Plague in Northwestern Europe

The Dutch Experience, 1350-1670*

RONALD ROMMES
Open Universiteit Nederland / Open University of the Netherlands

In 1347, plague (*Yersinia Pestis*) broke out in Europe as part of what has been called the Second Pandemic; a period of plague activity which did not entirely disappear until the early 19th century[1]. The disease spread all over Europe, killing millions of people. In the centuries that followed the initial shock of the mid-14th century, plague returned regularly. French researcher Jean-Noël Biraben identified periods in which plague expanded geographically and periods in which plague withdrew from many regions. These periods formed cycles that usually lasted 9 to 13 years. Biraben (1975, 1, 118-129) saw a change in the 1530s, with plague cycles becoming more irregular.

The plague waves swept all over Europe, but within Europe there existed different plague regimes and geographically different developments over time. Biraben distinguished between short outbreaks of widespread plague epidemics in Mediterranean countries on the one hand, and a more prolonged presence of the disease in the towns of Northwestern Europe on the other, and Guido Alfani has recently confirmed this for the seventeenth century (Biraben 1975, 1, 114-116; Alfani 2013, 4-6). The differing histories of plague in Italy and England seem to reflect these patterns.

In Italy, plague didn't strike as often in the 17th century as it had done in the 16th century, but when it struck, plague often killed a much larger proportion of the population in a single epidemic than in England. Sometimes up to half of the local population died within one or two years. And because plague was so widespread, it had major consequences for Italian society. According to Alfani, plague played a major role in the economic and demographic decline of the country in the 17th century (Alfani 2013). In Italy plague had such devastating effects because of its high territorial pervasiveness, a new concept that Alfani has recently introduced. A quick recovery of the Italian population and economy was impossible, because plague hit so many towns and villages at the same time.

The English case was very different. In England, plague epidemics became more localized from 1480 onwards and had less profound effects in the 16th and 17th centuries than before. However, the disease was rarely absent from England and Wales between 1485 and 1665. Although plague in England did not occur as often as it

* I would like to thank two anonymous referees and especially Daniel Curtis (University of Utrecht) for their comments on an earlier draft of this article.

had, when it struck a town or village the consequences were often serious. In Tudor and Elizabethan England, one outbreak could kill up to one-third or more of the local population, but usually mortality stayed below 10%. There were even years in which there were no more than a few cases of plague in a given town (Slack 1985, 16, 67-68, 113-142). The demographic impact was much less than in Italy, and in contrast to Italy the urbanization rate increased «by means of steady population movements from countryside to cities» (Alfani 2013, 17-18).

The Netherlands would belong to the plague pattern of Northwestern Europe. However, not much is known about plague in this country. The information that Biraben had, was minimal. Since his work, new information has appeared, mostly in Dutch. This article presents an overview of the history of plague in the geographical area which is now the kingdom of the Netherlands. First, I have reconstructed the main years of epidemic plague between 1350 and 1670, making an overall chronology of plague epidemics. Second, after a short case study on the city of Utrecht, I will present some estimates on plague mortality in the 17th century and discuss why plague was not able to stop population growth in the Dutch Republic's urban core area.

Plague in Dutch historiography. In the Netherlands, plague enjoyed some popularity as a research topic in the first decades of the 20th century. Especially people with medical training collected historical data on this disease. Many of their articles were published in the Dutch Magazine for Health Care (*Nederlandsch Tijdschrift voor Geneeskunde*). After the 1930s, interest in plague disappeared, but was revived when historical demography became popular in the 1960s and 1970s. At that time it was quite common among leading historians to downplay the role of plague in Dutch history, and generally it was thought that the Black Death had hardly touched this region. New research, especially by Dick de Boer (1978) changed this view, and two years later Wim Blockmans (1980) could show convincingly that plague had been widespread in the Low Countries in the 14th and 15th centuries.

In the late 1980s and the early 1990s, historical plague research acquired some popularity again. In 1988 Leo Noordegraaf and Gerrit Valk published a book on the impact of plague in the County of Holland between 1450 and 1670[2]. The demographic impact of plague was not the focus of the authors, who concentrated more on the cultural side such as the perception of plague and its impact on popular mentality, although they did make a go of reconstructing some estimates of local mortality. Economic historian Jan Luiten van Zanden, however, was interested in precisely the mortality that plague caused, because this directly affected labor supply to resources and real wages. This prompted Ronald Rommes to make estimates of plague mortality in the provinces of Holland and Utrecht in the 17th century (Van Zanden 1988; Rommes 1990). These estimates are still considered to be valid today (Van Zanden, Prak 2012).

Since the 1990s, plague in the Netherlands has mostly been studied from the wider perspective of the history of medicine and medical organization from the Middle Ages onwards, especially in local urban contexts. These studies have pro-

vided us with new information, for instance on cities such as Groningen, Hoorn and Leiden (Huisman 1992; Ladan 2012; Steendijk-Kuypers 1994).

One of the major problems in the study of plague in Dutch history is the lack of sources. This may explain why historical plague research has not progressed much in the past decades. One problem is the fact that burial registers do not always go back before the first half of the 17th century. Especially in the countryside, complete series of burials sometimes only start after plague had already left the country. Historians then have to rely on using a combination of sources: archives of city councils (including urban accounts), of plague houses, hospitals, orphanages, monasteries and churches, as well as contemporary chronicles and diaries.

The general problem that every researcher encounters, is the recognition of plague in archival sources and chronicles. Words like *plague*, *pest* and *pestilence* were often used in an indiscriminate way, so it is never certain that a particular reference to *a* plague refers to *the* plague. It is only from the second half of the 15th century that specific references are made to outbreaks of other diseases, especially dysentery, smallpox and later also syphilis. This is how we know that the epidemic that hit the Duchy of Guelders in 1472-73 was not plague, but dysentery (*rode loop*, *rood melisoen*), and that there was an outbreak of smallpox in 1497-98 (Van Schaïk 1987, 305-306).

Very often there are references to extreme mortality, but although plague may have been the cause of it, there is no certainty. Combining different sources Rudolph Ladan (2012, 58-61) identified 28 mortality crises in Leiden between 1395 and 1610, but he could only find confirmation that plague was the cause in 18 cases. He attributed two mortality crises to other diseases (the «English Sweating Sickness» and dysentery) and one to famine, but wasn't able to identify the cause of the high mortality in seven other cases[3].

The Dutch situation. The current kingdom of the Netherlands was largely formed in the 16th and 17th centuries. The Eighty Years War of independence (1568-1648) against the Habsburg monarchy laid the foundation for a federal republic of seven independent states, called *gewesten* or provinces, and a number of connected territories (semi-independent counties, occupied regions, etc.). In this federation the western province of Holland played a leading role in politics, economics and culture. Almost half of the population and more than half of the country's wealth were concentrated there in the 17th century, which is known as «the Golden Age of Holland». After the French invasion of 1795, the Dutch federation was transformed into a single nation state, which became a monarchy in the early 19th century.

The Netherlands offered ideal circumstances for the introduction and spread of diseases. Since the Middle Ages, there was heavy involvement in international trade, especially by the many harbor towns in the coastal areas. Across the North Sea there was trade with England, Scotland, France, Northern Germany, Scandinavia, Poland and the Baltic region. A very important expansion of Dutch overseas connections took place at the end of the 16th century when trade with the Mediterranean countries grew tremendously, and direct trade with Asia and other parts of the world

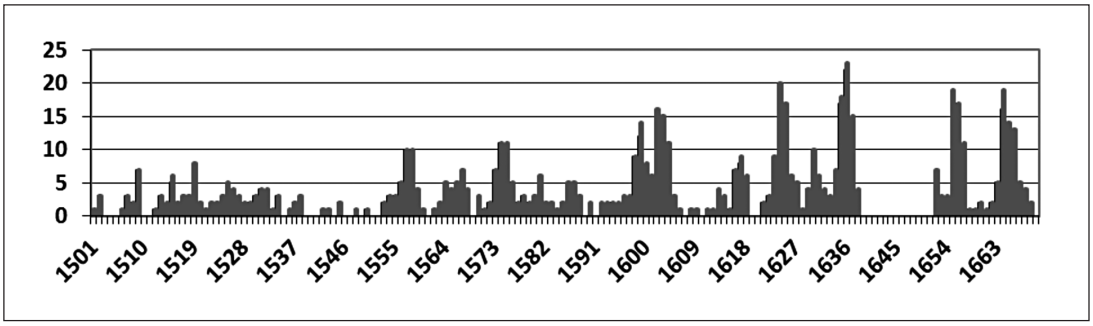
started by the East India Company. Beside the overseas contacts, there was trade with neighboring regions across the rivers, especially the Rhine, the Meuse and the Scheldt. Obviously there was also overland trade, for instance using the Hessian roads (*Hessenwegen*) which went deep into the Holy Roman Empire.

