The Black Death is thought to have originated in the arid plains of Central Asia, where it then travelled along the Silk Road, reaching Crimea by 1343. From there, it was most likely carried by Oriental rat fleas living on the black rats that were regular passengers on merchant ships. Spreading throughout the Mediterranean and Europe, the Black Death is estimated to have killed 30–60% of Europe's total population. In total, the plague reduced the world population from an estimated 450 million down to 350–375 million in the 14th century. The world population as a whole did not recover to pre-plague levels until the 17th century. The plague recurred occasionally in Europe until the 19th century.

The plague disease, 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. Nestorian graves dating to 1338–39 near Lake Issyk Kul in Kyrgyzstan have inscriptions referring to plague and are thought by many epidemiologists to mark the outbreak of the epidemic, from which it could easily have spread to China and India. In October 2010, medical geneticists suggested that all three of the great waves of the plague originated in China. In China, the 13th century Mongol conquest caused a decline in farming and trading. However, economic recovery had been observed at the beginning of the 14th century. In the 1330s a large number of natural disasters and plagues led to widespread famine, starting in 1331, with a deadly plague arriving soon after. Epidemics that may have included plague killed an estimated 25 million Chinese and other Asians during the 15 years before it reached Constantinople in 1347.

Plague was reportedly first introduced to Europe via Genoese traders at the port city of Kaffa in the Crimea in 1347. After a protracted siege, during which the Mongol army under Jani Beg was suffering from the disease, the army catapulted the infected corpses over the city walls of Kaffa to infect the inhabitants. The Genoese traders fled, taking the plague by ship into Sicily and the south of Europe, whence it spread north. 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.

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 spread to Bjørgvin (modern Bergen) and Iceland. Finally it spread to northwestern Russia in 1351. The plague was somewhat less common in parts of Europe that had smaller trade relations with their neighbours, including the Kingdom of Poland, the majority of the Basque Country, isolated parts of Belgium and the Netherlands, and isolated alpine villages throughout the continent.

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 entered the region from southern Russia also. 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 travelled 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.[citation needed]

Gasquet (1908) claimed that the Latin name atra mors (Black Death) for the 14th-century epidemic first appeared in modern times in 1631 in a book on Danish history by J.I. Pontanus: "Vulgo & ab effectu atram mortem vocatibant. ("Commonly and from its effects, they called it the black death"). The name spread through Scandinavia and then Germany, gradually becoming attached to the mid 14th-century epidemic as a proper name. In England, it was not until 1823 that the medieval epidemic was first called the Black Death.

Medical knowledge had stagnated during the Middle Ages. The most authoritative account at the time came from the medical faculty in Paris in a report to the king of France that blamed the heavens, in the form of a conjunction of three planets in 1345 that caused a "great pestilence in the air". This report became the first and most widely circulated of a series of plague tracts that sought to give advice to sufferers. That the plague was caused by bad air became the most widely accepted theory. Today, this is known as the Miasma theory. The word 'plague' had no special significance at this time, and only the recurrence of outbreaks during the Middle Ages gave it the name that has become the medical term.

The dominant explanation for the Black Death is the plague theory, which attributes the outbreak to Yersinia pestis, also 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 the French-Swiss bacteriologist Alexandre Yersin, after whom the pathogen was named Yersinia pestis. 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, which act as hosts, keeping the disease endemic, and a second that lack resistance. When the second population dies, the fleas move on to other hosts, including people, thus creating a human epidemic.

The historian Francis Aidan Gasquet wrote about the 'Great Pestilence' in 1893 and suggested that "it would appear to be some form of the ordinary Eastern or bubonic plague". He 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 Eastern Roman Empire from 541 to 700 CE.

Other forms of plague have been implicated by modern scientists. The modern bubonic plague has a mortality rate of 30–75% and symptoms including fever of 38–41 °C (100–106 °F), headaches, painful aching joints, nausea and vomiting, and a general feeling of malaise. Left untreated, of those that contract the bubonic plague, 80 percent die within eight days. Pneumonic plague has a mortality rate of 90 to 95 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 near 100%. 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.

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 and Raoult in 1998. They assessed the presence of DNA/RNA with Polymerase Chain Reaction (PCR) techniques for Y. pestis from the tooth sockets in human skeletons from 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".

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 Y. p. orientalis and Y. p. medievalis, suggesting the plague may have entered Europe in two waves. Surveys of plague pit remains in France and England indicate 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 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 Bergen op Zoom (and possibly other parts of the southern Netherlands) was not directly infected from England or France in 1349 and suggesting 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.

The results of the Haensch study have since been confirmed and amended. Based on genetic evidence derived from Black Death victims in the East Smithfield burial site in England, Schuenemann et al. concluded in 2011 "that the Black Death in medieval Europe was caused by a variant of Y. pestis that may no longer exist." A study published in Nature in October 2011 sequenced the genome of Y. pestis from plague victims and indicated that the strain that caused the Black Death is ancestral to most modern strains of the disease.

