

Black Death

The **Black Death** was one of the most devastating pandemics in human history, peaking in Europe between 1348 and 1350. It is widely thought to have been an outbreak of plague caused by the bacterium *Yersinia pestis*, an argument supported by recent forensic research, although this view has been challenged by a number of scholars. Thought to have started in China, it travelled along the Silk Road and had reached the Crimea by 1346. From there, probably carried by Oriental rat fleas residing on the black rats that were regular passengers on merchant ships, it spread throughout the Mediterranean and Europe.

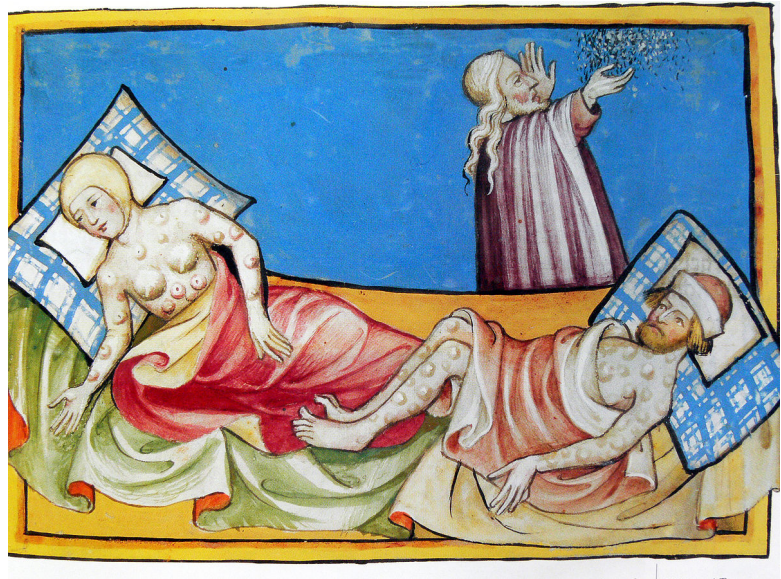


Illustration of the Black Death from the Toggenburg Bible (1411)

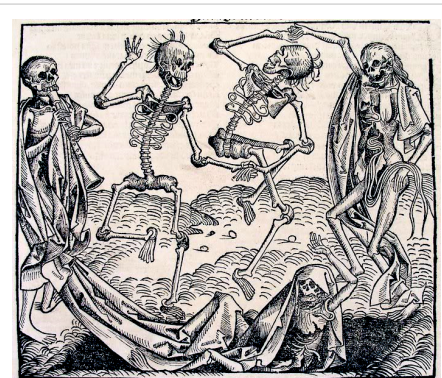
The Black Death is estimated to have killed 30% – 60% of Europe's population,^[1] reducing the world's population from an estimated 450 million to between 350 and 375 million in 1400. This has been seen as having created a series of religious, social and economic upheavals, which had profound effects on the course of European history. It took 150 years for Europe's population to recover. The plague returned at various times, killing more people, until it left Europe in the 19th century.

Overview

There have been three major outbreaks of plague. The Plague of Justinian in the 6th and 7th centuries is the first known attack on record, and marks the first firmly recorded pattern of bubonic plague. From historical descriptions, as much as 40% of the population of Constantinople died from the plague. Modern estimates suggest half of Europe's population was wiped out before the plague disappeared in the 700s.^[2] After 750, major epidemic diseases did not appear again in Europe until the Black Death of the 14th century.^[3] The Third Pandemic hit China in the 1890s and devastated India but was confined to limited outbreaks in the west.^[4]

The Black Death originated in or near China and spread by way of the Silk Road or by ship.^[4] It may have reduced the world's population from an estimated 450 million to between 350 and 375 million in 1400.^[5]

The plague is thought to have returned at intervals with varying virulence and mortality until the 18th century.^[6] On its return in 1603, for example, the plague killed 38,000 Londoners.^[7] Other notable 17th-century outbreaks were the Italian Plague of 1629–1631, and the Great Plague of Seville (1647–1652), the Great Plague of London (1665–1666),^[8] and the Great Plague of Vienna (1679). There is some controversy over the identity of the disease,



