son**.
 - After recovery from cowpox, Jenner exposed Phipps to smallpox.
 - Result: Phipps did **not** develop smallpox.
4. **Further Trials and Publication:**
 - Jenner repeated the procedure on others to confirm results.
 - Published his findings in **1798**, demonstrating a safe method to prevent smallpox.

Impacts and Legacy:

- **Safer Alternative:** Jenner's method replaced the risky practice of inoculation.
- **1810:** Received a **£10,000 government grant** to promote vaccination and research.
- **1853:** **Smallpox vaccination made compulsory** in Britain, increasing public protection.
- **1980:** Smallpox officially **eradicated worldwide**, a major milestone in public health.
- Jenner's work **laid the foundation for modern vaccination**, influencing vaccines for many other infectious diseases.



Louis Pasteur and vaccine development

Louis Pasteur (1822–1895) was a French chemist and microbiologist who made significant contributions to the understanding of infectious diseases. He developed vaccines for several diseases, including anthrax and rabies.

1. By accident, one of Pasteur's assistants injected a form of cholera into a chicken and many expected this to die. However, the chicken survived. Through observation in 1879–1880, Pasteur realised that a weaker version of cholera was injected into the chicken. Through this, Pasteur realised a weakened version of a disease is important as the patient will have the disease in them, not suffer from symptoms and develop immunity. The results were that the vaccinated chickens were protected from the disease, while non-vaccinated chickens died to the infection. This then led to his further research of anthrax and rabies.
2. **Anthrax Vaccine (1881):** Pasteur's work on anthrax led to the development of the first successful vaccine for the disease. He demonstrated that weakened forms of the anthrax bacteria could be used to start immunity. They then injected weaker forms of anthrax and people stopped getting serious symptoms of the disease.
3. Also, **Rabies Vaccine (1885):** Perhaps his most famous achievement, Pasteur developed a vaccine for rabies. He used the spinal cords of infected rabbits to create a vaccine that could prevent rabies in humans.



Magic Bullet and Paul Ehrlich

The term "magic bullet" is associated with the German physician Paul Ehrlich (1854–1915). Ehrlich was a forerunner in immunology and chemotherapy.

Ehrlich proposed a therapeutic agent that could selectively target and destroy bacteria without harming healthy cells. He used the term "magic bullet" to describe this idealised drug. They were used to treat various bacterial infections, including respiratory infections (such as pneumonia and bronchitis), skin infections, urinary tract infections, and bacterial meningitis.

While Ehrlich did not discover a literal "magic bullet," his work laid the foundation for the development of antibiotics and other targeted therapies.

Modern Technology and helping to understand medicine and the body

Discovery by Alexander Fleming (1928)

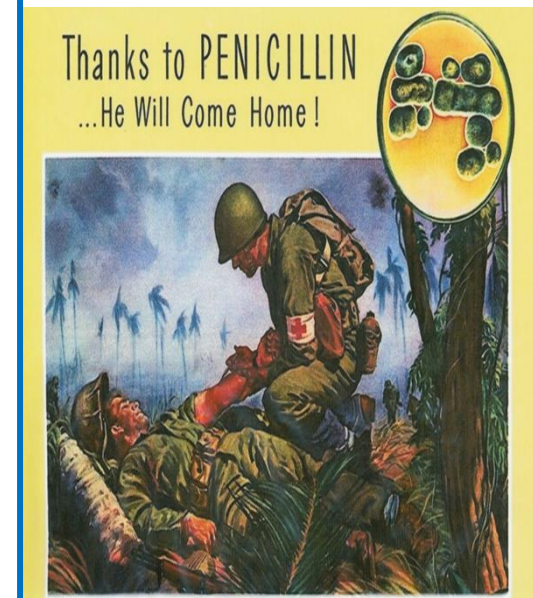
- **Event:** While on holiday, Fleming left out a **petri dish with staphylococcus germs**.
- **Observation: Mould (Penicillium)** landed on the bacteria and **killed it**.
- **Conclusion:** The mould produced a **substance that killed bacteria**.
- **Fleming's interpretation:** He called it an **"antiseptic"**, thinking it could be used to treat wounds externally.
- **Note:** Fleming **did not continue the research** for widespread medical use.

