

The background of the entire page is a dramatic, painterly illustration. It depicts a shipwreck on a dark, jagged, and rocky coastline. The ship's hull is partially submerged, with its masts and rigging visible against a turbulent, dark sky. In the upper right corner, a bright, glowing orb, resembling a skull or a full moon, casts a light over the scene. The overall mood is somber and ominous, reflecting the theme of the book.

Plagues & Pestilence

THE VOYAGE OF CONTAGIONS

the
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Plagues & Pestilence



They stowed away in the hulls of mighty sea vessels, landed upon the shores of new and ancient continents and marched across empires. They spread from village to village, by road, river and horseback. When they came, they fell swift and mercilessly upon their victims and vanished, leaving no trace of their path. They struck royalty, peasantry and, without warning, destroyed formerly unconquerable empires. There was no safe harbor, no village, temple or palace that provided respite from their deprivation. There was only death and fear and the hopelessness of fighting a nameless enemy. Military campaigns, increased migration and new technologies all contributed to their passage. They were desperately attributed to “bad air,” “sinful retribution” and “Satan’s scourge.” They passed from table to table, through a lover’s embrace and from parent to child, always resisting cure and destroying life without regard for age, innocence or wealth. Continents were swept away by the death of the majority of their population and soon, the boundaries of the world would stretch, forging a new battleground for their carnage. Encounters between explorers and populations in the rest of the world often introduced local epidemics, of extraordinary virulence. Various diseases killed the entire native population of the Canary Islands in the 16th century and half the native population of Hispaniola in 1518 was killed by smallpox. Measles killed two million Mexican natives in the 1600s and it is believed the death of 90 percent of the Native American population of the New World was caused by Old World diseases. Since the dawning of the Earth, mankind has been gripped with fear and left searching for clues and cures to combat the voyage of contagions.



*El Almirante Christoval Colon Descubre la Isla Española
y haze poner una Cruz, etc.*

Engraving shows Christopher Columbus being greeted by native people upon his landing on the island of Hispaniola. Courtesy of Library of Congress.

BUBONIC PLAGUE

The Black Death

EUROPE RAVAGED

An English tailor named George Viccars received a shipment of cloth tainted with bubonic plague-infected fleas from London. Within four days, he died and within a month, five more villagers perished from a swift, sudden illness.

The plague, otherwise known as the Black Death, first spread to Britain in 1348, and made its way to major cities within several days. In 1665, London experienced one of the worst outbreaks of plague. People fled the city and thousands died every week. The only respite came in the winter, when the cold weather killed the primary source of the disease: fleas. At the time, there was no scientific explanation for the diseases and most people were too afraid to care for those who exhibited symptoms. If one member of a household began displaying symptoms, the entire household was placed on an extended quarantine, which of course, contributed to the spread of the disease within the household.

GOD BLESS YOU

When Gregory I became Pope in 590 A.D., an outbreak of the bubonic plague was reaching Rome. In hopes of fighting off the disease, he ordered unending prayer and parades of chanters through the streets. At the time, sneezing was thought to be an early symptom of the plague. Stating “God bless you” became a common effort to halt the disease.

RING AROUND THE ROSY

This rhyme delivers the image of children grasping hands and slowly rotating in a circle, only to collapse and giggle at its conclusion. But this is more than an innocent childhood rhyme. It was born amidst the horror of a disease so fierce that it bled the very innocence of the European continent. Below is an explanation of the meaning of the phrases used in the rhyme.

RING AROUND THE ROSY: One of the first visible signs of infection was red rings surrounding a rosy bump, all over the victim's body.

POCKET FULL OF POSIES: A common belief of the time was that the plague was born from “foul air.” People believed they could protect themselves from the bad air by keeping their local air smelling sweet with things, like flowers. It also helped them deal with the smell of death.

ASHES, ASHES: In the terminal phases of the disease, victims would be hemorrhaging internally, sometimes triggering sneezing as it irritated the breathing passages. “Ashes” is a child's approximation of a paroxysm of sneezing. In this weakened state, a victim could, and often did, sneeze his lungs out.

WE ALL FALL DOWN: The often sudden death associated with the plague.

The plague ravaged Europe and Asia between the 14th and 17th centuries. In the 14th century alone, it is estimated to have killed 200 million people. Although the disease is no longer a major health problem in Europe, it is still endemic in some parts of the world. About 3,000 cases are reported annually to the World Health Organization (WHO). Bubonic plague is still endemic in the United States and there are fears that climate change and increasing globalization could result in a re-emergence of the disease in the developed world as black rats, the bacterium's hosts, have recently reappeared in some parts of the United Kingdom.

“Sometimes it came by road, passing from village to village, sometimes by river, as in the East Midlands, or by ship, from the Low Countries or from other infected areas. . . the plague killed indiscriminately, striking at rich and poor alike.”

- J. Bolton *The World Upside Down*,
Black Death in England



*Eyam Plague Cottages, Derbyshire, England.
Courtesy of Library of Congress.*



Courtesy of Library of Congress.

Ring Around the Rosy
Pocket Full of Posies
Ashes, Ashes
We All Fall Down



Oriental Rat Flea. Common carrier of the bubonic plague-causing bacterium yersinia pestis. Courtesy of CDC.

Protective dress of a plague doctor, middle ages. The beak contained an herbal mixture to purify the air. Glass "windows" prevented the plague contagion from infecting the doctor through his eyes.



Cholera

Cholera, an acute diarrheal illness caused by infection of the intestine with the bacterium *Vibrio Cholerae*, is often mild or without symptoms, but sometimes can be severe. Approximately one in 20 infected persons has severe disease characterized by profuse watery diarrhea, vomiting and leg cramps. In these persons, rapid loss of bodily fluids leads to dehydration and shock. Without treatment, death can occur within hours.

Today, it is well known that cholera is usually spread in poor drinking water. Early theories blamed the infection on mists and “miasmas,” which caused many of the early attempts to control cholera to fail. In reality, the poor sanitary condition of a city's water supply was responsible. Early Victorian cities also included cowsheds mixed in amongst the houses. These elements, combined with poor handling of human sewage (often merely a hole in the ground), led to a rapid contamination of the drinking water.

THE BROAD STREET PUMP

The famous Broad Street water pump in London was a shallow water pump that pumped water from the contaminated water table. In the 1850s, John Snow performed pioneering data analysis to prove his hypothesis that cholera was spread in the drinking water. Snow reasoned that if cholera was spread by a mist or miasma, as the prevailing theories suggested, then the cases should be uniformly distributed along the streets. To see if this was the case, he plotted each cholera case on a map. He carefully analyzed the cholera deaths, correlating them with the source of drinking water. Snow went to the pump and took a water sample. Looking in his microscope, he found the water contained bacteria which he had not seen before. He went back to the pump and removed the pump handle. The Broad Street cholera outbreak stopped almost overnight. Snow's work with the London cholera outbreaks of the 1850s is often cited as the beginning of modern epidemiology. Unfortunately, word of this pioneering epidemiology was slow to spread, and the London cholera outbreaks would continue into the 1880s when all of the shallow water-pumps were finally decommissioned.



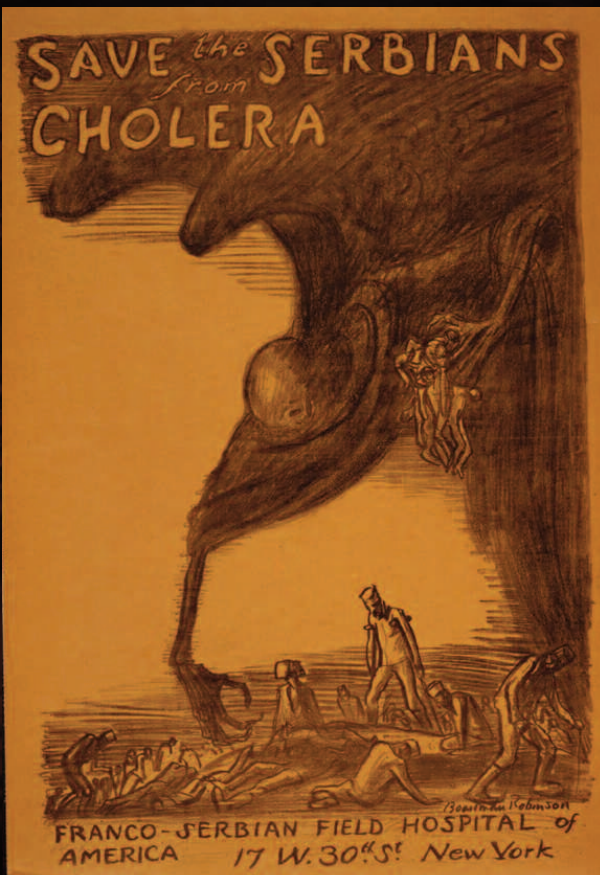
JOHN SNOW (March 16, 1813 - June 16, 1858) was a British physician and a leader in the adoption of anesthesia and medical hygiene. He is considered to be one of the fathers of epidemiology. You can still buy a pint of beer at the pub on the corner of Cambridge Street, not 15 steps from the site of the pump that once nearly destroyed the neighborhood. Only the name of the pub is changed. It is now called The John Snow. A replica of the pump, with a memorial plaque, now stands near the location of the original pump.