Inspired by Black Death, *The Dance of Death* is an allegory on the universality of death and a common painting motif in late medieval period.

but in its virulent form, after the Great Plague of Marseille in 1720–1722,^[9] the Great Plague of 1738 (which hit Eastern Europe), and the Russian plague of 1770-1772, it seems to have gradually disappeared from Europe. By the early 19th century, the threat of plague had diminished, but it was quickly replaced by a new disease. The Asiatic cholera was the first of several cholera pandemics to sweep through Asia and Europe during the 19th and 20th centuries.^[10]

The 14th century eruption of the Black Death had a drastic effect on Europe's population, irrevocably changing the social structure. It was, arguably, a serious blow to the Catholic Church, and resulted in widespread persecution of minorities such as Jews, foreigners, beggars, and lepers. The uncertainty of daily survival has been seen as creating a general mood of morbidity, influencing people to "live for the moment", as illustrated by Giovanni Boccaccio in *The Decameron* (1353).^[11]

Naming

Medieval people called the catastrophe of the 14th century either the "Great Pestilence" or the "Great Plague".^[12] Writers contemporary to the plague referred to the event as the "Great Mortality". Swedish and Danish chronicles of the 16th century described the events as "black" for the first time, not to describe the late-stage sign of the disease, in which the sufferer's skin would blacken due to subepidermal hemorrhages (purpura), and the extremities would darken with gangrene (acral necrosis), as the term is more likely to refer to black in the sense of glum, lugubrious, or dreadful as to denote the terribleness and gloom of the events.^[13] The German physician and medical writer Justus Hecker suggested that a mistranslation of the Latin *atra mors* (terrible, or black, death) had occurred in Scandinavia when he described the catastrophe in 1832^[12] in his publication "*Der schwarze Tod im vierzehnten Jahrhundert*". The work was translated into English the following year, and under the influence of the cholera epidemic of that time, "*The Black Death in the 14th century*" gained widespread attention which coined the term *Schwarzer Tod* and *Black Death* in the German and English speaking worlds, respectively.

Migration

Populations in crisis

In Europe, the Medieval Warm Period ended sometime towards the end of the 13th century, bringing the "Little Ice Age"^[14] and harsher winters with reduced harvests. In Northern Europe, new technological innovations such as the heavy plough and the three-field system were not as effective in clearing new fields for harvest as they were in the Mediterranean because the north had poor, clay-like soil.^[12] Food shortages and rapidly inflating prices were a fact of life for as much as a century before the plague. Wheat, oats, hay and consequently livestock, were all in short supply. Their scarcity resulted in malnutrition, which increases susceptibility to infections due to weakened immunity. In the autumn of 1314, heavy rains began to fall, which were the start of several years of cold and wet winters.^[12] The already weak harvests of the north suffered and the seven-year famine ensued. In the years 1315 to 1317 a catastrophic famine, known as the Great Famine, struck much of North West Europe. It was arguably the worst in European history, perhaps reducing the population by more than 10%.^[12]

Infection and migration

The plague disease, generally thought to be caused by *Yersinia pestis*, is enzootic (commonly present) in populations of fleas carried by ground rodents, including marmots, in various areas including Central Asia, Kurdistan, Western Asia, Northern India and Uganda.^[15] Nestorian graves dating to 1338-9 near Lake Issyk Kul in Kyrgyzstan have inscriptions referring to plague and recent investigations by the Russian archeologist Chwolson show a high incidence rate and are thought by many epidemiologists to mark the outbreak of the epidemic, from which they could easily have spread to China and India.^[16] In October 2010, medical geneticists confirmed that the plague came from China.^[4] In China, the 13th century Mongol conquest disrupted



farming and trading, and led to widespread famine starting in 1331 with plague arriving soon after. The population dropped from approximately 120 to 60 million.^[17] The 14th-century plague killed an estimated 25 million Chinese and other Asians during the 15 years before it entered Constantinople in 1347.^[18]