The plague theory 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. In 1984 zoologist Graham Twigg produced the first major work to challenge the bubonic plague theory directly, 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).

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 time of publication of the Domesday Book and the year 1377. Estimates of plague victims are usually extrapolated from figures from 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 results may be flawed and might not have been repeated elsewhere, despite extensive samples from other mass graves. 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 that of 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; and that the pattern of the Black Death, with major outbreaks in the same areas separated by 5 to 15 years, differs from modern bubonic plague—which often becomes endemic for decades with annual flare-ups.

A variety of alternatives to the Y. pestis have been put forward. Twigg suggested that the cause was a form of anthrax, and Norman 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. Archaeologist Barney Sloane has argued that there is insufficient evidence of the extinction of a large number of rats in the archaeological record of

the medieval waterfront in London and that the plague spread too quickly to support the thesis that the Y. pestis was spread from fleas on rats; he argues that transmission must have been person to person. However, no single alternative solution has achieved widespread acceptance. 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. In 2014, scientists with Public Health England announced the results of an examination of 25 bodies exhumed from the Clerkenwell area of London, as well as of wills registered in London during the period, which supported the pneumonic hypothesis.

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. The Black Death killed about 40% of Egypt's population. Half of Paris's population of 100,000 people died. In Italy, the population of Florence was reduced from 110–120 thousand inhabitants in 1338 down to 50 thousand in 1351. At least 60% of the population of Hamburg and Bremen perished, and a similar percentage of Londoners may have died from the disease as well. Interestingly while contemporary reports account of mass burial pits being created in response to the large numbers of dead, recent scientific investigations of a burial pit in Central London found well-preserved individuals to be buried in isolated, evenly spaced graves, suggesting at least some pre-planning and Christian burials at this time. Before 1350, there were about 170,000 settlements in Germany, and this was reduced by nearly 40,000 by 1450. 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. The disease bypassed some areas, and the most isolated areas were less vulnerable to contagion. Monks and priests were especially hard hit since they cared for victims of the Black Death.

The plague repeatedly returned to haunt Europe and the Mediterranean throughout the 14th to 17th centuries. According to Biraben, the plague was present somewhere in Europe in every year between 1346 and 1671. The Second Pandemic was particularly widespread in the following years: 1360–63; 1374; 1400; 1438–39; 1456–57; 1464–66; 1481–85; 1500–03; 1518–31; 1544–48; 1563–66; 1573–88; 1596–99; 1602–11; 1623–40; 1644–54; and 1664–67. Subsequent outbreaks, though severe, marked the retreat from most of Europe (18th century) and northern Africa (19th century). According to Geoffrey Parker, "France alone lost almost a million people to the plague in the epidemic of 1628–31."

In England, in the absence of census figures, historians propose a range of preincident population figures from as high as 7 million to as low as 4 million in 1300, and a postincident population figure as low as 2 million. By the end of 1350, the Black Death subsided, but it never really died out in England. Over the next few hundred years, further outbreaks occurred in 1361–62, 1369, 1379–83, 1389–93, and throughout the first half of the 15th century. 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%. The most general outbreaks in Tudor and Stuart England seem to have begun in 1498, 1535, 1543, 1563, 1589, 1603, 1625, and 1636, and ended with the Great Plague of London in 1665.

In 1466, perhaps 40,000 people died of the plague in Paris. During the 16th and 17th centuries, the plague was present in Paris around 30 per cent of the time. The Black Death ravaged Europe for three years before it continued on into Russia, where the disease was present somewhere in the country 25 times between 1350 to 1490. Plague epidemics ravaged London in 1563, 1593, 1603, 1625, 1636, and 1665, reducing its population by 10 to 30% during those years. Over 10% of Amsterdam's population died in 1623–25, and again in 1635–36, 1655, and 1664. Plague occurred in Venice 22 times between 1361 and 1528. The plague of 1576–77 killed 50,000 in Venice, almost a third of the population. 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 in 1348–50. The last plague outbreak ravaged Oslo in 1654.

In the first half of the 17th century, a plague claimed some 1.7 million victims in Italy, or about 14% of the population. In 1656, the plague killed about half of Naples' 300,000 inhabitants. More than 1.25 million deaths resulted from the extreme incidence of plague in 17th-century Spain. The plague of 1649 probably reduced the population of Seville by half. In 1709–13, a plague epidemic that followed the Great Northern War (1700–21, Sweden v. Russia and allies) killed about 100,000 in Sweden, and 300,000 in Prussia. The plague killed two-thirds of the inhabitants of Helsinki, and claimed a third of Stockholm's population. Europe's last major epidemic occurred in 1720 in Marseille.

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