Broadside shows a man with the body of a snake in the center of a group of skulls, representing the disease cholera. The image is accompanied by a sarcastic and ironic ballad describing how cholera has afflicted the various social classes of Mexican society. Death kills everyone, regardless of his or her place in society. Courtesy of Library of Congress.



Water pump in Tangermünde, Germany. Installed in early 1800s, deactivated late 1800s. Courtesy of Rainer M. Engel, M.D.



Death reaching down from a storm cloud to menace a devastated populace in this 1918 poster. Courtesy of Library of Congress.

Malaria

Malaria is an infectious disease caused by protozoan parasites and transmitted by mosquitoes. It is widespread in tropical and subtropical regions, including parts of the Americas, Asia and Africa. The disease is particularly devastating in Africa, where it is a leading killer of children. In addition to being home to the deadliest strain of malaria, and the mosquito best equipped to transmit the disease, many areas in Africa lack the proper infrastructure and resources to fight back. Each year, malaria causes disease in approximately 650 million people and kills between one and three million, mostly young children in sub-Saharan Africa. Malaria is commonly associated with poverty, but it is also a cause of poverty and a major hindrance to economic development.

Malaria parasites are transmitted by female *Anopheles* mosquitoes. The parasites multiply within red blood cells, causing symptoms that include fever, chills, nausea, flu-like illness, and in severe cases, coma and death. Malaria transmission can be reduced by preventing mosquito bites using mosquito nets and insect repellents, or by mosquito-control measures such as spraying insecticides inside houses and draining standing water where mosquitoes lay their eggs. Although some vaccines are under development, none is currently available for malaria; preventative drugs must be taken continuously to reduce the risk of infection. These prophylactic drug treatments are often too expensive for most people living in affected regions. Malaria infections are treated by using antimalarial drugs, such as quinine or artemisinin derivatives, although drug resistance is increasingly common.

The disease is a self-perpetuating problem with large-scale impact on societies and economies and accounts for up to half of all hospital admissions and outpatient visits in Africa. In addition to the burden on the health system, malaria illness and death cost Africa approximately \$12 billion a year in lost productivity. The effects permeate almost every sector. Malaria increases school absenteeism, decreases tourism, inhibits foreign investment and even affects the type of crops that are grown.

MALARIA FACTS

- Only female mosquitoes can transmit malaria.
- Each year, malaria afflicts approximately 500 million people (roughly the population of the United States, Canada and Mexico combined).
- Malaria kills more than a million people per year; 90 percent of those who die are African children.
- Every 30 seconds a child dies of malaria in Africa.

Yellow Fever

Yellow fever, also transmitted by mosquitoes, is an acute viral disease. It is a major cause of hemorrhagic illness in many African and South American countries despite existence of an effective vaccine. The “yellow” refers to the jaundice that affects some patients.

Yellow fever has been a source of several devastating epidemics. French soldiers were attacked by yellow fever during the 1802 Haitian Revolution; more than half of the army perished due to the disease. Outbreaks followed by thousands of deaths occurred periodically in other Western Hemisphere locations until research, which included human volunteers (some of whom died), led to an understanding of the method of transmission to humans and development of a vaccine and other preventative efforts in the early 20th century.

Over the last 20 years the number of yellow fever epidemics has risen and more countries are reporting cases. In both Africa and the Americas, there is a large susceptible, unvaccinated population. Changes in the world's environment, such as deforestation and urbanization, have increased contact with the mosquito/virus and, as a result, the WHO estimates that yellow fever causes 200,000 illnesses and 30,000 deaths every year in unvaccinated populations. Widespread international travel has also played a role in spreading the disease.



Drawing shows a woman representing the state of Florida lying on the ground in the clutches of a monster labeled "Yellow Jack." Columbia, wearing a phrygian cap, stands above them, one arm upraised in a call for help. Behind the trio, frightened families flee the Florida swamp. A box of opened fruit, identified as "Trade," lies askew in the foreground. Courtesy of Library of Congress.

Victorian trade card (picturesque ads for various medicines) extolling the benefits of a tonic which could cure malaria. Courtesy of Ben Swanson, DDS.





Female Anopheles. Courtesy of David Scharf/Science Faction Images

Inset: Female *Anopheles freeborni* taking a blood meal from a human host by pumping the ingested blood through her "labrum," which is visible here as a thin, red "needle-like" structure between the mosquito's head and the host's skin. Note her blood-filled, distended abdomen, which is so full that clear, fluid is spilling from the anus at the abdominal tip in order to make room for still more ingested blood. Courtesy of CDC.



Above: A Stearman bi-plane is spraying an insecticide during malaria control operations in Savannah, GA. Courtesy of CDC.



In 1958, The National Malaria Eradication Program used an entirely new approach implementing DDT for spraying of mosquitoes. Courtesy of CDC.



MAJ. WALTER REED, M.D.

In 1900, U.S. Major Walter Reed, M.D. returned to Cuba to examine tropical diseases including yellow fever. During Reed's tenure with the U.S. Army Yellow Fever Commission in Cuba, it was confirmed that the disease was transmitted by mosquitoes, disproving the common belief that yellow fever could be transmitted by clothing and bedding soiled by the body fluids of yellow fever sufferers. Later in 1900 a dramatic series of experiments were conducted at Camp Lazear, named for Reed's assistant and friend Jesse William Lazear who had died two months earlier of yellow fever. Lazear, without telling his colleagues, allowed himself to be bitten by yellow fever-infected mosquitoes and died of the disease. Clara Maas, a nurse who volunteered to be bitten by yellow fever infected mosquitoes twice, eventually died following her second bout with the disease. This disproved the theory that a prior case of yellow fever was sufficient to immunize a patient against the disease. Maas' death roused public sentiment and abolished the use of human subjects for yellow fever experiments.

Above: Major Walter Reed, M.D.
Below: Jesse William Lazear

Leprosy

Between the 11th and 13th centuries A.D., leprosy spread along trade routes in Europe and also in places in the Holy Land occupied by European Crusaders and pilgrims, its most prominent victim being Baldwin IV, the “leper king” of Jerusalem. So acute was the suffering of those infected by leprosy that the disease was thought to be highly contagious. Persons with leprosy not wealthy enough to live at home in isolation were segregated in what came to be called lazarets, or leprosaria. Outside these hospices these persons were feared, ostracized and frequently condemned to wander the roads wearing signs and ringing bells to warn healthy people of their approach. Leprosy came to be referred to as the “living death,” and often its victims were treated as if they had already died. Funeral services were conducted to declare those living with the disease “dead” to society, and relatives were allowed to claim their inheritance. Like many diseases, leprosy was considered to be a form of divine punishment for worldly sins, and the outward signs of the disease were taken as proof that leprosy victims were utterly sinful. Special laws required the use of separate seats in churches, separate holy-water fonts, and in some cases a “lepers’ window” or slot in the church wall through which the afflicted could view the mass without contaminating the congregation.

Rather abruptly and for unknown reasons, the incidence of leprosy began to decline in Europe, with the exception of Scandinavia, between 1200 and 1300 A.D. In Norway the disease persisted until the 20th century but has now disappeared. Leprosy came to the southern United States by French Canadians (Acadians) who were expelled from Canada in 1755. Another immigrant group known to include people with leprosy moved to the United States from Scandinavia, mainly Norway, in the middle of the 19th century and settled principally in Minnesota. The disease was transmitted and has persisted in Louisiana, where occasional new cases appear even today among people of Acadian descent.

Even into the 20th century, the only effective control applied to prevent the spread of the disease was compulsory segregation of the patient, frequently in large “leper colonies.” Perhaps the most famous American colony was at Kalaupapa, on the island of Molokai, HI, where the Belgian priest Father Damien served leprosy patients who had been forcibly relocated to the isolated community. In 1894 the Louisiana Leper Home was established near Carville, LA, on the Mississippi River near New Orleans. Early in the 20th century, the Carville home was transferred to U.S. federal control and became officially known as the Gillis W. Long Hansen’s Disease Center. The new name, Hansen’s disease, was part of a determined effort by health authorities to rid leprosy of its old social stigma and to focus attention on the fact that leprosy was finally becoming a treatable disease.