The disease may have traveled along the Silk Road with Mongol armies and traders or it could have come via ship.^[19] By the end of 1346 reports of plague had reached the seaports of Europe: "India was depopulated, Tartary, Mesopotamia, Syria, Armenia were covered with dead bodies".^[20]

Plague was reportedly first introduced to Europe at the trading city of Caffa in the Crimea in 1347. After a protracted siege, during which the Mongol army under Jani Beg was suffering the disease, they catapulted the infected corpses over the city walls to infect the inhabitants. The Genoese traders fled, taking the plague by ship into Sicily and the south of Europe, whence it spread north.^[21] Whether or not this hypothesis is accurate, it is clear that several existing conditions such as war, famine, and weather contributed to the severity of the Black Death.

European outbreak

There appear to have been several introductions into Europe. It reached Sicily in October 1347 carried by twelve Genoese galleys.^[22] where it rapidly spread all over the island. Galleys from Caffa reached Genoa and Venice in January 1348 but it was the outbreak in Pisa a few weeks later that was the entry point to northern Italy. Towards the end of January one of the galleys expelled from Italy arrived in Marseilles.^[23]

From Italy the disease spread northwest across Europe, striking France, Spain, Portugal and England by June 1348, then turned and spread east through Germany and Scandinavia from 1348 to 1350. It was introduced in Norway in 1349 when a ship landed at Askøy, then proceeded to spread to Bjørgvin (modern Bergen) but never reached Iceland.^[24] Finally it spread to north-western Russia in 1351. The plague spared some parts of Europe, including the Kingdom of Poland and isolated parts of Belgium and the Netherlands.

Middle Eastern outbreak

The plague struck various countries in the Middle East during the pandemic, leading to serious depopulation and permanent change in both economic and social structures. As it spread to western Europe, the disease also entered the region from southern Russia. By autumn 1347, the plague reached Alexandria in Egypt, probably through the port's trade with Constantinople, and ports on the Black Sea. During 1347, the disease traveled eastward to Gaza, and north along the eastern coast to cities in Lebanon, Syria and Palestine, including Ashkelon, Acre, Jerusalem, Sidon, Damascus, Homs, and Aleppo. In 1348–49, the disease reached Antioch. The city's residents fled to the north, most of them dying during the journey, but the infection had been spread to the people of Asia Minor.

Mecca became infected in 1349. During the same year, records show the city of Mawsil (Mosul) suffered a massive epidemic, and the city of Baghdad experienced a second round of the disease. In 1351, Yemen experienced an outbreak of the plague. This coincided with the return of King Mujahid of Yemen from imprisonment in Cairo. His party may have brought the disease with them from Egypt.

Symptoms

Contemporary accounts of the plague are often varied or imprecise. The most commonly noted symptom was the appearance of buboes (or *gavocciolos*) in the groin, the neck and armpits, which oozed pus and bled when opened.^[25] Boccaccio's description is graphic:

"In men and women alike it first betrayed itself by the emergence of certain tumours in the groin or armpits, some of which grew as large as a common apple, others as an egg...From the two said parts of the body this deadly *gavocciolo* soon began to propagate and spread itself in all directions indifferently; after which the form of the malady began to change, black spots or livid making their appearance in many cases on the arm or the thigh or elsewhere, now few and large, now minute and numerous. As the *gavocciolo* had been and still was an infallible token of approaching death, such also were these spots on whomsoever they showed themselves."^[26]

Ziegler comments that the only medical detail that is questionable is the infallibility of approaching death, as if the *bubo* discharges, recovery is possible.^[27]

This was followed by acute fever and vomiting of blood. Most victims died within two to seven days after infection. David Herlihy identifies another potential sign of the plague: freckle-like spots and rashes^[28] which could be the result of flea-bites.

Some accounts, like that of Louis Heyligen, a musician in Avignon who died of the plague in 1348, noted a distinct form of the disease which infected the lungs and led to respiratory problems^[25] and which is identified with pneumonic plague.