A second factor that helped the spread of diseases was the high level of urbanization in most of the country. There were 158 towns and cities in the early modern period (Lourens, Lucassen 1997), about 35 of them having at least 2.500 inhabitants around 1560 (Rommes 1998, 72-73). Between 1525 and 1675, the percentage of people living in towns of at least 2.500 inhabitants rose from 30% to 45% (De Vries, Van der Woude 1995, 84-5). In the Holland-Utrecht region more than half the population already lived in towns by 1600, being by far the most urbanized part of the Netherlands and possibly of Europe. Foreign visitors marveled at the number of towns they were able to visit in just a few days. The presence of so many towns implied that the distance between towns and villages in most of the country was never more than 25 kilometers, so most villagers were capable of visiting a (large) town and return home the same day. Between the towns there was intensive trade by the many small rivers, canals and roads. Added to this was a much used canal system for passenger transportation which was greatly expanded since the 1590s (De Vries 1978).

A third factor facilitating the spread of diseases was the frequent movement of soldiers and armed civil militia during the many wars of the late Middle Ages. The Peace of Venlo of 1543 brought a peaceful interval of a few decades, which ended after the iconoclasms of 1566. The following Eighty Years War started a new period of almost continual troop movements. The Dutch War of Independence was interconnected with other European wars, which meant that troops to and from all over Europe passed through the country. Many a soldier from Ireland, Scotland, England, France, Germany, Switzerland or Spain died on Dutch soil, often from disease. The Peace of Westphalia in 1648 brought relief, but naval wars with the English (1652-54, 1665-67) and an invasion by the Bishop of Münster (1665) followed. When the French invaded the country in 1672 (with the assistance of Cologne and Münster), plague had already left the country for good.

Plague in the 14th and 15th centuries. Unfortunately, plague in the Dutch Middle Ages has not been studied systematically. There are, however, all kinds of references in the historical literature, usually based on chronicles and sometimes on archival records. We know of huge mortality in and around Deventer in 1350 and also of very high mortality in several others parts of the country in 1350-51, possibly already in 1349[4]. Clearly, it is hardly possible to prove that it was actually plague that caused the high mortality that sources refer to (Theilmann, Cate 2007 on medieval England). However, DNA-research has shown that people in a medieval burial place in the southwestern town of Bergen op Zoom, in the Duchy of Brabant, died from *Yersinia Pestis*. The genotype of *Yersinia Pestis* that was found there differs from the genotype that was found in England and France, which suggests a different provenance of plague. It is suggested that the Black Death came from a

Fig. 1. *Periodicity of plague in 25 Dutch towns, 1501-1670 (number of infected towns)*



northeastern direction, from the Hanseatic towns of Northern Germany or from Bergen in Norway (Haensch *et alii* 2010)[5]. It was indeed in the northeast of the Netherlands that there was high mortality in several monasteries in 1350. From there the disease seems to have moved south to the towns along the river IJssel (Zwolle, Deventer, Zutphen), and then to the west to Utrecht, where there was very high mortality in the town and diocese[6] in or around 1351. There are also strong indications of very high mortality in parts of the County Holland.

After this initial outbreak, plague returned many times. From the historical literature a series of epidemics of bubonic plague, «groin plague» (*peste inguinaria*) and «pestilence» can be reconstructed: 1359-63, 1368-69, (1374-75?), 1381-84, 1397-1402, 1419-22, 1428-31, 1437-42, 1449-60, 1466-75, 1480-85, 1489-95[7]. In the years between these general epidemics there were several outbreaks in a single town (1409 Maastricht, 1426 Hoorn, etc.). Some of the more general outbreaks match the plague waves Biraben identified on a European scale, but others were in periods in which plague seemed to withdraw from Europe, so possibly other contagious diseases were involved (dysentery in the 1470s). From the information we have, it appears that plague may temporarily have become endemic for some decades since the late 1440s.

All plague years were associated with high mortality, but it is impossible to know how many people died. In Deventer mortality was sky high in 1350. The plague of 1400 was later known as «the great mortality» (*die grote starft*) (Kuys *et alii* 1983, 137-138). In Utrecht more than 11.000 people are said to have died during the plague of 1368, which would have been the complete population. More credible are the estimates by Dick de Boer based on partial evidence of mortality in Leiden and the surrounding countryside. He estimated that a quarter to a third of the urban population died during some of the epidemics, and that plague in the countryside killed about the same percentage of the population in 1368-69 (De Boer 1978, 47-104; Hoppenbrouwer 1992, 58-60). However, not all the outbreaks in Leiden were equally severe and conclusive evidence of plague in the countryside is sometimes lacking.

Plague in the 16th and 17th centuries. In the historical literature we find plague mentioned in 1501-02 in a number of towns along the rivers Rhine and Waal, suggesting that it spread from east to west by ship. In 1506, plague was back in Utrecht and in the next year it was also found in Deventer, Amersfoort and a few other

towns. Possibly the contagion came from Cologne, where there was plague in 1501-02 and 1506-07 (Biraben 1975, 1, 410). In 1508-09, plague spread west to Leiden, Gouda and other cities, but there are no mentions of plague in 1510-11. In 1512, there was plague in Maastricht, in 1513 in The Hague and Gouda, and in 1514 in Utrecht and in the northeast. In the following years, many more places were infected and until the 1530s plague stayed in the country. There were small peaks in the number of infected towns (see figure 1[8]) in 1515, 1519, 1525, 1530 and 1537-38. Probably plague also struck in 1529 (Groningen, Kampen), but the attention of chroniclers and historians has been drawn to the «English Sweating Sickness» that visited many places that year (Huisman 1992, 22; Ladan 2012, 56-58).

In the 1540s there were many local outbreaks, but plague does not seem to have been as widespread as in the previous decades. In the 1550s this changed. Plague was almost everywhere, as were other epidemic diseases[9]. Again plague seems to have come from the east, striking Arnhem and Amersfoort in 1553. The next year there was plague in several towns, including Amsterdam and Den Bosch. In 1557-58, the number of infected places increased dramatically. Possibly there was a link with extra grain transports because these were years of famine. According to a famous medical doctor, Pieter van Foreest («the Dutch Hippocrates»), farmers supplying the town brought plague into Delft from a neighboring village. 5.000 inhabitants of Delft are said to have been killed by the disease, a third of the population (Burri 1982, 23). Tiel, a small town 30 kilometers south of Utrecht, was infected after one of its inhabitants brought home the household goods he had bought on an auction in Utrecht (Kuys *et alii* 1983, 177). In 1559-60, plague was still raging in a few towns.

In 1562 there was plague in Hoorn. Because this was a port, this isolated outbreak may have come by ship over sea. In Amsterdam in 1563, quarantine measures were imposed on English ships because of the fear of plague, and in 1564 Kampen, also a port, took preventive measures because ships were expected from Gdansk and other towns where plague was raging (Noordegraaf, Valk 1996, 201; Ten Kate 1922, 1657). Gdansk was very important for the Dutch because much grain came from there in the 16th- and 17th centuries. Without these grain imports («the mother of all trades»), the population of Holland could not be fed (Van Tielhof 2002). Consequently, plague epidemics in the Baltic were always a cause for concern. It is striking that even a farmer in the countryside of Groningen made a note of this in his diary (Huisman 1992, 27-28).