For centuries, oil derived from the seeds of the chaulmoogra tree had been used to treat leprosy and other skin conditions in India and China. However, the drug was not effective when applied locally to affected areas, produced nausea when taken orally, and caused pain upon injection. Its true value was never fully accepted by authorities, and it was finally abandoned upon the introduction of sulfones in the 1940s, the first truly effective leprosy drug. Diaminodiphenyl sulfone, or DDS, was synthesized in Germany in 1908, but it was not until the 1930s that researchers began to investigate its possible antibacterial properties. In 1941 doctors at Carville began to test a derivative of the compound, called promin, on patients. Promin had drawbacks: it had to be given intravenously, on a regular schedule and for a long period of time, but it reversed the course of the disease in enough cases to be heralded as the “miracle at Carville.” Over the following decade, researchers produced sulfone drugs that could be taken orally. The most effective was a medicinal form of DDS called dapsone, which quickly replaced chaulmoogra oil as the standard medication for leprosy. About the same time, clofazimine, a drug that also had anti-inflammatory properties, was introduced. With these drugs it was possible to treat people with leprosy as outpatients and to cease the practice of isolating them from the general population.

No sooner was leprosy finally treatable than the problem of drug resistance arose. In the early 1980s, experts assembled by WHO issued the recommendation that all leprosy patients receive combination multidrug therapy and that all leprosy treatment be strictly limited in duration. Patients with localized leprosy would be treated for only six months, and the most advanced cases would receive treatment for only two years. Initially, these methods were highly controversial, but, as they were shown to be successful, they became the standard of treatment.

The prospect of improved treatment led public health authorities to embrace the slogan “Leprosy is curable.” Leprosy patients who completed multidrug-therapy regimens were counted as cured and were taken off the lists of those with the disease. This had the effect of reducing the official numbers of people with leprosy from millions to only hundreds of thousands. In the 1990s, the WHO launched an ambitious campaign to eliminate leprosy worldwide by the year 2000. The goal could not be reached and leprosy remains a public health problem in more than a dozen countries.



*Leper Coin from
Cullio, HI.
Courtesy of Erwin
Rugendorff, M.D.*



Tubercular leprosy. Taylor, R.W., *Atlas of Skin and Venereal Diseases*, 1889. Courtesy William P. Didusch Center for Urologic History.



Lepers, Egypt. Courtesy of Library of Congress.



Special money issued for leprosy camps: this money was valid only inside the camp, and "regular" money was not accepted. Courtesy of Erwin Rugendorff, M.D.

SEPARATING MYTH FROM FACT

MYTH

Leprosy can be passed down from a parent to child by genetics and is transmittable through casual physical contact.

There is no cure for leprosy.

Leprosy is recognized by ulcers and sores and those with visible signs of the disease should be avoided.

Leprosy is caused by immoral behavior or a curse.

FACT

Leprosy is neither hereditary nor does it spread through casual touch. Leprosy is the least infectious of all the communicable diseases. 95 percent of people are naturally immune to the leprosy germ.

Early and regular treatment of leprosy completely cures the disease as well as prevents any deformity, and patients can live a normal life.

Ulcers and sores are not always signs of active disease. They are often a sign of a mostly cured leprosy patient and do not transmit the disease.

The disease is caused by a germ, not a punishment or a curse.



Leper colony on Moloka'i Island, Kalaupapa, HI. Courtesy of Library of Congress.

"The leper who has the disease shall wear torn clothes and let the hair of his head hang loose, and he shall cover his upper lip and cry, 'Unclean, unclean.' He shall remain unclean as long as he has the disease; he is unclean; he shall dwell alone in a habitation outside the camp."

- Leviticus 13: 45-56

Poliomyelitis

The effects of poliomyelitis (polio) infection have been known since prehistory. Egyptian paintings and carvings depict otherwise healthy people with withered limbs, and children walking with canes at a young age. The first clinical description of poliomyelitis was provided by the British physician Michael Underwood in 1789. He referred to polio as “a debility of the lower extremities.” The work of physicians Jakob Heine in 1840 and Karl Oskar Medin in 1890 led to the disease being known as Heine-Medin disease. The disease was later called “infantile paralysis,” based on its propensity to affect children.

Prior to the 20th century, polio infections were rarely seen in infants before six months of age and most cases occurred in children six months to four years of age. Poor sanitation resulted in a constant exposure to the virus, which enhanced a natural immunity within the population. Around 1900, small, localized paralytic polio epidemics began to appear in Europe and the United States. Outbreaks reached pandemic proportions in Europe, North America, Australia and New Zealand during the first half of the 20th century. By 1950, the peak age incidence of paralytic poliomyelitis in the United States had shifted from infants to children aged five to nine years. Accordingly, the rate of paralysis and death due to polio infection also increased during this time. In the United States, the 1952 polio epidemic would be the worst outbreak in the nation's history. Of the nearly 58,000 cases reported that year, 3,145 died and 21,269 were left with mild to disabling paralysis.

Polio is one disease that was rife for the quackish treatments of the early 20th century. Some of these suggestions strike us as absolutely weird. One treatment of 1916 calls upon a number of modern inventions such as electricity and radioactivity; published in *A Monograph on the Epidemic of Poliomyelitis in New York City* it states, “give oxygen through the lower extremities by positive electricity. Frequent baths using almond, meal, or oxidizing the water. Applications of poltices of Roman chamomile, slippery elm, arnic, mustard, cantharis, Dulcis amygdalae, and of special merit, spikenard oil and xanthoxolinum. Internally used caffeine, kola, dried muriate, elixir of cinchone, radium water, chloride of gold, liquor calcis, wine of pepsin.”

MARCH OF DIMES

Like so many medical disasters, polio has also left a legacy for the betterment of mankind. Not only did early treatment lead to the birth of physical rehabilitation therapy, it led to campaigns for social and civil rights for the disabled survivors, eventually leading to many civil rights improvements.

Franklin D. Roosevelt had become permanently paralyzed in 1921, though it is not clear whether it was polio or Guillain Barré syndrome. Despite his limitations, he continued to be active in politics. Hearing about the therapeutic value of ther-

mal mineral baths in Warm Springs, GA, Roosevelt went there and finally ended up buying the property. It became a rehabilitation center for young polio victims. When he became U.S. president, birthday balls took place on his birthday in January; these events helped raise money for the care of polio patients. They were so successful that, five years later, they were merged into a nationwide organization: the National Foundation for Infantile Paralysis.

The Foundation would go on to change philanthropic fundraising. Rather than ask a few wealthy individuals or corporations for major contributions, the group launched campaigns aimed at encouraging the public to make small contributions. One such campaign – the annual “March of Dimes” asked each person to contribute 10 cents and would ultimately become synonymous with the organization. The campaigns conducted by the March of Dimes collected hundreds of millions of dollars, more than all of the U.S. charities (other than the Red Cross) at that time.

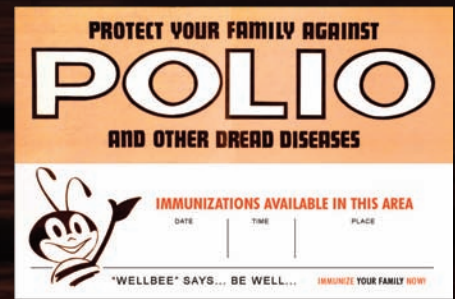
The polio epidemics changed not only the lives of those who survived them, but also led to profound cultural changes: the emergence of grassroots fundraising campaigns that would revolutionize medical philanthropy, the rise of rehabilitation therapy, and through campaigns for the social and civil rights of disabled polio survivors, helped to spur the modern disability rights movement. Today, polio survivors are one of the largest disabled groups in the world. The WHO estimates that there are 10 to 20 million polio survivors worldwide.

Two polio vaccines are used throughout the world, both inducing immunity to polio, efficiently blocking person-to-person transmission of the poliovirus. The first polio vaccine was developed in 1952 by Jonas Salk at the University of Pittsburgh, and announced to the world on April 12, 1955. Eight years after Salk's success, Albert Sabin, of the Cincinnati Children's Hospital, developed an oral polio vaccine (OPV). Human trials of Sabin's vaccine began in 1957 and it was licensed in 1962. Because OPV is inexpensive and easy to administer, it has become the vaccine of choice for controlling poliomyelitis in many countries.

Today, cases of polio are very rare in modernized countries due to the wide availability of a vaccine. Typically, people receive injections of dead polio viruses four times during their childhood, rendering them immune to the virus. Most cases of infection occur in third world countries that lack the resources to provide thorough vaccination. All travelers to those countries are advised to make sure that they are fully vaccinated and, if not, to get vaccinated before departing.



Egyptian stele of figure believed to have polio. Courtesy of Gylptoteket.