"It is said that the plague takes three forms. In the first people suffer an infection of the lungs, which leads to breathing difficulties. Whoever has this corruption or contamination to any extent cannot escape but will die within two days. Another form...in which boils erupt under the armpits,...a third form in which people of both sexes are attacked in the groin."^[29]



Buboes in a victim of plague



A scene showing monks, disfigured by the plague, being blessed by a priest. England, 1360–75

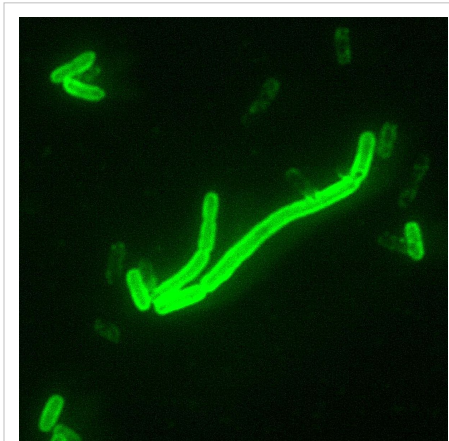
Causes

Medical knowledge had stagnated during the Middle Ages and the most authoritative account at the time came from the Medical Faculty in Paris in a report to the King of France, which blamed the heavens—a conjunction of three planets in 1345, which caused a "great pestilence in the air".^[30] This report became the first and most widely circulated of a series of "plague tracts" which sought to give advice to sufferers. That the plague was caused by bad *air* became the most widely accepted theory. It's important to realise that the word *plague* had no special significance at this time. But the recurrence of outbreaks during the middle ages gave it a unique reputation and the name has become the medical term.

The importance of hygiene was only recognised in the nineteenth century and until then it was common that the streets were filthy, with live animals of all sorts around and human fleas and ticks abounding. Any transmissible disease will spread easily in such conditions. One benefit of the black death was the establishment of the idea of quarantine in Dubrovnik in 1377 after continuing outbreaks.

Plague

The dominant explanation for the Black Death is the plague theory, which attributes the outbreak to the pathogen responsible for an epidemic that began in southern China in 1865, eventually spreading to India. The investigation of the pathogen that caused the 19th-century plague was begun by teams of scientists who visited Hong Kong in 1894, among whom was Alexandre Yersin, after whom the pathogen was named *Yersinia pestis*.^[32] The mechanism by which *Y. pestis* was usually transmitted was established in 1898 by Paul-Louis Simond and was found to involve the bites of fleas whose midguts had become obstructed by replicating *Y. pestis* several days after feeding on an infected host. This blockage results in starvation and aggressive feeding behaviour by the fleas, which repeatedly attempt to clear their blockage by regurgitation, resulting in thousands of plague bacteria being flushed into the feeding site, infecting the host. The bubonic plague mechanism was also dependent on two populations of rodents—one resistant to the disease, who act as hosts, keeping the disease endemic, and a second who lack resistance. When the second population die, the fleas move on to other hosts, including people, thus creating a human epidemic.^[32]



Yersinia pestis seen at 200x magnification. This bacterium, carried and spread by fleas, is generally thought to have been the cause of millions of deaths.^[31]

The historian Francis Aidan Gasquet, who had written about the 'Great Pestilence' in 1893^[33] and suggested that "it would appear to be some form of the ordinary Eastern or bubonic plague" was able to adopt the epidemiology of the bubonic plague for the Black Death for the second edition in 1908, implicating rats and fleas in the process, and his interpretation was widely accepted for other ancient and medieval epidemics, such as the Justinian plague that was prevalent in the Roman Empire from 541 to 700 AD.^[32]