From 1564 to 1568, years of general hardship and social upheaval, there were outbreaks of plague in many parts of the country, but also of dysentery, smallpox, «fevers» and «evil cough». Grain transports and troop movements following the iconoclasms of 1566 helped to spread these diseases. Things got worse after the start of the Dutch Revolt in 1568, with troops moving around constantly. These were ideal circumstances for plague to spread, so in the 1570s and 1580s the disease was never far away. Especially between 1573 and 1576 many places were infected.

In the 1590s, there were many local outbreaks with high mortality, but it was not until 1598 that a major epidemic started. It spread quickly over the whole country and hit most towns and rural areas severely in 1598-99 and often again in 1602-05.

According to Theodorus Velius, a medical doctor who wrote a chronicle in 1604, in Hoorn 5.000 people died in 1599, which would have been about 40% of the population. In 1603 Dordrecht lost more than 15% of its population within a few months (Steendijk-Kuypers 1994, 189, 199, 210; Frijhoff, Nusteling, Spies 1998, 97). In Leiden for three years in a row mortality was two to three times above the average, which suggests that in 1602-04 10-15% of the population may have died of plague. The same level of mortality can be estimated for Amsterdam and Utrecht in these years. Not just the major cities suffered. According to a remembrance sign in the major church of Muiden, a small town close to Amsterdam, 650 out of 900 inhabitants died of plague in 1602. The Dutch Reformed Church in Westbroek, a village close to Utrecht, is said to have lost half of its members in a short time (Rommes 1991, 99).

From the middle of the 1600s until the early 1620s there were many local outbreaks. In 1613-14, especially in the east and the middle of the country, and in 1616-18, plague was more widespread. In Utrecht there were mortality peaks in 1614 and 1617. In 1616 plague also reached Amsterdam, Leiden and others cities in the west. In Leiden for three years in a row mortality was about 50% higher than in previous years, which suggests a relatively mild epidemic. Amsterdam lost about 8% of its population in 1617 (Dijkstra 1921, 30-31; Nusteling 1985, 243).

The 1620s and 1630s saw the worst period of plague of the 17th century, not only in the Dutch Republic but also in other parts of Northwestern Europe (Bruneel 1977, 222-226; Croix 1981, 289-299). Major factors were the start of the Thirty Years War in the Holy Roman Empire (1618-1648), with strong international involvement, and the end of the 12-year truce (1609-1621) in the Dutch-Spanish war. In most Dutch cities plague lingered for several years and there were also outbreaks in many rural areas. After some towns in the east and the south of the country were struck in 1621-22, the disease spread in 1623 to Amsterdam, Dordrecht and Groningen, and possibly also to Utrecht and Leiden. In the next three years the disease hit all major cities and many people died. In Leiden almost a quarter of the population died in 1624-25. Teacher David Beck in nearby The Hague made anxious entries in his diary about the very high plague mortality in Delft in 1624, but it seems that plague spread only slowly in The Hague (Veldhuijzen 1993). In 1624-25, it was not just the plague that killed so many people. In several towns (Amsterdam, Amersfoort, Hoorn, Tilburg, Utrecht) there were also outbreaks of dysentery.

In 1626 plague retreated, but spread again in 1630. This may be the result of large-scale troop movements in 1629 and extra grain imports after bad harvests. In the early 1630s plague almost disappeared, but there were still victims in the plague hospital of Rotterdam in 1632-33, and the disease seems to have lingered in a few towns. In Maastricht in 1633 about 9% of the population died of plague (Klinkenberg 1990, 280-281).

In 1634 there was plague in the southeast, the southwest and the middle of the country, and it spread in all directions. In 1635 virtually every town was hit by the disease and very often also by dysentery, «fevers» or «other dirty diseases». In terms of overall mortality, these may have been the worst years of the *Ancien Régime*. In

Amsterdam more than 20% of the population died in two years. Leiden, the second largest city with almost 50.000 inhabitants, lost more than a third of its population. Mortality there peaked in late September and early October 1635, when almost 3.000 people died in just two weeks (Van Campen 1940, 51-53). In Nijmegen more than 6.000 people died between 1 July 1635 and 1 August 1636. After this last date our information stops, precisely when the epidemic was at its peak. By then almost 40% of the population of 16.000 (including soldiers and their families) had already died, so it is very likely that eventually half the population perished (Frijhoff 1991). In Deventer in 1636 between April and October 3.314 people died on a total population of 7.000-8.000. Since there was plague in this town before and after this period, possibly also half the population died. Zutphen and Zwolle probably lost a third of their population in 1636 (Frijhoff 1989, 94-95; Holthuis 1993, 99-100; Ten Hove 2005, 290). Plague was also widespread in the countryside, prompting the Estates of Utrecht to take action.

In 1638 it was suddenly over. Everywhere plague disappeared and until the 1650s seems to have stayed away[10].When the disease returned, is not very clear. Everywhere there was high mortality in the early 1650s, but plague is seldom mentioned. However, there seem to have been outbreaks in the countryside in the northeast of the country and in Maastricht in the southeast. Probably there was also an outbreak in the harbor town Enkhuizen in 1652-54, but in nearby Alkmaar the high mortality in these years was not caused by plague. It was only in 1655 that plague spread quickly over the whole country, starting a major epidemic that lasted about three years. All major cities were infected and several rural areas as well. Plague mortality was usually much lower than in the 1630s, but not everywhere. Hoorn lost more than 4.000 people in 1656 (Steendijk-Kuypers 1994, 221). Leiden, again, lost at least a third of its population and Zwolle probably also.

Despite Biraben's firm conviction that plague had completely disappeared from Europe between 1658 and 1663, the disease lingered in a few Dutch towns (Biraben 1975, 1, 127-129). In Rotterdam there was a small outbreak in 1660 with 89 registered victims. Had plague come by ship? It took another three years before a major epidemic was on its way. According to an oft-repeated story, plague entered the country in Amsterdam in 1663 on an infected ship from Smyrna (Izmir). But because plague was already in the country before this ship arrived, it remains unclear if the arrival of this ship really caused an outbreak.

In response to this new outbreak, quarantines for Dutch ships were imposed in harbors all over Europe. Even within the Dutch Republic, quarantine restrictions were imposed, for instance by the provincial estates of Zeeland against products from Holland and Utrecht. Despite these quarantines, plague spread to the south, where Antwerp and Brussels were infected. By ship from Amsterdam, plague reached French towns like Saint Malo, Amiens and Rouen, and also London, where the famous «great plague» of 1665-66 killed at least 70.000 people. Plague also moved in a southeasterly direction through Germany, reaching Switzerland in 1667 (Biraben 1975, 1, 122; Bruneel 1977, 240; Charlier 1969, 37-38; Eckert 1978, 72-75; Revel 1970).

In the Netherlands plague was widespread in 1664-67. In Holland most towns

experienced at least one year of high mortality. In other parts of the country all the towns seem to have been infected. According to a parish priest, in Maastricht in 1664 a family that had just arrived from Holland introduced plague. Shortly after their arrival plague broke out in the house where they stayed. Next, visiting neighbors helped spread the disease, first in the street where they lived, then through the rest of the parish (Klinkenberg 1990, 279-280). In the east, Zutphen (7.500-8.000 inhabitants) probably had the highest mortality. According to the sexton of the local Saint Walburgis church in 1666, 1.768 people died, 79% of them in the second half of the year (Frijhoff 1989, 95). Again many rural areas were infected.

At least until 1669 plague remained present. Some historians mention plague in 1670 (and in 1673), but there is no evidence that the high mortality in these years was caused by plague. Dysentery is more likely, although occasional cases of plague cannot be ruled out. After 1670 plague had definitely left the country for good. An era that had lasted 320 years had come to an end. The quarantines of the 18th century helped keep the country free of plague when parts of Europe were struck in the first decades of the 18th century (Noordegraaf, Valk 1996, 152-155).