This 1963 poster featured CDC's national symbol of public health, the "Wellbee", and included the date, time and location of where one could receive a vaccination for polio, and other diseases. CDC.

Left: St. Peter and the Lame Man. Art and Medicine, by Leonard Marks, M.D.



Poster: President's Birthday Ball, promoting the fight against infantile paralysis, 1939. Courtesy of Library of Congress.



Before vaccination was available, cases of poliomyelitis were quite common and left people without use of a limb or with total paralysis. The people who became paralyzed were often forced to live inside of an "iron lung" that replicated the action of the abdominal muscle to allow respiration. Courtesy of CDC.

A SPOON FULL OF SUGAR

Lyricist Robert B. Sherman had searched for nearly two weeks for a catchy phrase that could be Mary Poppins' anthem. He came across the perfect title when his seven-year-old daughter, Laurie, came home from school one day and announced that she had just received a polio vaccine. Thinking that the vaccine had been administered as a shot, Sherman asked, "Did it hurt?" She replied, "No. They just gave it to me on a cube of sugar and I swallowed it down." Sherman tried the idea on his brother the following morning; they put the phrase to music and the song "A Spoonful of Sugar" was born.

Extract from Regulation 20, of the Sanitary Code of the State of Connecticut

The local health officer upon receiving a report of a case of any of the diseases designated in this regulation shall promptly institute and maintain control during the period of communicability by the method hereinafter designated:

(c) when the disease is
Diphtheria Scarlet fever
Polio-myelitis Smallpox

the apartment or premises where such disease exists shall be placarded and the affected person and attendants shall be isolated and quarantined therein.

QUARANTINE POLIOMYELITIS

All persons are forbidden to enter or leave these premises without the permission of the HEALTH OFFICER under PENALTY OF THE LAW.

This notice is posted in compliance with the SANITARY CODE OF CONNECTICUT and must not be removed without permission of the HEALTH OFFICER.

Health Officer.

Syphilis

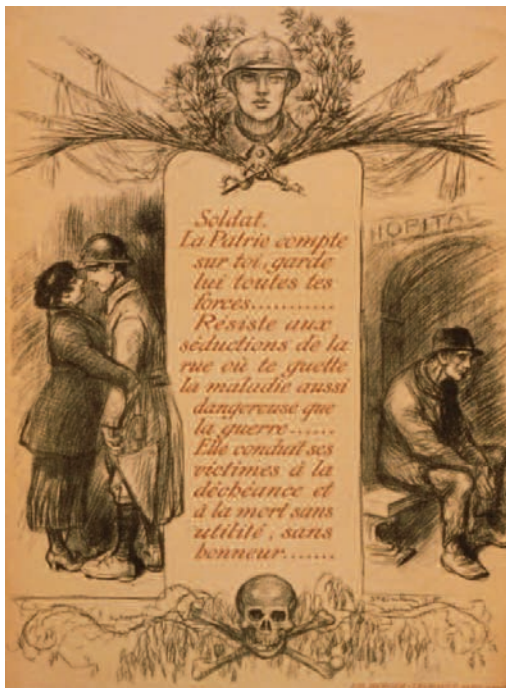
Syphilis is a curable sexually transmitted disease. The route of transmission of syphilis is almost always by sexual contact, though in utero it can pass from mother to child. The signs and symptoms of syphilis are numerous; before the advent of serological testing, precise diagnosis was very difficult. In fact, the disease was dubbed the “Great Imitator” because it was often confused with other diseases, particularly in its early stages. Syphilis (unless antibiotic-resistant) can be easily treated with antibiotics including penicillin. The oldest and still most effective method is an intramuscular injection of benzathine penicillin. If not treated, syphilis can cause serious effects such as damage to the heart, aorta, brain, eyes and bones. In some cases these effects can be fatal.

TUSKEGEE SYPHILIS STUDY

One of the best-documented cases of unethical human medical experimentation in the 20th century was the Tuskegee syphilis study. The study took place in Tuskegee, AL and was supported by the Tuskegee Institute and the U.S. Public Health Service (PHS). The study began in 1932 using a group of 600 African-American sharecroppers. Of these 600, 399 had the disease and 201 were uninfected control patients. At first the PHS stated that treatment was supposed to be a part of the study, but they were unable to produce any useful data. The PHS then decided to leave the men untreated and follow the course of the disease to their eventual deaths. The men thought they were receiving experimental treatment for “bad blood” in exchange for free meals and a \$50 death benefit. However, the study was designed to measure the progression of untreated syphilis and to determine whether syphilis caused cardiovascular damage more often than neurological damage. It was also designed to determine if the natural course of the disease was different in black men vs. white men. By 1947 penicillin had become the standard treatment of syphilis. The men were never advised that they had syphilis, nor were they offered any treatments intended to be used at the beginning of the study.

The original study was meant to last six to nine months, but continued for 40 years, ending in 1972, long after wives and children had been infected, and many of the men had died of syphilis. It was estimated that more than 100 men and women died as a result of this study. The study ended because of a story printed in the *Washington Star*. A class-action lawsuit was then filed against the federal government. This lawsuit was settled out of court and the living subjects and their descendants were awarded a total of ten million dollars. In 1974, the U.S. government passed the National Research Act, which required the government to review and approve all

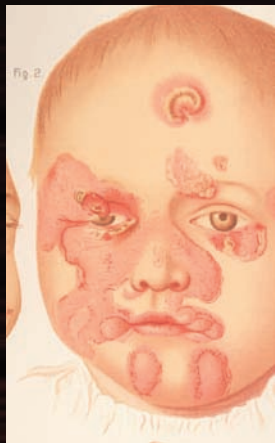
medical studies involving human subjects. On May 16, 1997, President Bill Clinton publicly apologized on behalf of the U.S. government stating: “The people who ran the study at Tuskegee diminished the stature of man by abandoning the most basic ethical precepts. They forgot their pledge to heal and repair. They had the power to heal the survivors and all the others and they did not.”



“Soldier, The Fatherland counts on you keep all your forces. Resist the seductions of the street as now awaits you the disease that is as dangerous as war. She drives its victims to disgrace and to death without utility, without honor.” Courtesy of Library of Congress.



Members of the Tuskegee Study, photograph from the records of the CDC. Courtesy of the CDC.



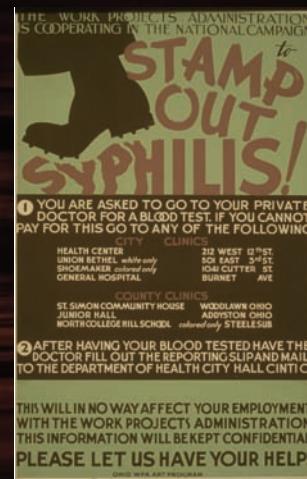
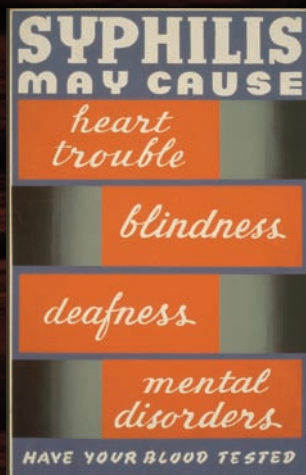
Inherited syphilis of a young infant. Today these lesions would be called congenital. They usually progressed to significant destruction of soft tissues and bones. Taylor, R.W., Atlas of Skin and Venereal Diseases, 1889.



Ulcerative Cutaneous Gummata. This shows extensive destruction and proliferation of the lesions involving cheeks, nose and lips. Taylor, R.W., Atlas of Skin and Venereal Diseases, 1889.



Syphilis Cutanea Vegetans. Brown-red warty numerous-clefted mulberry-like granulomata, secondary to syphilis. These are usually found in the face, the nasal labial fold, and close to the mouth.



Courtesy of Library of Congress.



Among other sexually transmitted diseases, syphilis was often spread in conjunction with major military conflict. Soldiers, usually traveling from several different countries and moving from continent to continent, spread the disease. When the French King Charles VIII invaded Italy and conquered Naples in 1495, his mercenaries, through sexual contact with the local population, became infected and then, returning home, quickly spread the infection all over Europe. During World War I, it is estimated that up to 10 percent of troops were infected with syphilis, and due to the overwhelming number of cases seen in WWII, rapid treatment centers were set up to treat infected troops. The poster above is an example of the efforts to send a clear message to U.S. troops.

Smallpox

In 1519, Hernán Cortés landed on the shores of what is now Mexico and conquered what was then the Aztec empire. In 1520, a competing group of Spanish conquistadors arrived from Cuba and landed in Mexico. Among them was an African slave who had smallpox. When Cortés was informed of their invasion, he dispatched his army and defeated them. During this contact, one of Cortés' men contracted the disease. Soon, the Aztecs rose up in rebellion against Cortés and his men. Outnumbered, the Spanish were forced to flee. In the fighting, the Spanish soldier carrying smallpox was killed and after the battle, the smallpox virus spread to the Aztec soldiers. Smallpox devastated the Aztec population. It killed most of the Aztec army, the emperor and 25 percent of the overall population.