Florey and Chain – Development and Trials (Four Steps of Science)

1. **Observe:** Noticed Fleming's discovery and its potential to **treat bacterial infections in humans**.
2. **Hypothesise:** Predicted that **penicillin could treat infections inside the body** safely.
3. **Test:**
 - **First tests on 8 mice:** Some injected with lethal bacteria and treated with penicillin survived, showing **penicillin's effectiveness**.
 - **First human trial:** Conducted on a **policeman with an infected wound**.
 - Patient **started to recover** after penicillin treatment.
 - **Ran out of penicillin**, and the patient later **died**.
 - Demonstrated that penicillin **worked against infections** but **highlighted the need for mass production**.
 - Showed penicillin was **more effective than any previous treatments**, proving it as the **first true antibiotic**.
 - Developed methods to **grow and purify penicillin**, which was **essential for creating a stable, safe, and effective drug**.
4. **Publish:** Shared results to provide **scientific evidence** of penicillin's effectiveness, leading to further research and production.

Mass Production and Wartime Use

- **Funding:** Received **\$3 million from the US government** to produce penicillin on a large scale.
- **Development:** Optimised **fermentation techniques** for **purified penicillin production**.
- **World War II Impact:**
 - Provided **enough penicillin for every injured allied soldier on D-Day**, death rate decreasing by **15%..**
 - Mass production became a **critical wartime effort**.
 - Played a **crucial role in reducing deaths from infected wounds** and establishing penicillin as the **world's first widely used antibiotic**. This went from 18% before WW2 to 1% after WW2.



Antibiotic resistance

In recent years, a problem has emerged with some bacteria becoming resistant to antibiotics. One example bacterium is MRSA. These bacteria are sometimes referred to as superbugs. Some of the potential causes of antibiotic resistance include:

- patients not fully completing a course of antibiotics
- overuse of antibiotics
- use of antibiotics in some farming

In the medical community there is a concern that antibiotic resistance could grow, so more bacteria become resistant to antibiotics. Many infections have been treated straightforwardly with antibiotics since the discovery of penicillin. However, superbugs could make these infections life threatening again. To deal with this, research is being done to try to discover new antibiotics and ways of dealing with superbugs.

Modern Day Treatment

- **Vaccination** programs after WWII greatly reduced or eradicated diseases such as TB, polio, measles, and rubella in the UK.
- **Thalidomide**, initially used for morning sickness, is now repurposed to treat **AIDS** and some cancers.
- **IVF (In Vitro Fertilisation)** developed in 1978 revolutionised fertility treatments, enabling childless women to conceive; Louise Brown was the first test tube baby.
- **Global vaccination campaigns** successfully eradicated **smallpox** in 1980; the same vaccine is now used to control **monkeypox**.
- Modern treatments are shaped by advances in **science, technology, and government support**, ensuring safer, more effective, and widely accessible healthcare.

Alternative and complementary medicines

Alternative and complementary medicines are treatments and methods that are not considered to be mainstream. They include some ideas and methods that are believed to be effective but that lack the evidence base or testing that apply to a mainstream treatment. Following are some examples:

- **acupuncture** - using needles inserted into specific parts of the body to help with pain relief.
- **yoga** - exercises and movements that are believed to help improve mental health and improve strength and flexibility.
- **hypnotherapy** - using relaxation and focusing of thoughts to support people with mental health challenges or help them change their behaviour - for example, to help them stop smoking.
- **herbal remedies** - people take herbs to help with a range of medical issues, including mental health challenges, pain or a low immune system.
- **Chiropractic care** is a healthcare profession that focuses on the diagnosis and treatment of disorders related to the musculoskeletal system, particularly the spine. Chiropractors use various manual techniques, including spinal adjustments and manipulation, to address issues such as misalignments, pain, and overall health.