After the plague disappeared around 1670, it still took another few years before mortality levels of 10% or more finally disappeared, because the French occupation of 1672-73 and its aftermath caused very high mortality in some regions. After the 1670s outbreaks of dysentery, smallpox, malaria, cholera and other diseases occasionally led to high mortality, but these diseases never killed as many people in a single year as plague had done. Cholera, for instance, killed less than 70.000 people in the Netherlands in the whole 19th century ('t Hart 1990, 303), which was less than plague killed in the 1630s alone (see below).

Plague in town: the case of Utrecht. A short study of a single city makes it clearer how plague touched Dutch society, especially in the 17th century. With a population of an estimated 13.000 in 1400 and at least 20.000 in 1500, Utrecht was the largest town in the geographical area that is now the Netherlands. It was also the richest and the most important town, mostly because it was the seat of the Prince-Bishop of Utrecht. Until 1528, when Emperor Charles V took power, the Prince-Bishop was the worldly ruler of the *Nedersticht* (the later province of Utrecht) and the *Oversticht* (the later provinces of Overijssel and Drenthe).

In the 16th century, the population of Utrecht grew to an estimated 25.000. After the Dutch Revolt, Utrecht's importance declined because it lost its religious (Catholic) function and because, as an inland town, it had no access to the profitable fisheries and overseas trade and transport that boosted the economy of the coastal regions. As a consequence, Utrecht's development lagged behind the major cities in Holland, and Utrecht fell from the first to the fifth place in the Dutch urban hierarchy. This decline was only relative, because the population grew to 30.000 in the 1620s and 33.000 by 1670 (Rommes 1998).

What do we know about plague in Utrecht? First, that it is very likely that the disease probably visited the city in 1350-51, because there was very high mortality in the town and diocese. In the general plague years of 1359 and 1368, the city was

also hit. After this, there is a gap in our knowledge, so we do not know if the plague that struck many other cities in the early 1380s also came to Utrecht. In 1400, there was definitely plague in Utrecht, and again in 1421, the late 1430s, 1450, 1455, 1457, 1465, 1467-8, 1472 (?) and 1474. It seems that the infection usually came from the east. There were many contacts with Amersfoort, 20 kilometers to the northeast, and with towns like Deventer and Arnhem further east. From Utrecht, plague was probably often transported to the small towns and villages in its hinterland, as well as to the towns in the west.

When plague struck, the measures that were taken were usually the same as in other places in the Netherlands. In the 15th century it was acknowledged that plague was a contagious disease (*aenclevende sieckte*), so the council took measures to prevent plague from spreading by keeping infected persons from the rest of the community. They were only allowed to leave their house carrying a white stick, so that others could avoid them. Also they were banned from the busy markets and the processions, and from visiting the parish churches during services. Infected houses should be recognizable by a bundle of straw on the door or hanging out of a window. After someone had died in a house, all economic activities there were suspended for six weeks. In a few hospitals, room was made for infected persons who wished to go there[11]. The separate regulations from earlier outbreaks were put together in 1474 in a Plague Ordinance. For the next two hundred years, the regulations of the Plague Ordinance had to be followed during outbreaks of plague.

In 1481, Utrecht rebelled against its bishop, with a bloody civil war as a result. When the rebels also started interfering with the political affairs of Holland it became a major conflict which lasted two years. It ended with the defeat of the rebels and with a plague epidemic in the city, probably brought there by soldiers from Holland. Plague was back in 1490-91, 1493-94, 1502, 1506-07, 1514-15, 1518-20, (1523?), 1525, 1530, 1532, 1534, (1538?), 1545, 1554-57, (1567?), (1569?), 1574-77, 1581, 1585-86, 1588, 1593, 1597-99, (1600?), 1602-03, 1613-14, 1616-18, (1623?), 1624-31, 1634-38, 1655-60, and 1662-68. This string of years suggests that after plague arrived, it could linger for several years. This phenomenon is well known from other towns (Biraben 1975, 1, 114; Cohn 2002, 189 on Geneva; Slack 1985, 67-68, 133, 144-172; Thoen, Devos 1998, 32 table 3). The best evidence for the lingering of plague in Utrecht comes from the burial registers that have been preserved since 1623. The data were compiled on a weekly basis and appear to be complete, although an under registration of 1% to 3% is to be expected (Rommes 1990, 264-265). Since September 1624, recognized plague victims had the word «plague» (*pest*, *peste*) or simply a «p» behind their names. This allows us to draw up statistics of the number of plague victims, which is rare for Dutch towns[12].

The burial registers show very high mortality in the summer of 1624, but plague cannot have been the cause, because in the middle of August only 18 houses were infected by plague and early in September the council stated that there was 'not much plague' in the city. The cause of the high mortality in the summer of 1624 was an outbreak of dysentery, against which measures were taken by the council in July (Rommes 1991, 100).

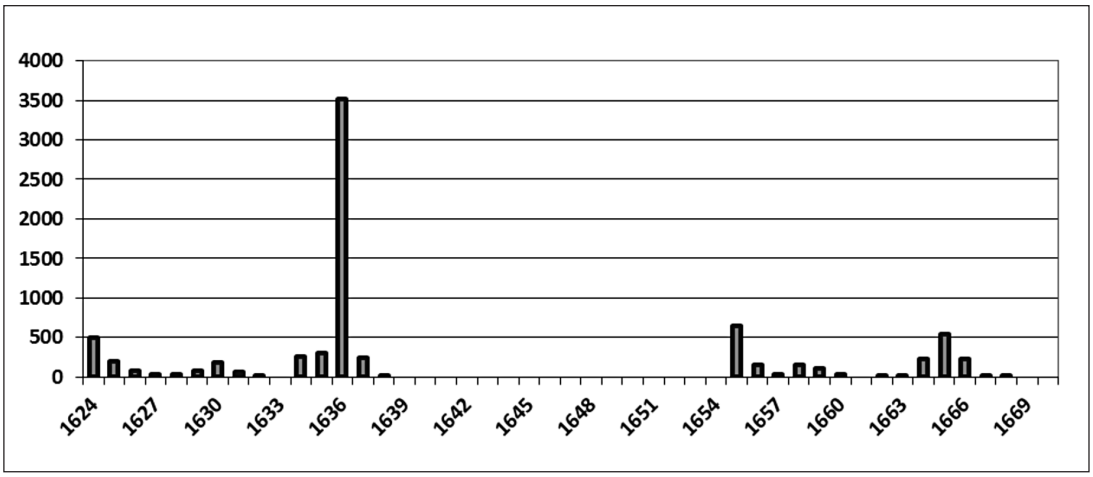
The registration of plague victims shows us is that in every year from 1624 to 1632 people in Utrecht were recognized as having died of plague. If we compare this with other archival information, we can see that the council only reacted to plague in some of these years. From the number of people dying we can understand why. After an estimated 500 victims in 1624, plague mortality dropped to 200 in 1625, and then to 82, 36, 39 and 82 in the following years[13]. Most of the plague victims lived in the poorer parts of town, so the elite probably did not feel threatened. Besides, there were more important things to deal with. Trade and industry had to continue as usual, and there were bad harvests, a river flooding (1624) and nearby Spanish troops. The Spanish army occupied Amersfoort in 1629 and pillaged the countryside. Military reinforcements arrived in Utrecht and this probably helped to spread plague. The number of victims jumped to 182 in 1630, but in the next years the disease slowly disappeared: 68 victims in 1631 and only 1 in 1632. In total almost 1.200 people died of plague in nine years.

In February 1634, plague was back in Utrecht. It may have come from Den Bosch in the south or from Rotterdam in the west. In the early stages of the outbreak most victims lived in a few neighboring streets in the southern part of town. From there it took several months for the disease to spread. It was only in the course of July and August that we can speak of a real epidemic, but still there were never more than 25 plague victims in a week. After the middle of August the number of victims suddenly dropped, but rose again from the end of September to early November. Next, the relatively cold winter halted the plague. By then, the disease had spread in a northern direction, but most victims still fell in the southern parts of town. In total 250 people died of plague in 1634, which was to no great concern to the city council. It was only at the end of December that trade in clothes and textiles from «contaminated places» was banned.