A Spanish priest left this description of the swift annihilation of the Aztec empire:

"As they did not know the remedy of the disease – they died in heaps, like bedbugs. In many places it happened that everyone in a house died and, as it was impossible to bury the great number of dead, they pulled down the houses over them so that their homes became their tombs."

The effects of smallpox on the Incan Empire were even more devastating. Beginning in Colombia, smallpox spread rapidly before the Spanish invaders first arrived in the empire. The spread was probably aided by the efficient road system of the Incas. Within a few years, smallpox claimed between 60 and 90 percent of the Incan population, with other waves of European disease weakening them further.

Even after the two mighty empires of the Americas were defeated by the virus and disease, smallpox continued its march of death. In 1633 in Plymouth, MA, the Native Americans were struck by the virus. As it had done elsewhere, the virus wiped out entire population groups of Native Americans. It reached Lake Ontario in 1636, and the lands of the Iroquois by 1679, killing millions. The worst sequence of smallpox attacks took place in Boston, MA. From 1636 to 1698, Boston endured six epidemics. In 1721, the most severe epidemic occurred. The entire population fled the city, bringing the virus to the rest of the 13 colonies. In the late 1770s, during the American Revolutionary War, smallpox returned once more and killed an estimated 125,000 people. In his "Travels in North America," Peter Kalm described how in that period, the dying Native American villages were overrun with wolves feasting on the corpses and weakened survivors.

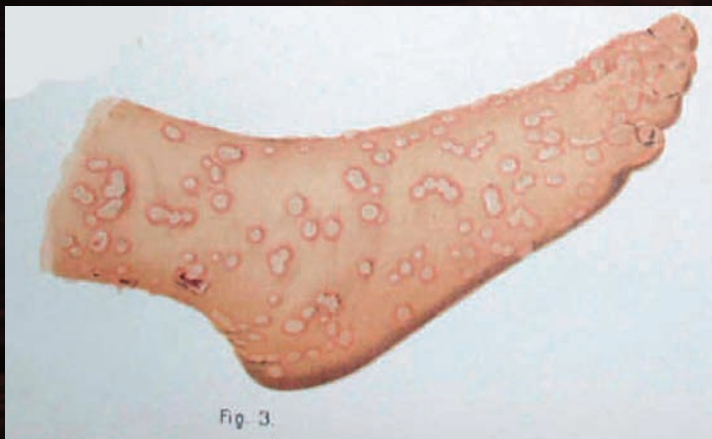
LORD AMHERST AND GERMAN WARFARE

Lord Jeffrey Amherst, Commander-in-Chief of the British troops in America from 1758-1763, saw his reputation tarnished when word spread that he ordered smallpox-infected blankets to be distributed to Native American tribes. In Carl Waldman's *Atlas of the North American Indian*, he states, in reference to a siege of Fort Pitt (Pittsburgh) by Chief Pontiac's forces during the summer of 1763: "Captain Simeon Ecuyer had bought time by sending smallpox-infected blankets and handkerchiefs to the Indians surrounding the fort, an early example of biological warfare, which started an epidemic among them." Amherst himself had encouraged this tactic in a letter to Ecuyer.

Historians have questioned whether or not the blankets were knowingly infected and distributed to the Native American population, but evidence, including letters from Amherst himself, has proven that indeed, the virus was used as a weapon. Historian Francis Parkman, in his book *The Conspiracy of Pontiac and the Indian War after the Conquest of Canada* refers to a postscript in a letter from Amherst to one of his commanders wondering whether smallpox could not be spread among the Indians: "Could it not be contrived to send the Small Pox among those disaffected tribes of Indians? We must on this occasion use every stratagem in our power to reduce them."

INOCULATION

The theory of inoculation dates back to as early as 1000 B.C., when people in India rubbed pus into skin lesions and the Chinese blew powdered smallpox scabs up their noses. The patients would develop a mild case of the disease and from then on were immune to it. The process spread to Turkey where Lady Mary Wortley Montague, wife of the British ambassador, learned of it from Emmanuel Timoni, a doctor affiliated with the British Embassy in Istanbul. She had the procedure performed on her son and daughter, aged five and four respectively. They both recovered quickly and the procedure was hailed as a success. In 1721, an epidemic of smallpox hit London and left the British Royal Family in fear. Hearing of Lady Wortley Montague's efforts, they wanted to use inoculation on themselves. Doctors told them that it was a dangerous procedure, so they decided to try it on other people first. The test subjects they used were condemned prisoners. The doctors inoculated the prisoners and all of them recovered in a couple of weeks. So assured, the British Royal Family inoculated themselves and reassured the English people that it was safe.



Discrete eruption of the right foot, showing the typical umbilication or demarcation. Taylor, R.W., Atlas of Skin and Venereal Diseases, 1889.

INOCULATION

Those who are desirous to take the infection of the SMALL - POX, by inoculation, may find themselves accommodated for the purpose, by applying to.

Stephen Samuel Hawley

Fiskdale, in Sturbridge.

February 7, 1801

N. B. A Pest-House will be opened, and accommodations provided by the first day of March next.

Courtesy of Library of Congress.



Portrait of Lady Mary Wortley Montague, who inoculated her children in 1718 against smallpox. Courtesy of Wellcome Images.



*Man with Smallpox.
Courtesy of Library of Congress.*

Smallpox

Inoculation still had its critics. Some claimed that smallpox was God's way of punishing people and that inoculation was a tool of Satan. Even though inoculation was a powerful method of controlling smallpox, it was far from perfect. Inoculation caused a mild case of smallpox which resulted in death in about two percent of the cases. It was also difficult to administer. Sick patients had to be quarantined to prevent them from transmitting the disease to others. Thus George Washington initially hesitated to have his Revolutionary War troops inoculated during a smallpox outbreak in February 1777, writing, "Should we inoculate generally, the enemy, knowing it, will certainly take advantage of our situation," but the virulence of the outbreak soon prompted him to order inoculation for all troops and recruits who had not had the disease.

VACCINATION

At the age of 13, English physician Edward Jenner was apprenticed to Dr. Daniel Ludlow in Sodbury. He observed that people who caught cowpox while working with cows were known not to catch smallpox. He assumed a causal connection. The idea was not taken up by Dr. Ludlow at that time. After Jenner returned from medical school in London, a smallpox epidemic struck his home town of Berkeley, England. He advised the local cow workers to be inoculated. The farmers told him that cowpox prevented smallpox. This confirmed his childhood suspicion, and he studied cowpox further. He inoculated James Phipps, the eight-year-old son of his gardener, not with smallpox but with cowpox virus from a milkmaid named Sarah Nelmes. After an extremely weak bout of cowpox, James recovered. Jenner then tried to infect James with smallpox but nothing happened—the boy was immune to smallpox.

BIOLOGICAL WEAPON

During World War II, scientists from the United Kingdom and the United States were involved in research on whether smallpox could be used as a biological weapon. Plans of large scale production were never carried through as they considered that the weapon would not be effective due to the wide-scale availability of a vaccine. The first smallpox weapons factory in the Soviet Union was established in 1947 in the city of Zagorsk, where small amounts of the virus were injected into chicken eggs. An especially virulent strain was brought from India in 1967 by a special Soviet medical team that was sent to India to help to eradicate the virus. The pathogen was manufactured and stockpiled in large quantities throughout the 1970s and 1980s. In 1978, there was a breach in smallpox containment at a research laboratory in Birmingham, England. A medical photographer, Janet Parker, died from the disease itself, after which the professor responsible for the unit, Professor Henry Bedson, committed suicide. In light of this accident, all known stocks of smallpox were destroyed, except the stocks at the United States Centers for Disease Control and Prevention (CDC) and the Russian State Research Center of Virology and Biotechnology in Koltsovo, guarded by the Russian military.

ERADICATION

Smallpox was responsible for an estimated 300-500 million deaths in the 20th century. As recently as 1967, the WHO estimated that 15 million people contracted the disease and that two million died in that year. After successful vaccination campaigns throughout the 19th and 20th centuries, the WHO certified the eradication of smallpox in 1979. To this day, smallpox is the only human infectious disease to have been completely eradicated from nature.



Niger's Smallpox Eradication Program, 1967-69. Courtesy of CDC.