The modern bubonic plague has a mortality rate of thirty to seventy-five percent and symptoms including fever of 38–41 °C (101–105 °F), headaches, painful aching joints, nausea and vomiting, and a general feeling of malaise. If untreated, of those that contract the bubonic plague, 80% die within eight days.^[34] Pneumonic plague has mortality rate of ninety to ninety-five percent. Symptoms include fever, cough, and blood-tinged sputum. As the disease progresses, sputum becomes free flowing and bright red. Septicemic plague is the least common of the three forms, with a mortality rate close to one hundred percent. Symptoms are high fevers and purple skin patches (purpura due to disseminated intravascular coagulation). In cases of pneumonic and particularly septicemic plague the progress of the disease is so rapid that there would often be no time for the development of the enlarged lymph nodes that were

noted as buboes.^[35]

"Many modern scholars accept that the lethality of the Black Death stemmed from the combination of bubonic and pneumonic plague with other diseases and warn that every historical mention of 'pest' was not necessarily bubonic plague...In her study of 15thC outbreaks, Ann Carmichael states that worms, the pox, fevers and dysentery clearly accompanied bubonic plague."^[36]

Alternative explanations

This interpretation was first significantly challenged by the work of British bacteriologist J. F. D. Shrewsbury in 1970, who noted that the reported rates of mortality in rural areas during the 14th century pandemic were inconsistent with the modern bubonic plague, leading him to conclude that contemporary accounts were exaggerations.^[32] In 1984 zoologist Graham Twigg produced the first major work to directly challenge the bubonic plague theory, and his doubts about the identity of the Black Death have been taken up by a number of authors, including Samuel K. Cohn, Jr. (2002), David Herlihy (1997), and Susan Scott and Christopher Duncan (2001).^[32]

It is recognised that an epidemiological account of the plague is as important as an identification of symptoms. But researchers are hampered by the lack of reliable statistics from this period. Most work has been done on the spread of the plague in England, and even estimates of overall population at the start vary by over 100% as no census was undertaken between the Domesday Book and 1377.^[37] Estimates of plague victims are usually extrapolated from figures for the clergy.

In addition to arguing that the rat population was insufficient to account for a bubonic plague pandemic, sceptics of the bubonic plague theory point out that the symptoms of the Black Death are not unique (and arguably in some accounts may differ from bubonic plague); that transference via fleas in goods was likely to be of marginal significance and that the DNA testing may be flawed and have not been repeated elsewhere, despite extensive samples from other mass graves.^[32] Other arguments include: the lack of accounts of the death of rats before outbreaks of plague between the 14th and 17th centuries; temperatures that are too cold in Northern Europe for the survival of fleas; that, despite primitive transport systems, the spread of the Black Death was much faster than modern Bubonic plague; that mortality rates of the Black Death appear to be very high; that, while modern bubonic plague is largely endemic as a rural disease, the Black Death indiscriminately struck urban and rural areas; that the pattern of the Black Death, with major outbreaks in the same areas separated by between 5 and 15 years, differs from modern Bubonic plague, which often becomes endemic for decades, flaring up on an annual basis.^[32]

Walløe complains that all of these authors "take it for granted that Simond's infection model, black rat → rat flea → human, which was developed to explain the spread of plague in India, is the only way an epidemic of *Yersinia pestis* infection could spread", whilst pointing to several other possibilities.^[38]

A variety of alternatives to the *Y. pestis* have been put forward. Twigg suggested that the cause was a form of anthrax and N. F. Cantor (2001) thought it may have been a combination of anthrax and other pandemics. Scott and Duncan have argued that the pandemic was a form of infectious disease that characterise as *hemorrhagic* plague similar to Ebola. However, no single alternative solution has achieved widespread acceptance.^[32] Many scholars arguing for the *Y. pestis* as the major agent of the pandemic, suggest that its extent and symptoms can be explained by a combination of bubonic plague with other diseases, including typhus, smallpox and respiratory infections. In addition to the bubonic infection, others point to additional septicemic (a type of "blood poisoning") and pneumonic (an airborne plague that attacks the lungs before the rest of the body) forms of the plague, which lengthen the duration of outbreaks throughout the seasons and help account for its high mortality rate and additional recorded symptoms.^[25]