In the first half of 1635, not many people died of plague. Even in June and July there were never more than a couple of victims in a week. However, in August things changed. Slowly plague mortality rose to a peak of 32 victims in the last week of October. The disease had now spread over most of Utrecht and its suburbs. The council took some measures in September and again in November, but was not very worried because the outbreak was relatively mild in comparison to other cities. The Plague Ordinance was not yet considered necessary, although the epidemic had already killed more than 500 people!

During the mild winter of 1635-36, plague continued to kill people, so the trade in second hand goods from infected houses was banned in February. Early in April, the weekly number of victims exceeded 20 and this rose to 47 in the middle of May. By now, there were victims all over town, with some streets and neighborhoods particularly badly hit. With mortality rising, the plague hospital became overburdened and out of money in June. A second plague hospital had to be opened and a few old monasteries were made ready to receive plague victims. The Plague Ordinance was finally proclaimed in August, after more than 100 people had died of plague in one week. Later that month, plague mortality reached a peak with 213 victims in a week. Because of the many burials three parish churches were closed for the Sunday

Fig. 2. *Plague mortality in Utrecht, 1624-1670*

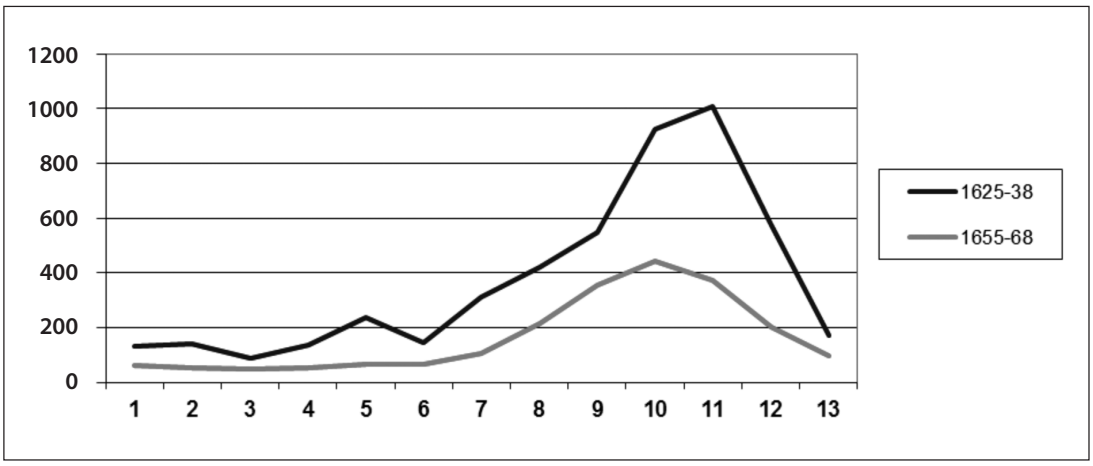


services. People living outside the town walls were not be buried in the parish churches anymore, but in a new cemetery. In the winter, mortality dropped, which was a cause for a celebration in the churches in January 1637. However, plague had not disappeared yet, and in the course of 1637 there were another 249 victims and there were 6 more in 1638. In total, in five years at least 4.300 people were killed by plague and there must have been hundreds of victims of other diseases. Most victims lived in the poorest parts of town, especially around the cities gates. The houses of the well-to-do, along the canals, were mostly spared[14].

From 1638 to 1655, Utrecht was free of plague. It may have been the first time since the 14th century that plague was absent for so long. When the disease returned in 1655, it came in a very different way than in the previous epidemic. In 1634, the disease had entered the city unnoticed, but now people saw it coming. In the middle of July the council still hoped to prevent an outbreak by banning the sale of cucumbers[15], but by then the disease had already made its first victims. Most early cases were in the vicinity of the southern gate and near the church of Saint Jacob in the north of the city. The disease spread quickly, so within a short time the plague hospital opened its doors and the Plague Ordinance was proclaimed. After a month, additional plague hospitals were opened and poor people with plague were ordered to go to there. Refusal would mean they lost their charity support. The trade in old clothes from Leiden, and in products like meat and straw was suspended. The swift reactions by the authorities were completely the opposite from the complacency during the outbreak of the 1630s. At the end of the year the council was happy to announce that plague had only killed 640 people. Because trade was hindered by rumors of huge mortality in Utrecht, the council asked the publishers of several journals to print the true mortality figures. After 1655, plague remained present in a number of backstreets, with mortality occasionally rising and falling for five more years. In the first half of 1660 the last plague victims were registered. In total plague had killed 1.105 people in six years.

Early in 1662 there were a few isolated cases of plague, but no epidemic followed.

Fig. 3. *Plague mortality in Utrecht. Number of victims in 4-weekly periods*



There were some more victims from the autumn of 1663 until the spring of 1664, when plague mortality suddenly increased. The outbreak lasted until the winter. In the spring of 1665 the disease started to spread again, with a mortality peak in October (60 deaths in one week). Plague mortality continued until November 1666, after which only sporadic cases were reported in 1667 and 1668. By then, there had been plague mortality for seven years in a row, but there were only 1.034 recognized victims. Again, in the 1660s plague mortality was largely concentrated in the neighborhoods around the city's northern and southern gates. The council had taken the usual measures. The Plague Ordinance was reintroduced in August 1664. Trade in textiles, skins, hemp and flax was banned, unless there was an official document which stated that the products came from uninfected houses, cellars or warehouses.

To summarize, for centuries plague was an important part of life in Utrecht. Between 1620 and 1670, in more than half of the years people died of plague, and it seems very likely that the threat of plague was as great in the 17th century as in the 16th and in most of the 15th century. In the 17th century, plague struck Utrecht six or seven times, but most outbreaks were relatively mild. Total mortality never rose above 15% in a single year. Information on burials from the accounts of three parish churches suggests that mortality in the plague years between 1561 and 1620 probably never rose to more than three times the average of previous years, which seems more or less consistent with the level of mortality after 1620 (Rommes 1991, 98-99, 119).

The total number of victims in Utrecht between 1624 and 1670 was at least 7.650, 12.5% of all the registered burials in these years. This means that plague was relatively less important as a cause of death than in cities like Basel (28% in 1621-70) and London (18% in 1621-70) (Biraben 1975, 1, 194-197). Most people died of plague in the summer and the autumn, with a peak in October (figure 3). The mortality data from 1624 to 1638 show that 51% of the plague victims were children and young adults, 40% were adults and 9% unnamed victims who had died in the plague hospital. Among all the other people who died in these years, 55% were children and young adults and 45% were adults, so plague didn't cause excess mor-

Tab. 1. *Estimates on plague victims* during epidemics in Holland-Utrecht 1620-1670*

	1620s	1630s	1650s	1660s
Alkmaar			900 (1655-56)	
Amsterdam	13.000 (1623-25)	17.000 (1635-36)	12.100 (1655-56)	20.000 (1663-64)
Delft	3.300 (1624)			
Dordrecht		2.520 (1636-37)	885 (1657)	800 (1665-56)
Edam				100 (1664-67)
Enkhuizen		1.860-2.215 (1636-68)	2.075-2.435 (1652-54)	1.000-1.250 (1666-68)
Gouda	750 (1625)	1.200 (1635-36)		
Haarlem		7.100 (1636)		*1.071 (1664)*
Hoorn			3.300 (1656)	
Leiden	7.450 (1624-25)	18.000 (1635-36)	19.150 (1654-55)	1.800-2.050 (1664)
Oudewater	210-350			
(1624-27)	500-750 (1636)	0-30 (1654)	200 (1666)	
Rotterdam	1.800 (1625)	2.550 (1635)	*541 (1655-57)*	*902 (1663-67)*
Schiedam	0-50 (1625)	640 (1635-36)		0-50 (1664-65)
Utrecht	*1.200 (1624-31)*	*4.300 (1634-38)*	*1.105 (1655-60)*	*1.034 (1662-68)*
Wijk bij	80 (1625)	750 (1635-38)	0-25* (1655-58)	50 (1666-67)
Duurstede				