*Benjamin Jesty. Oil painting by M.W. Sharp
A physician inspects the growth of cowpox on a milking maid's hand while a farmer (Jesty?) passes another physician a lancet. Coloured etching, c. 1800. Courtesy Wellcome Images.*



Some years before Jenner's breakthrough, Benjamin Jesty, a farmer at Yetminster in Dorset, England is recorded to have observed the two milkmaids living with his family to have been immune to smallpox and then inoculating his family with cowpox to protect them from smallpox.



*"I hope that some day the practice of producing smallpox in human beings will spread over the world – when that day comes, there will be no more smallpox."
–Edward Jenner (1749-1823)*



Smallpox Lancets. Sharp blades used to remove pox. William P. Didusch Center for Urologic History.

Spanish Flu

INFLUENZA OF 1918

First identified early March 1918 in U.S. troops training at Camp Riley, Kansas, the so-called Spanish Flu spread and by October 1918 had become a world-wide pandemic on all continents. Unusually deadly and virulent, it ended nearly as quickly as it began, vanishing completely within 18 months. While in most places less than one-third of the population was infected, only a small percentage of whom died, in a number of towns in several countries entire populations were wiped out. Even in areas where mortality was low, those incapacitated by the illness were often so numerous that much of everyday life came to a stop. Some communities closed all stores or required customers not to enter the store but place their orders outside the store for filling. There were many reports of places with no healthcare workers to tend the sick because of their own ill health and without able-bodied grave diggers to bury the dead; in many places, mass graves were dug by steam shovel and bodies buried without coffins.

People without symptoms could be struck suddenly and within hours be too feeble to walk; many died the day after becoming sick. Symptoms included cyanosis, severe pulmonary obstruction and coughing up blood. In some cases,

the virus caused an uncontrollable hemorrhaging that filled the lungs, and patients drowned in their bodily fluids. In still others, the flu caused an uncontrollable loss of bowel functions and the victim would die from losing critical intestine lining. In fast-progressing cases, mortality was primarily from pneumonia, by virus-induced consolidation. Slower-progressing cases featured secondary bacterial pneumonias, and in a minority of cases neural involvement leading to mental disorders occurred.

The close quarters and mass movement of troops in World War I quickened the flu's spread. Researchers speculate that the soldiers' immune systems were weakened by the stresses of combat and chemical attacks, increasing their susceptibility to the disease. A large factor in the spread of the disease was the increased amount of travel. The modernization of transportation made it easier for sailors to spread the disease more quickly and to a wider range of communities.

I had a little bird,
Its name was Enza,
I opened the window,
And in-flew-enza.

-American Skipping Rhyme circa 1918



Another bout of 'flu that killed so many in Britain after WW1 lasted from 1929 to 1937; people wore surgical masks or as this couple show 'stylish nose caps.' Courtesy of Mary Evans Picture Library.



Demonstration at the Red Cross Emergency Ambulance Station in Washington, D.C., during the influenza pandemic of 1918. Courtesy of Library of Congress.

JAN. 30, 1902 THE ILLUSTRATED LONDON NEWS 159

INVALUABLE TO SUFFERERS FROM BRONCHITIS, INFLUENZA, &c.

FOR PREVENTION OF INFLUENZA. Clarke's specially prepared Bacillus Destroyer, for use in the Combination Lamp, 1s. 6d. per Bottle.

FOR RELIEF OF BRONCHITIS, ASTHMA, &c. Clarke's Specific (Pine) Inhalation, for use in the Inhaler, 1s. 6d. per Bottle.

CLARKE'S "Fairy" COMBINATION LAMP. (INVALIDS) Being a "Bronchitis Kettle" "Inhaler" & Food Warmer Combined.

The strong objection to the ordinary Bronchitis Kettle is that a fire in the Bed-room is imperative, and the amount of steam emitted is greatly in excess of what is required. The "Fairy" Combination Invalid's Lamp will diffuse the proper and an equal amount of steam throughout the night, by using the Double-Wick "Fairy" Lights (burning for 10 hours without any attention). Boiling Water should be put in the Kettle and Inhaler.

When the "INHALER" is required, simply remove the lid of the Kettle and place in the Inhaler, the contents of which will be kept at the proper temperature. The same instructions refer to the Registered China Pannikin when the Lamp is needed as a Food Warmer.

Clarke's Double-Wick "FAIRY" Lights (10 hours) should be used for the two former, and Clarke's "PYRAMID" Lights (9 hours) are recommended for the latter.

There is no Paraffin or other dangerous material used in either "Pyramid" or "Fairy" Lights. These are the only Lights that can safely be used in Lamps.

Bronchitis Lamp, 6s. 6d.; Inhaler, 2s. 6d.; Pannikin, 1s. 6d.; Two Boxes "Fairy" Lights, 2s.; Case, 6d. Total Cost, 13s. If Carriage Paid, 1s. extra.

N.B.—If any difficulty in obtaining CLARKE'S "PYRAMID" AND "FAIRY" LIGHTS COMPANY.

Advertisement for Clarke's "Fairy" combination lamp, an aid to the treatment of influenza and bronchitis, 1892. Courtesy of Mary Evans Picture Library.



Replica of the Double Maw's Valved Earthenware Inhaler. Courtesy of William P. Didusch Center for Urologic History.

Tuberculosis

Tuberculosis (TB) has been present in humans since antiquity; mycobacterium tuberculosis can be found in the remains of bison dated 17,000 B.C. However, whether TB originated in cattle and then transferred to humans, or diverged from a common ancestor, is unclear. Skeletal remains show prehistoric humans (4000 B.C.) had TB, and tubercular decay has been found in the spines of mummies from 3000-2400 B.C. In 460 B.C., Hippocrates identified TB as the most widespread disease of the times involving coughing up blood and fever, which was almost always fatal. Genetic studies also suggest that TB has been present in South America for about 2,000 years.

FOLKLORE

Before the Industrial Revolution, tuberculosis was often regarded as vampirism. When one member of a family died from it, the other members that were infected would lose their health slowly. People believed that this was caused by the original victim draining the life from the other family members. Furthermore, people who had TB exhibited symptoms similar to what people considered to be vampire traits, such as red, swollen eyes (which also creates sensitivity to bright light), pale skin and coughing blood, suggesting the idea that the only way for the afflicted to replenish this loss of blood was to replace it by sucking blood from others. Another folk belief attributed the pallor to being forced, nightly, to attend fairy revels, so that the victim wasted away owing to lack of rest; this belief was most common when a strong connection was seen between the fairies and the dead. Similarly, but less commonly, the worn appearance was attributed to the victims being “hagridden” or transformed into horses by witches to travel to their nightly meetings, again resulting in a lack of rest.

Tuberculosis was romanticized in the 19th century, with many believing that the disease produced feelings of euphoria referred to as “Spes phthisica” or “hope of the consumptive.” It was believed that those inflicted with the disease who were artists had bursts of creativity as it progressed. It was also commonly assumed that victims acquired a final burst of energy just before they died, which made women more beautiful and men more creative.

Tuberculosis, or consumption as it was commonly known, caused the most widespread public concern in the 19th and early 20th centuries as an endemic disease of the urban poor. In 1815, one in four deaths in England was from consumption; by 1918 one in six deaths in France was still caused by TB. After it was established in the 1880s that the disease was contagious, there were campaigns to stop spitting in public places, and the infected poor were “encouraged” to enter sanatoria that resembled prisons; the sanatoria for the middle and upper classes offered excellent care and constant medical attention. Whatever the purported benefits of the fresh air and labor in the sanatoria, even under the best conditions, 50 percent of those who entered were dead within five years.

THE DANDY DENTIST

John Henry “Doc” Holliday, well known for his association with Wyatt Earp and his exploits in Dodge City, KS and Tombstone, AZ, suffered from tuberculosis for much of his adult life. After failing to succeed with his dentistry practice, Doc traveled west, hoping to seek solace in the dry climate. His carefree lifestyle, characterized by gambling, drinking and violent gun fights, was fueled by his belief that he was destined to an early grave. He died from TB in Glenwood Springs, CO, at the age of 36.

“And now was acknowledged the presence of the Red Death. He had come like a thief in the night. And one by one dropped the revelers in the blood-bedewed halls of their revel, and died each in the despairing posture of his fall. And the life of the ebony clock went out with that of the last of the gay. And the flames of the tripods expired. And Darkness and Decay and the Red Death held illimitable dominion over all.”

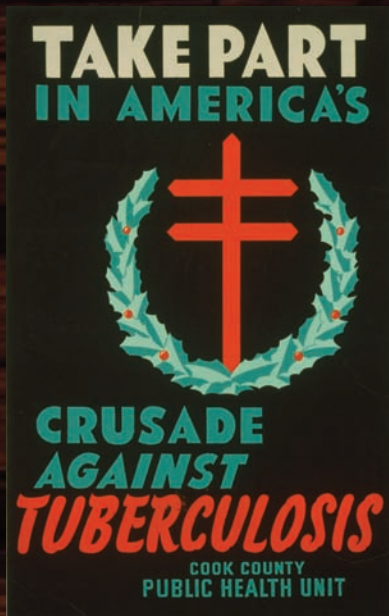
- Edgar Allan Poe, The Masque of the Red Death, 1850, possibly inspired by his wife, Virginia, who was suffering from TB.