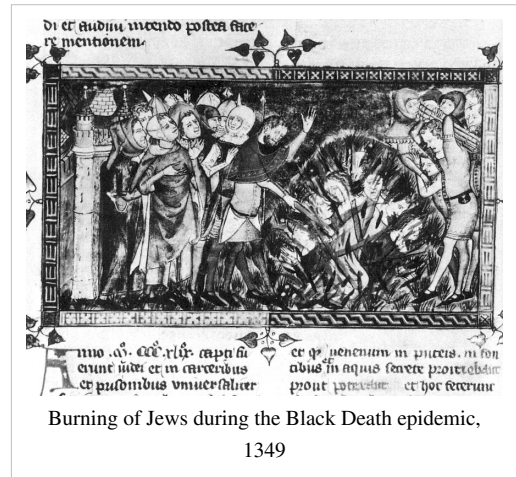


DNA Evidence

However, in October 2010 the open-access scientific journal *PloS Pathogens* published a paper by a multinational team who undertook a new investigation into the role of *Yersinia pestis* in the Black Death following the disputed identification by Drancourt & Raoult in 1998.^[39] Their surveys tested for DNA and protein signatures specific for *Y. pestis* in human skeletons from widely distributed mass graves in northern, central and southern Europe that were associated archaeologically with the Black Death and subsequent resurgences. The authors concluded that this new research, together with prior analyses from the south of France and Germany

"...ends the debate about the etiology of the Black Death, and unambiguously demonstrates that *Y. pestis* was the causative agent of the epidemic plague that devastated Europe during the Middle Ages."^[40]

The study also found that there were two previously unknown but related clades (genetic branches) of the *Y. pestis* genome associated with medieval mass graves. These clades (which are thought to be extinct) were found to be ancestral to modern isolates of the modern *Y. pestis* strains *Orientalis* and *Medievalis*, suggesting that the plague may have entered Europe in two waves. Surveys of plague pit remains in France and England indicate that the first variant entered Europe through the port of Marseille around November 1347 and spread through France over the next two years, eventually reaching England in the spring of 1349, where it spread through the country in three epidemics. Surveys of plague pit remains from the Dutch town of Bergen op Zoom showed that the *Y. pestis* genotype responsible for the pandemic that spread through the Low Countries from 1350 differed from that found in Britain and France, implying that Bergen op Zoom (and possibly other parts of the southern Netherlands) was not directly infected from England or France in AD 1349 and suggesting that a second wave of plague, different from those in Britain and France, may have been carried to the Low Countries from Norway, the Hanseatic cities or another site.^[40]



Burning of Jews during the Black Death epidemic, 1349

Consequences

Figures for the death toll vary widely by area and from source to source as new research and discoveries come to light. It killed an estimated 75–200 million people in the 14th century.^{[41] [42] [43]} According to medieval historian Philip Daileader in 2007:

The trend of recent research is pointing to a figure more like 45% to 50% of the European population dying during a four-year period. There is a fair amount of geographic variation. In Mediterranean Europe, areas such as Italy, the south of France and Spain, where plague ran for about four years consecutively, it was probably closer to 75% to 80% of the population. In Germany and England ... it was probably closer to 20%.^[44]

The most widely accepted estimate for the Middle East, including Iraq, Iran and Syria, during this time, is for a death rate of about a third.^[45] The Black Death killed about 40% of Egypt's population.^[46] Half of



A scene showing Jews being burned alive during the period of Black Death, *Liber Chronicarum*.

Paris's population of 100,000 people had died. In Italy, Florence's population was reduced from 110,000 or 120,000 inhabitants in 1338 to 50,000 in 1351. At least 60% of Hamburg's and Bremen's population perished.^[47] Before 1350, there were about 170,000 settlements in Germany, and this had been reduced by nearly 40,000 by 1450.^[48] In 1348, the plague spread so rapidly that before any physicians or government authorities had time to reflect upon its origins, about a third of the European population had already perished. In crowded cities, it was not uncommon for as much as 50% of the population to die. Europeans living in isolated areas suffered less, whereas monks and priests were especially hard hit since they cared for the Black Death's victims.^[49]