*Plague victims calculated from excess mortality (above 35 per thousand).
Italics: counted number of plague deaths.
Sources: Dijkstra (1921); Frijhof, Nusteling, Spies (1989); Mentink, Van der Woude (1965); Rommes (1990); Steendijk-Kuypers (1994).

tality among children and young adults in Utrecht in this period. Rich and poor were unequally afflicted by plague. The disease could stay for months in the backstreets and the suburbs, only occasionally spreading to the rest of the city. In Utrecht, especially a few suburbs and streets close to the northern and the southern gates were very often visited by plague. The people who lived there must have grown accustomed to its presence. For them plague became «an integral part of urban life» (Slack 1985, 111-112), and was just another part of the daily struggle against poverty and disease. Measures to prevent plague from spreading by trying to isolate the sick and their houses from the rest of the community were doomed to fail. People continued to visit their plague stricken relatives or neighbors and it was difficult to interfere with this. In Groningen in 1623, the population actually revolted against regulations that forbade the burial of plague victims by their neighbors (Huisman 1992, 152-159). There were, however, also very different reactions to outbreaks of plague. Numerous are the references to mayors, aldermen, councilors, merchants, noblemen and clergymen who fled in the face of plague, thereby possibly spreading the infection.

Estimates on plague mortality in Holland-Utrecht 1620-1670. Utrecht was part of the highly urbanized and densely populated Holland-Utrecht region. Here were ideal circumstances for plague to spread. This raises the question how many people died of plague in these two provinces. To make an estimate I have collected the

Tab. 2. *Estimates on plague mortality* during epidemics in Holland-Utrecht 1620-1670*

	1620s		1630s		1650s		1660s	
Alkmaar					7%	1655-56		
Amsterdam	12%	1623-25	12%	1635-36	7%	1655-56	10%	1663-64
Delft	17%	1624						
Dordrecht			11%	1636-37	4%	1657	3%	1666-67
Edam							2%	1664-67
Enkhuizen			10-11,5%	1636	11,5-13,5%	1652-54	6-8%	1666-68
Gouda	5%	1625	7%	1635-36				
Haarlem			18%	1636			*3%*	*1664*
Hoorn					16,5%	1656		
Leiden	17%	1624-25	36%	1635-36	36%	1654-55	3-4%	1664
Oudewater	8-13%	1624-27	19-28%	1636	0-1%	1654	6%	1666
Rotterdam	9%	1625	9%	1635-36	*2%*	*1655-57*	*3%*	*1663-67*
Schiedam	1%	1625	10%	1635-36			0-1%	1664-65
Utrecht	*4%*	*1624-31*	*14%*	*1634-38*	*3%*	*1655-60*	*3%*	*1662-68*
Wijk bij Duurstede	3%	1625	27%	1635-38	0-1%	1655-58	2%	1666-67
Average	11,3-11,4%		16,4-16,6%		10,0-10,1%		6,4-6,5%	

*Plague mortality = excess mortality (above 35 per thousand).
Italics: counted number of plague deaths.
Sources: Dijkstra (1921); Frijhof, Nusteling, Spies (1989); Mentink, Van der Woude (1965); Rommes (1990); Steendijk-Kuypers (1994).

available information from the historical literature in tables 1 and 2. Unfortunately, data are completely lacking for several towns (Amersfoort, The Hague), or are limited to mortality in only one year although plague struck several years in a row (Delft and Gouda in the 1620s, Haarlem and Rotterdam in the 1630s, Dordrecht in the 1650s, Haarlem in the 1660s). Furthermore, for Delft, a low figure is used for mortality in 1624, although possibly more than a third of the population died that year (Noordegraaf, Valk 1996, 57, 244). For Oudewater, the burial records have been used, but these may have been incomplete. According to the town's magistrates, a third of the population died of plague in the 1620s and half of the people perished in 1636 (Rommes 1990, 258, 260). To summarize, plague mortality might have been higher than the data in tables 1 and 2 suggest.

If we add up the numbers for the plague epidemic in the 1620s, we can estimate that plague mortality in the nine towns for which we have information was 27.780-27.970 on a population of 245.000: 11,3-11,4% died. If we project this percentage on the total urban population of 413.000 in 1620, making the assumption that all cities were infected, it follows that 46.750-47.100 people would have died (see table 4). In this same crude way the available information on plague mortality in the 1630s, 1650s and 1660s has been used to make estimates of total urban mortality by plague[16]. In the 1630s this would amount to 16,4-16,6% of the urban population. In the 1650s mortality was lower, 10,0-10,1% of the urban population, and in the 1660's only 6,4-6,5% of the urban population would have died of plague. This leads to estimates of total urban plague mortality in the 1630s of 73.900-74.700, in the 1650s of 56.550-57.150 and in the 1660s to 36.050-36.800.

All the mortality data are urban. Unfortunately, there is hardly any information

on rural mortality from this region, because registrations of burials often start after 1670 or are incomplete. So it is hard to say how widespread plague was in the countryside and how many people died of it, which makes the concept of territorial pervasiveness (proportion of the communities affected over the total) very difficult to apply[17]. However, we know from different sources that many villages were struck by plague during the major outbreaks of the 17th century: 1602-05, 1624-25, 1635-37, 1654-56, and 1665-68. Take for example the Gooi and Vechtstreek, a region with villages and a few small towns between Amsterdam, Utrecht and Amersfoort. In the 17th century a growing number of rich inhabitants of Amsterdam bought farms there and rebuilt them into country houses to spend their summers away from urban life. It caused a seasonal migration that increased the chances of spreading plague between town and countryside. As a result there was plague during all the major outbreaks of the 17th century.

Especially in the middle of the 1630s plague was widespread in the countryside, prompting the Provincial Estates of Utrecht, for the first time, to issue regulations comparable to those in the urban plague ordinances. Veenendaal, a large village 30 kilometers to the southeast of Utrecht, lost a quarter of its population in 1636. In that same year local sources mention high numbers of orphaned children in the countryside (Rommes 1991, 106). In the 1650s there are references to plague in a few villages, but not many. However, plague was widespread in the countryside in the 1660s. Veenendaal was struck again, and the church records of two nearby villages show that at least 6-7% of the members of the Dutch Reformed Church there died of plague in 1666-67.

Although it is clear that plague was often widespread in the countryside, it remains unclear how many villages experienced plague and how many villagers died. That plague could cause heavy mortality in the countryside is evident, but mortality must have varied from village to village, and from epidemic to epidemic. Because of the lack of sources we can only hypothesize on plague mortality in the Holland-Utrecht countryside. Two estimates are made, one based on an optimistic scenario A, and one on a more pessimistic scenario B. Scenario A assumes that plague struck one in five villages[18] and killed on average 5% of the population in these villages. It would mean that rural plague mortality in the 1620s and 1630s was about 3.500 (based on the rural population total in 1620), and in the 1650s and 1660s 4.150 (based on the rural population total in 1670). However, because of the short distances between town and countryside and based on the circumstantial evidence we have, we can also hypothesize a less favorable course of events in which plague struck two in five villages and the average plague mortality was 10% (scenario B). In that case, rural plague mortality would have been about 13.900 in the 1620s and 1630s, and 16.600 in the 1650s and 1660s (table 3).

From the information we have at the moment, it appears that in the 1630s the pessimistic scenario is by far the most likely. So we may hypothesize that during this outbreak plague killed (at the very least) 13.900 people in the countryside of Holland-Utrecht. In the 1650s the optimistic scenario seems more credible (4.150 plague victims), because it appears that not many villages were struck.

Tab. 3. *Estimates on urban and rural plague victims in Holland-Utrecht 1620-1670 (x 1.000)*

	1620s	1630s	1650s	1660s	Total
Towns	46,75-47,10	73,90-74,70	56,55-57,15	36,05-36,80	213,25-215,75
Villages	3,50-13,90	3,50-13,90	4,15-16,60	4,15-16,60	15,30-61,00
Total	50,25-61,00	77,40-88,60	60,70-73,75	40,20-53,40	228,55-276,75

Sources: see text.