Immigrants from Sweden, Johan and Amanda Nyquist. Amanda died from TB in 1898, Johan in 1901. Courtesy of Dorothy Hett.



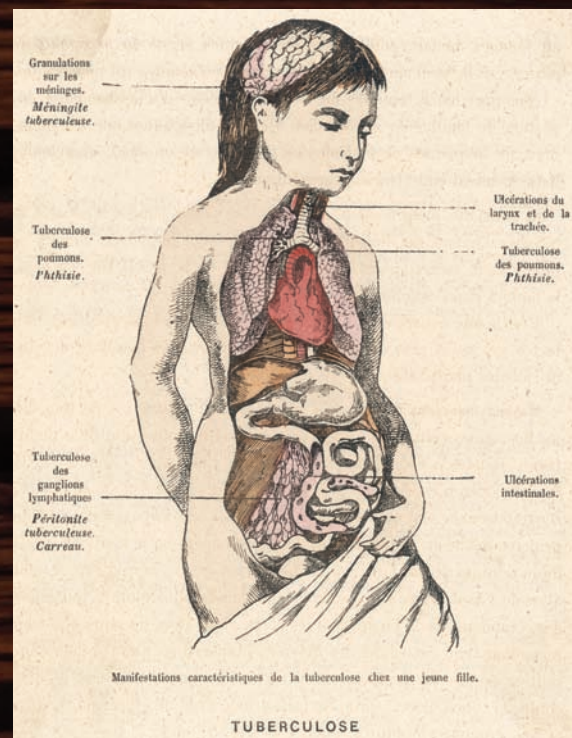
In the United States, concern about the spread of tuberculosis played a role in the movement to prohibit public spitting except into spittoons. Courtesy of William P. Didusch Center for Urologic History.



In 1904, Einar Holboll, a Danish postal clerk, developed the idea of a seal on envelopes during Christmas to raise funds for the treatment of tuberculosis. The plan was approved by the Postmaster and the King of Denmark, and the first seal bore the likeness of the Queen and the word Julen (Christmas). Over four million were sold in the first year. This pre-WW-II, pre-penicillin, poster for Christmas Seals captures the hopelessness that was once felt in the face of tuberculosis.



Enamel notice made for the London Brighton & South Coast Railway (LBSCR). Consumption, a wasting disease now known as tuberculosis, was highly infectious. It was not until the development of streptomycin in 1947 that effective and reliable treatment of the disease was possible. Courtesy of Science & Society.



Tuberculosis Sufferer, diagram to show how tuberculosis manifests itself in the body of a young girl. Courtesy of Mary Evans Picture Library.

Typhoid Fever

Caused by *Salmonella typhi*, typhoid fever is transmitted through contaminated food or water; contamination usually occurs through contact with the stool of an infected carrier. The patients suffer from a sustained high fever, as high as 104 degrees, weakness, diarrhea and anorexia. Left untreated, the fatality rate is 30 percent. Today we treat the disease with antibiotics.

Evidence of typhoid fever dates back to antiquity. The devastating plague that changed the outcome of the war between Sparta and Athens from 430 to 426 B.C. was typhoid fever – a fact recently confirmed by DNA analysis on dental pulp from three of the corpses buried in a mass grave in Athens. The cause may have been that the Athenian leader Pericles sheltered his people behind fortifications and crowded them (under unsanitary conditions) behind walls.

Historian Thucydides, who survived typhoid fever, describes it as beginning with “a sudden attack of violent heat in the head, along with inflammation of the eyes, throat, and tongue, and the emission [of] fetid breath.” Patients may also present with a rash of flat rose-colored spots. As the disease continues and the fever stays high, the patients may become delirious which gave the disease the nickname “Nervous Fever.” Interestingly, typhoid patients have a slow pulse, rather than the rapid pulse usually seen with fevers.

Typhoid can attack most organs, and death can come from a wide range of complications. Intestinal hemorrhage may occur due to bleeding of the ileum, and if intestinal perforation occurs, the patient usually dies. The perforation can occur without any alarming symptoms until the infection has spread through the entire bloodstream and diffuse peritonitis sets in, leading to a high fatality rate. The heart is involved—with toxic myocarditis leading to cardiovascular collapse. The diagnosis of typhoid fever can be made by blood, bone marrow or stool cultures and today prompt treatment with antibiotics, such as ampicillin, trimethoprim-sulfamethoxazole and ciprofloxacin have reduced the mortality rate to about one percent. Due to an increasing problem with drug resistance, the first line treatment in many areas today is ceftriaxone. According to the CDC, approximately five percent of people recovering from typhoid fever become asymptomatic carriers. Vaccines against typhoid fever are also available and advised for persons traveling to areas where the disease is endemic (Asia, Africa, Latin America).

While Athens is the city with the earliest typhoid epidemic recorded, newer epidemics hit Chicago from 1890-1892. The

city had a number of smaller outbreaks in prior years – the worst in 1891 when nearly 2,000 Chicago residents died from the disease. A growing population and virtually non-existent sanitation system contributed to the spread: all sewage from Chicago residents was discharged directly or indirectly via the Chicago River into Lake Michigan. By 1917, all the water being pumped into Chicago was chlorinated and the rates of typhoid fever dramatically decreased.



The angel of death (a winged skeletal creature) drops some deadly substances into a river near a town; symbolising typhoid. Watercolour, 1912, after R. Cooper. Courtesy of Wellcome Images.



Typhoid Fever. Lenticular spots of the disease, mostly of the abdomen.
Taylor, R.W., *Atlas of Skin and Venereal Diseases*, 1889.



Mary Mallon. Courtesy of Typhoid Mary: Captive to the Public's Health by Judith Leavitt.

TYPHOID MARY

Chicago was not the only major city where typhoid was prevalent in the late 1800s and early 1900s; the disease also struck with force in New York, Baltimore and Memphis. A series of cases in New York, however, would shed new insight on the disease's transmission. A report by Major Sopper published in *The Military Surgeon* in July 1919 talks in detail about the discovery of one of the earliest identified asymptomatic carriers of the disease. Mary Mallon, who would ultimately be known as "Typhoid Mary" in tabloid circles, was a personal cook to affluent families in the New York area at the turn of the 20th century. She is said to have infected nearly 50 people with typhoid over the course of her cooking career.

The discovery of Mallon's role in the spread of typhoid began when Sanitary Commission Major George Sopper was summoned by Mr. George Thompson to investigate an outbreak of the disease at his country home in Oyster Bay after six persons in the 11-person household had become ill with the disease in a short time. Water and local seafood had already been eliminated as sources of transmission, and experts instead began to examine the family's employment records. Discovering a change in cooks three weeks prior to the outbreak, Sopper changed his approach. The new cook, described as an Irish woman of about 40 years of age, intelligent, tall, heavy and non-communicative, was Mary Mallon. Further research into her employment records showed typhoid outbreaks in other households where she had prepared food. Understanding the disease's transmission through contact with contaminated feces or water, Sopper approached Mallon about her role in spreading the disease, but she refused his request for urine and stool samples. Because the concept of healthy carriers was still not well known or understood, Sopper's requests must have seemed outrageous and unfounded. Mallon was extremely uncooperative as Sopper continued to approach her with his request. She was ultimately taken to the health department's detention hospital, where blood and stool tests were positive for typhoid material. Mallon was forced into a three-year quarantine at a hospital on North Brother Island in New York. Two legal actions were brought to secure her release, claiming that she was being deprived of her liberty without ever having committed a crime. She was voluntarily released in 1910 on the condition that she refrain from taking employment as a cook and not engage in any occupation that would bring her in contact with food. However, the health department never made any attempt to train her in any other suitable work that would provide a similar wage or quality of life, and she returned to the kitchen. Working at a sanitarium in Newfoundland, NJ in 1914, she was accused of causing additional typhoid fever cases. A year later in 1915, an outbreak of the disease occurred at the Sloan Hospital for Women in New York City, where Mallon worked at that time. The epidemic attracted authorities, and Mallon was discovered and ultimately remanded to custody and returned to North Brother Island, where she remained incarcerated in quarantine until her death in 1938.