Because 14th century healers were at a loss to explain the cause, Europeans turned to astrological forces, earthquakes, and the poisoning of wells by Jews as possible reasons for the plague's emergence.^[12] The governments of Europe had no apparent response to the crisis because no one knew its cause or how it spread. The mechanism of infection and transmission of diseases was little understood in the 14th century; many people believed only God's anger could produce such horrific displays. There were many attacks against Jewish communities.^[50] In August 1349, the Jewish communities of Mainz and Cologne were exterminated. In February of that same year, the citizens of Strasbourg murdered 2,000 Jews.^[50] By 1351, 60 major and 150 smaller Jewish communities had been destroyed.^[51] The Brotherhood of the Flagellants, a movement said to number up to 800,000, reached its peak of popularity.^[52]



Flagellants practiced mortification of the flesh as a penance.

Recurrence

An epidemic of plague dies out after a few months because it has no host in which the bacteria can survive. However that does not mean that there isn't somewhere some surviving infection, in a rodent or flea or warm place, that acts as a reservoir so that sooner or later it breaks out again.^[53]

The plague repeatedly returned to haunt Europe and the Mediterranean throughout the 14th to 17th centuries.^[54] According to Biraben, plague was present somewhere in Europe in every year between 1346 and 1671.^[55] The Second Pandemic was particularly widespread in the following years: 1360–1363; 1374; 1400; 1438–1439; 1456–1457; 1464–1466; 1481–1485; 1500–1503; 1518–1531; 1544–1548; 1563–1566; 1573–1588; 1596–1599; 1602–1611; 1623–1640; 1644–1654; and 1664–1667.^[56] According to Geoffrey Parker, "France alone lost almost a million people to plague in the epidemic of 1628–31."^[57]

In England, in the absence of census figures, historians propose a range of pre-incident population figures from as high as 7 million to as low as 4 million in 1300,^[58] and a post-incident population figure as low as 2 million.^[59] By the end of 1350 the Black Death had subsided, but it never really died out in England. Over the next few hundred years, there were further outbreaks in 1361–62, 1369, 1379–83, 1389–93, and throughout the first half of the 15th century.^[60] An outbreak in 1471 took as much as 10-15% of the population, while the death rate of the plague of 1479-80 could have been as high as 20%.^[61] The most general outbreaks in Tudor and Stuart England seem to have begun in 1498, 1535, 1543, 1563, 1589, 1603, 1625, and 1636 and ending in with the Great Plague of London in 1665.^[62]

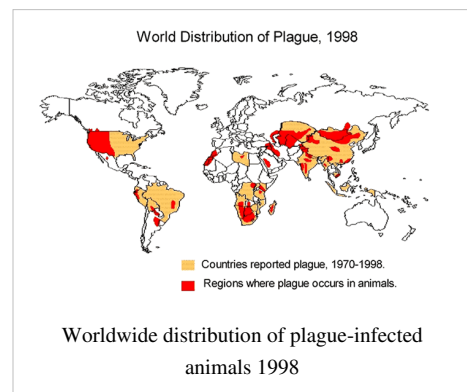
In 1466, perhaps 40,000 people died of plague in Paris.^[63] During the 16th and 17th centuries, plague visited Paris for almost one year out of three.^[64] The Black Death ravaged Europe for three years before it continued on into Russia, where the disease hit somewhere once every five or six years from 1350 to 1490.^[65] Plague epidemics ravaged London in 1563, 1593, 1603, 1625, 1636, and 1665,^[66] reducing its population by 10 to 30% during those years.^[67] Over 10% of Amsterdam's population died in 1623–1625, and again in 1635–1636, 1655, and 1664.^[68] There were twenty-two outbreaks of plague in Venice between 1361 and 1528.^[69] The plague of 1576–1577 killed 50,000 in Venice, almost a third of the population.^[70] Late outbreaks in central Europe included the Italian Plague of 1629–1631, which is associated with troop movements during the Thirty Years' War, and the Great Plague of Vienna in 1679. Over 60% of Norway's population died from 1348 to 1350.^[71] The last plague outbreak ravaged Oslo in 1654.^[72]



Plague Riot in Moscow in 1771. During the course of the city's plague, between 50,000 and 100,000 died (1/6 to 1/3 of its population).