Unfortunately, for the 1620s and 1660s it is more difficult to make estimates. Probably rural plague mortality then was somewhere between 5.000 and 10.000.

Added up, the estimates for urban and rural plague mortality lead to an overall estimate of 228.550 to 276,750 plague victims in Holland-Utrecht between 1620 and 1670. By far the worst epidemic was in the middle of the 1630s, when probably (at least) 90.000 people died of plague. During the other outbreaks plague mortality stayed well below this number. On average it seems that plague killed between 4% and 12% of the population in Holland-Utrecht during epidemics. If this was the same in the rest of the country, then about 500.000 people would have died of plague in the Netherlands in these fifty years. To make an estimate for the whole 17th century, we have to add the outbreaks of the early 1600s and of the 1610s, which would lift the total to 550.000 or possibly even 600.000. For an area with a population of 1,4 to 1,6 million in 1600, and 1,85 to 1,9 million in 1650 and in 1700 (De Vries, Van der Woude 1995, 71), the number of plague victims seems high, much higher at least than in England and Wales, where two to three times as many people lived in the 17th century than in the Netherlands. Relatively speaking, plague mortality in the Netherlands seems comparable to that in Northern Italy, where 2 million people died of plague in the 17th century on a total population of 6,5 million (Alfani 2013, 411 table 2). However, a huge difference between seventeenth-century Northern Italy and the Netherlands, is that the aforementioned victims were caused by just one plague wave in Northern Italy (in 1629-30) while in the Netherlands they are the combined result of six distinct epidemics.

Plague and population growth in Holland-Utrecht. In Northern Italy, plague mortality stopped demographic growth for half a century or more, but this was not the case in Holland-Utrecht. In 1620, about 760.000 people lived in this Dutch region, 413.000 in the towns (54%) and 347.000 (46%) in villages and hamlets. Amsterdam was by far the largest city (105.000 inhabitants), followed by Leiden (44.750), Haarlem (39.500) and Utrecht (30.000). In the next 50 years, the total population of this region grew by 29% to 982.000 (table 4). So, despite high plague mortality the population continued to grow. Population growth was both rural and urban. Urban growth was largely concentrated in two cities, Amsterdam and Rotterdam, that both doubled their population. Other cities grew only modestly (Leiden, Utrecht), stagnated or declined.

In the early 1980s, Ad van der Woude suggested that Dutch population growth might have been possible by surpluses of births over deaths, at least in the 16th cen-

Tab. 4. *Population of Holland-Utrecht 1620-1670*

	1620	1670	Growth
Urban	413.000	567.000	154.000 (37%)
Rural	347.000	415.000	68.000 (20%)
Total	760.000	982.000	222.000 (29%)

Sources: see text.

tury and possibly even in a part of the 17th century. For the 17th century he estimated (urban) mortality on an average of 35 per thousand, which was much lower than he and Mentink had thought in 1965, when they wrote that urban mortality rates of 40-45 per thousand were the rule in the 17th century (Van der Woude 1982; Mentink, Van der Woude 1965, 54). This earlier estimate is more consistent with more recent figures on urban mortality. In Utrecht between 1620 and 1670 the overall mortality rate was 41 per thousand, and estimates on mortality in other cities point at roughly the same (Enkhuizen) or even higher levels: Amsterdam 1601-1675 45 per thousand, Dordrecht 1636-1680 ≥ 49 per thousand, Alkmaar 1650-1657 57 per thousand. Because of the huge mortality in plague years, Leiden must have had a very high overall mortality rate (Frijhoff, Nusteling, Spies 1998, 98-99; Nusteling 1985, 42; Rommes 1998, 34-35; Vis 1991, 69; Willemsen 1988,178-179).

The theory of the urban graveyard effect seems to be valid for this part of the Netherlands in this period. More people must have died in the towns than were born there, so urban population growth could only come from net migration. With a birth rate of 34 per thousand, the population growth of Amsterdam between 1600 and 1675 was only possible because of a migration surplus of 267.000. In the same period, Utrecht had a migration surplus of about 18.000 (Nusteling 1985, 42; Rommes 1998, 32). We can see from the marriage bans, the marriage registers and the registration of new citizens that Dutch cities were full of migrants. In Amsterdam in 1625-75 almost 62% of the betrothed was born outside the city, in Rotterdam in 1650-54 it was about 45%, in Leiden in 1641-50 67%, in Utrecht in 1641-50 45%, in Amersfoort in 1641-50 36% (Kuijpers, 2005; Lesger 2006; Nusteling 1985, 35-49, 240-243; Rommes 1998, 76-91).

Urban growth could not have come from migration from the surrounding countryside, the natural *hinterland* of the cities. Even if we consider a very favorable birth rate of 40 per thousand and a death rate of 30 per thousand in the countryside, this would only have produced a surplus of births over deaths of, at most, 200.000 in 50 years[19]. This was not even enough to make up for the excess mortality of Amsterdam alone. Urban growth was only possible because the towns were able to attract enough migrants from outside their *hinterland*. We see this, for instance, in the marriage registers of Utrecht. Between 1600 and 1670 only 30,5% of the migrants came from Holland-Utrecht. Another 28,5% came from other parts of the Dutch Republic, 30% from Germany and 11% from other parts of Europe. There was even a black man from Angola marrying a local girl, and a black woman from Angola who married a German in 1648.

What is especially striking, is the importance of foreign immigration. In Amsterdam between 1600 and 1675 57,5% of the migrants among the betrothed came from abroad. Most of them were from Germany, but there were also many young men and women from what is now Belgium and Scandinavia[20]. In Rotterdam (1650-54) 50% of the bridegrooms and 31% of the brides among the migrants were from abroad, and in Leiden (1641-50) the percentages were even higher. In Leiden there were twice as many migrants from Belgium and Northern France than from Germany, in Rotterdam the numbers were roughly equal. In all these cities the migration from the direct *hinterland* seems to have been relatively modest, although this particular migration is probably underestimated in the marriage registers because already married couples (with children) were more likely to migrate over short distances.

The foreign migration was not just directed at the major urban centers. Foreign immigrants also settled in smaller towns like Edam and Wijk bij Duurstede, and they even lived in the countryside. Many of the rural migrants came as seasonal workers from German regions like Westphalia, the Rhineland and Lower Saxony. In the spring they would arrive to work in the fields (haying and mowing), to dig peat or to perform other forms of seasonal labor. In the late summer or early autumn they returned home with their hard earned cash (Lucassen 1987). Although most of them were married and had a family at home, there were also bachelors who married a Dutch girl and never went back. It is easy to see why Thomas Malthus once called Holland the «grave of Germany».

Conclusion. The frequency of the plague waves in the Netherlands seems to fit a familiar pattern. There were major outbreaks every 10 to 15 years until the middle of the 15th century, and then every 5 to 10 years until the 1630s, possibly skipping the 1540s. In the 1650s and 1660s the disease was back for the last time. Through the centuries, plague went from town to town and usually also struck the countryside. It never became merely an urban disease. In the major towns plague could linger for several years, which was very clear in Utrecht. This helped plague to become temporarily endemic during several decades in the 15th, 16th and 17th centuries. It seems there existed an equilibrium between *Yersinia Pestis*, the agents (insects?) that spread it and the local population. When the equilibrium disappeared, the disease spread. The question is what changed the situation: the introduction of a more virulent strain of *Yersinia Pestis* from outside, or local circumstances? Did weather conditions play a part, with dry, hot summers with occasional heavy showers stimulating the reproduction of fleas, flies and other insects that spread diseases, and also contaminating water and food? In the plague years 1602 (Amsterdam) and 1636 (Nijmegen) there was mention of extraordinary swarms of mosquitoes: could they have spread plague, as is suggested by Cohn (2002, 187)?