HIV & AIDS

The advances made by medicine to treat and contain deadly epidemics of the past did not prepare the world for a disease that emerged in the late 1970s and early 1980s: the Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS). The epidemic caused by HIV has become one of the deadliest epidemics in human history. According to the WHO, about 250,000 people across the globe die every month from this disease, which suppresses the immune system resulting in a spectrum of illnesses. Over 400,000 people live with AIDS in the United States alone. Worldwide, 25 million people have died of AIDS with 500,000 in the United States alone. It is estimated that 25 percent of patients with HIV are unaware of their condition. Recent data suggest that there are currently nearly 40 million people with HIV infection worldwide with 4.3 million new cases of HIV and 2.9 million AIDS deaths in 2006.

Current data suggest that HIV originated in Africa, probably from monkeys' blood and meat. Chimpanzees harbor several strains of a simian immunodeficiency virus (SIV) which is very similar in genetic makeup to human HIV. The monkey's geographic range within West Africa overlaps the same regions where the AIDS epidemic has been present for the greatest amount of time. Scientists believe that a strain of SIV crossed to humans sometime after World War II in the late 1940's or early 1950's. The HIV I virus has been isolated from a blood sample in a male from the Democratic Republic of Congo, drawn in 1959. It is postulated that transmission from chimpanzees to humans was due to the hunting and butchering of the animals, thereby exposing the hunters to the blood-borne virus, though this remains hypothetical.

At present, much research is directed at the development of a vaccine against this disease; a \$15 million grant has been given by the Gates Foundation to the Virology Institute of the University of Maryland under Dr. Robert Gallo. Developing such a vaccine is a major challenge as the HIV mutates constantly. While inroads have been made, the epidemic continues to spread.

FROM FEAR TO ACTION

When AIDS was first publicized, most people lived in fear of the unknown. It was a new threat that brought along many of the same types of misconceptions as early diseases. AIDS was largely viewed as something that was only a problem in homosexual communities. Over the course of the 1980s-1990s that perception shifted. In 1984, 13-year-old Ryan White, from Indiana, became infected with HIV from a tainted blood treatment and was given six months to live. After being expelled from school because of his infection, he became a national spokesman for AIDS. White fought for readmission but, despite doctor's assessments that he posed no risk to his classmates, parents and teachers in his hometown rallied against him. A lengthy legal battle ensued, and media coverage of the struggle made White a national celebrity and spokesman for AIDS research. Elizabeth Glaser contracted HIV after receiving an HIV-contaminated blood transfusion in 1981 while giving birth. She eventually passed the virus to her infant daughter through breastfeeding and to her second child in utero. The manner in which White and Glaser contracted the virus led to an increased awareness of the disease and a heightened realization that anyone could contract it. These highly publicized cases also helped efforts to educate the public and provide funding for research and treatment of AIDS. In 1988, the Elizabeth Glaser Pediatric AIDS Foundation was founded to increase the level of care provided to youths affected by AIDS and in 1990 the Federal Ryan White Program was enacted to improve the quality of care for low-income individuals and families affected by the disease.

“Because of lack of education on AIDS, discrimination, fear, panic, and lies surrounded me.”

- Ryan White, who contracted HIV through blood-based products used to treat his hemophilia

A detailed illustration of a hand holding a small, dark, textured object, possibly a piece of wood or a small animal, against a background of stylized, textured lines. The hand is rendered in a realistic style with visible skin texture and shading. The object being held is dark and has a rough, textured surface. The background consists of broad, sweeping, textured strokes in shades of brown and tan, suggesting a natural or outdoor setting. The overall style is that of a fine art illustration, possibly a woodcut or a detailed drawing.

1. *Wahre und scheinbare Begriffe sind die zwei Seiten
 einer Münze. Die scheinbare Seite ist diejenige, die man
 häufiger sieht, weil sie vorwiegend ist. Eine scheinbare
 Seite ist nicht richtig, weil sie nicht die Wahrheit ist.*
 2. *Die zwei Seiten der Münze sind die zwei Seiten der
 Wahrheit. Die eine Seite ist die Seite der Wahrheit, die
 andere Seite ist die Seite der Scheinbarkeit. Die eine Seite
 ist die Seite der Wahrheit, die andere Seite ist die Seite
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 7. *Die zwei Seiten der Münze sind die zwei Seiten der
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A circular inset, resembling a porthole or a lens, is set into a dark, textured wooden surface. Through the circular opening, a microscopic view of a biological specimen is visible. The specimen features prominent, thick, red-stained structures that appear to be branching or interconnected, possibly representing connective tissue or a network of cells. Scattered throughout the red structures and the surrounding blue-stained background are numerous small, bright green, oval-shaped particles, which could be microorganisms, cells, or specific cellular components. The blue background has a fibrous or granular texture. The circular frame of the inset is made of a dark, polished wood with visible grain and some wear.

A close-up photograph showing a hand holding a syringe with a needle. The syringe is positioned over a white surface that is heavily stained with bright red blood. In the background, a glass containing an orange liquid is visible, along with some other indistinct objects, suggesting a medical or forensic setting.

1987 Poster. Courtesy of the National Library of Medicine.

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Conquering Fears

Vaccinations, advanced diagnostics and modern cures have helped ease the spread of deadly contagions. As public awareness efforts help maintain a healthy understanding of disease, modern medicine continues to work diligently to thwart old and new threats. Many parts of the world are still without the basic preventive and treatment measures necessary to fight against infections and viruses that have become increasingly drug resistant. Despite efforts to thwart the spread of deadly diseases, new dangers arise and bring the same questions that were asked in ancient times: What is it? Where did it come from? How do we cure it?

The next devastating germ may be skulking in the cargo hold of a ship, prowling in the tropics, concealed within an exotic insect or perhaps even carried by an infected human boarding an airliner. Our high tech, globe-trotting travel habits may provide a new path for deadly diseases, one that allows them to travel swiftly and stealthily. With each new disease comes the fear of a new outbreak and forces modern medicine to continue its battle against the voyage of contagions.



Smallpox antitoxin syringe, c. 1898.

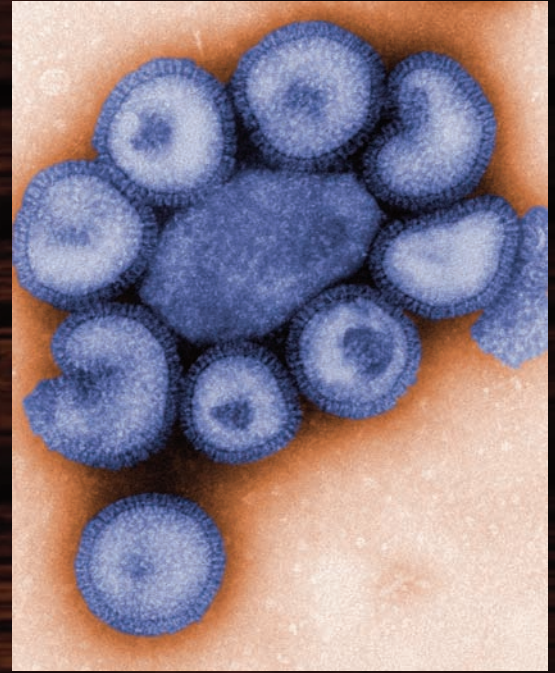
H.K. Mulford Co., PA.

Courtesy of Joel Cherry, M.D.

We have lost
and we have gained;
we have learned and
yet we have more to learn.



People scrambling to get away from a leper; in their haste the crowd has left an infant on the roadside. The leper strolls by, ringing a bell to warn others of his infection. Watercolour by R. Cooper. Courtesy of Wellcome Images.

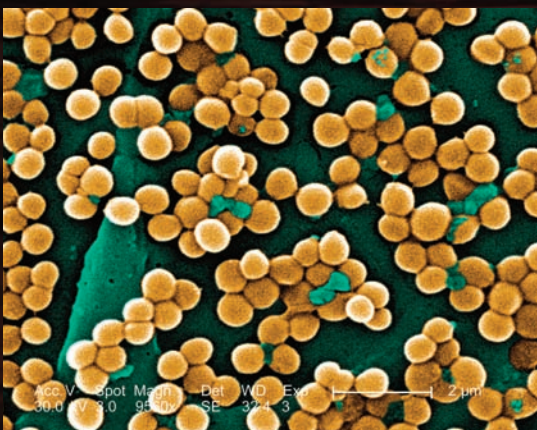


This transmission electron micrograph (TEM) depicts the ultrastructural details of a number of influenza virus particles, or virions. The flu is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness, and at times can lead to death.

Every year in the United States, on average:

- 5% to 20% of the population gets the flu
- more than 200,000 people are hospitalized from flu complications, and
- about 36,000 people die from flu.

Courtesy of CDC.



*This 2005 scanning electron micrograph (SEM) depicted numerous clumps of methicillin-resistant *Staphylococcus aureus* bacteria, commonly referred to by the acronym, MRSA. Courtesy of CDC.*



Courtesy of CDC.



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