In the first half of the 17th century a plague claimed some 1,730,000 victims in Italy, or about 14% of the population.^[73] In 1656 the plague killed about half of Naples' 300,000 inhabitants.^[74] More than 1,250,000 deaths resulted from the extreme incidence of plague in 17th century Spain.^[75] The plague of 1649 probably reduced the population of Seville by half.^[76] In 1709–1713, a plague epidemic that followed the Great Northern War (1700–1721, Sweden v. Russia and allies)^[77] killed about 100,000 in Sweden,^[78] and 300,000 in Prussia.^[76] The plague killed two-thirds of the inhabitants of Helsinki,^[79] and claimed a third of Stockholm's population.^[80] Europe's last major epidemic occurred in 1720 in Marseilles.^[71]

The Black Death ravaged much of the Islamic world.^[81] Plague was present in at least one location in the Islamic world virtually every year between 1500 and 1850.^[82] Plague repeatedly struck the cities of North Africa. Algiers lost 30,000–50,000 to plague in 1620–21, and again in 1654–57, 1665, 1691, and 1740–42.^[83] Plague remained a major event in Ottoman society until the second quarter of the 19th century. Between 1701 and 1750, 37 larger and smaller plague epidemics were recorded in Istanbul, and 31 between 1751 and 1800.^[84] Baghdad has suffered severely from visitations of the plague, and sometimes two-thirds of its population has been wiped out.^[85]



The Third Pandemic (1855–1959) started in China in the middle of the 19th century, spreading plague to all inhabited continents and killing 10 million people in India alone.^[86]

From 1944 through 1993, 362 cases of human plague were reported in the United States; approximately 90% of these occurred in four western states; Arizona, California, Colorado, and New Mexico.^[87] Plague was confirmed in the United States from nine western states during 1995.^[88]

The plague bacterium could develop drug-resistance and again become a major health threat. The ability to resist many of the antibiotics used against plague has been found so far in only a single case of the disease in Madagascar, in 1995.^[89]

In culture

The Black Death had a profound impact on art and literature throughout the generation that experienced it. Much of the most useful manifestations of the Black Death in literature, to historians, comes from the accounts of its chroniclers. Some of these chroniclers were famous writers, philosophers and rulers such as Boccaccio and Petrarch. Their writings, however, did not reach the majority of the European population. Petrarch's work was read mainly by wealthy nobles and merchants of Italian city-states. He wrote hundreds of letters and vernacular poetry, and passed on to later generations a revised interpretation of courtly love.^[90] There was one troubadour, writing in the lyric style long out of fashion, who was active in 1348. Peire Lunel de Montech composed the sorrowful *sirventes* "Meravilhar no-s devo pas las gens" during the height of the plague in Toulouse.



Pieter Bruegel's *The Triumph of Death* (c. 1562) reflects the social upheaval and terror that followed the plague which devastated medieval Europe

They died by the hundreds, both day and night, and all were thrown in ... ditches and covered with earth. And as soon as those ditches were filled, more were dug. And I, Agnolo di Tura ... buried my five children with my own hands ... And so many died that all believed it was the end of the world.

—The Plague in Siena: An Italian Chronicle^[91]

How many valiant men, how many fair ladies, breakfast with their kinfolk and the same night supped with their ancestors in the next world! The condition of the people was pitiable to behold. They sickened by the thousands daily, and died unattended and without help. Many died in the open street, others dying in their houses, made it known by the stench of their rotting bodies. Consecrated churchyards did not suffice for the burial of the vast multitude of bodies, which were heaped by the hundreds in vast trenches, like goods in a ships hold and covered with a little earth.

—Giovanni Boccaccio^[92]

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- Black Death (http://www.bbc.co.uk/history/british/middle_ages/black_01.shtml) at BBC

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