In the 17th century, plague possibly left the country between 1607 and 1610, and again between 1638 and the early 1650s. These years do not match the plague free periods (1612-24, 1654-64) in England and Wales (Slack 1985, 67-68). Since Dutch ships are often blamed for introducing plague to England (Slack 1985, 68, 313, 323-

Map of the Netherlands in the middle of the 19th century. By then the former county Holland was split between in a northern and a southern province (Noord-Holland and Zuid-Holland)

324), the question is why this didn't happen in the 1610s and the 1650s. In the latter case the explanation lies in the Anglo-Dutch naval war of 1652-54, which reduced shipping between the countries to a minimum, but it is less clear why plague didn't cross the North Sea in the 1610s. Were the outbreaks in the Netherlands in 1613-14 and 1616-18 too limited, or were effective quarantines imposed in England? In the 1640s it was the other way around, with plague raging in England and not reaching the Dutch ports. This shows that it is too easy to speak

of general plague waves that simply swept all over Europe. There were situations and circumstances that helped or hampered the diffusion of plague.

Plague in the Netherlands often spread slowly, which seems to fit in a Northwest European pattern. However, in the 17th century plague killed as many people in the Netherlands as in Northern Italy. But there were striking differences. While in the Netherlands plague was present for many years in a row, becoming temporarily endemic, in Italy plague struck only during a few years and then disappeared. The Italian outbreaks caused very high mortality in a relatively short time, while in the Netherlands mortality usually stayed below 15%. Of course there were exceptions to this general pattern, for instance the very high mortality in Leiden and in other towns in the 1630s. It may well be the simultaneous outbreak of different diseases that explains these cases of exceptionally high mortality. It is striking that in many plague years contemporaries also mentioned other diseases, usually dysentery and «fevers».

Despite the occasional cases of extremely high local mortality, plague could not stop Dutch population growth. Especially in the urban core area, Holland, economic growth continued to provide jobs, high wages and other opportunities that were attractive for migrants from all over Northwestern Europe. Added to the favorable socio-economic situation was the relative religious freedom, especially in major cities like Amsterdam and Rotterdam, which attracted especially protestant and Jewish migrants from many parts of Europe. The fact that Holland was hardly troubled by warfare since the late 1570s contributed to the favorable circumstances (Utrecht was not so lucky). It made Holland a magnet for long distance migrants in the 17th century and stimulated population growth, despite high plague mortality.

[1] Some scholars have had serious doubts if all three pandemics were in fact the disease caused by *Yersinia Pestis*. See for instance Cohn (2002). His interpretation of plague epidemiology differs fundamentally from Benedictow (2004, 8-56). This debate will, however, not be pursued in this article.

[2] Noordegraaf, Valk (1988). I have used the second edition here (1996), which contains a short update on the last pages.

[3] In some of these years plague in Leiden is extremely likely, because there were outbreaks of this disease in neighbouring towns and because mortality peaked in the late summer and autumn.

[4] The evidence for plague in 1349 is not very convincing. Most things that have been written on the Black Death of 1349-50 are based on Meinsma (1924). His book is a curious mix of 'hard evidence', unfounded hypotheses and fiction.

[5] Their geographical interpretation is based on Benedictow (2004, 203-208).

[6] In the general plague years, usually heavy mortality or 'plague' are mentioned in the diocese of Utrecht, but since this covered a very large area we never know where exactly. We often see this: unspecified mentions of plague in a certain region, often a (part of a) county, diocese or duchy.

[7] Not included are periods with very high mortality in the 1370s, 1380s and 1390s of which we don't know if plague was the cause.

[8] These 25 cities are spread over the whole country, and have been chosen because of their size (> 5.000 inhabitants) and importance, and because there is information available for most of this period. I have currently started working on a much needed database on plague in the Netherlands.

[9] Dysentery struck Amersfoort and Utrecht in 1556-57, and in both towns there were also 'fevers'. In Alkmaar and Delft there was a contagious and deadly throat disease (Burri 1982, 25, 35). In Hoorn it was possibly not 'the' plague that struck (Steendijk-Kuypers 1994, 37,

190-191). It is very interesting that in England there was the same 'complex epidemic picture' in these years (Slack 1985, 71-72).
[10] It is not impossible that a few villages in the south were struck by plague coming from Flanders in the middle of the 1640s (a kind remark from Daniel Curtis).
[11] The first plague hospitals in the Netherlands appeared in the 15th century, but it was mostly in the 16th century that they were built as separate institutions (in Utrecht in the 1560s).
[12] There are some statistics on plague victims in Rotterdam (Mentink,Van der Woude 1965, 53-55). The parish priests of Maastricht also registered plague deaths (Klinkenberg 1990, 270, 280-281). In Utrecht plague was 'diagnosed' by grave diggers and sextons, definitely not by 'university-trained physicians' as in Milan (Cohn, Alfani 2007, 178).
[13] No doubt the actual number of plague victims was (much) higher, since people may die from plague before the outward symptoms are visible.
[14] Information on the professional occupation of the victims is often registered, but this does not point to excess mortality among the members of a particular professional group.
[15] Measures against the trade in fruit and vegetables existed at least since the first half of the 16th century.
[16] For the 1620s the urban population total of 1620 has been used (413.000). For the 1630's a total of 450.000 is realistic, because it allows for the fast growth of Amsterdam and Rotterdam since 1620. For the 1650s and 1660s the population total of 1670 (567.000) is credible.
[17] However, at the moment Daniel Curtis is researching this by systematically collecting all the available information.
[18] In the plague of 1720-22 in the Provence region of Southern France one in five villages and towns with less than 1.000 inhabitants were infected; Biraben (1975, 1, 287-289).
[19] With an average rural population of 381.000 there would have been 762.000 births and 571.500 deaths. According to a rather speculative estimate by Van Zanden and Prak, in the 17th century the birth rate in the countryside of Holland would have been 35,9 per thousand and the death rate 32,2 per thousand, which amounts to a rural birth surplus of only 70.000 (Van Zanden, Prak 2012, 241 table 1).
[20] On migration from Norway: Sicking, De Bles, Des Bouvrie (2004). For a more general view: Van Lottum (2007).

Bibliography

G. Alfani 2013, *Plague in Seventeenth-Century Europe and the Decline of Italy: an Epidemiological Hypothesis*, «European Review of Economic History», vol. 17, 4, 408-430.

O.J. Benedictow 2004, *The Black Death, 1346-1353. The Complete History*, The Boydell Press, Woodbridge.

J.-N. Biraben 1975, *Les hommes et la peste en France et dans les pays européens et méditerranéens*, Mouton, Paris-La Haye.

W. Blockmans 1980, *The Social and Economic Effects of Plague in the Low Countries 1349-1500*, «Belgisch Tijdschrift voor Filologie en Geschiedenis», 58, 833-863.

D. de Boer 1978, *Graaf en grafiek. Sociale en economische ontwikkelingen in het middeleeuwse 'Noordholland' tussen ± 1345 en ± 1415*, New Rhine Publishers, Leiden.

C. Bruneel 1977, *La mortalité dans les campagnes. Le duché de Brabant aux XVII^e et XVIII^e siècles*, Bibliothèque de l'Université, Louvain (Receuil de travaux d'histoire et de philologie, série 6, fasc. 10).

R. Burri 1982, *Die Delfter Pest von 1557 nach den Beobachtungen von Petrus Forestus*, Juris Verlag, Zürich.

J.W.C. van Campen (hrsg. von) 1940, *Notae quotidianae van Aernout van Buchell*, Kemink, Utrecht.

J. Charlier 1969, *La peste à Bruxelles de 1667 à 1669 et ses conséquences démographiques*, Pro Civitate, Bruxelles, (Collection Histoire, s. 8, 20).

S.K. Cohn jr. 2002, *The Black Death transformed. Disease and culture in early Renaissance Europe*, Arnold-Oxford University Press, London-New York.

S.K. Cohn jr., G. Alfani 2007, *Households and Plague in Early Modern Italy*, «Journal of Interdisciplinary History», XXXVIII, 2, 177-205.

A. Croix 1981, *La Bretagne aux 16^e et 17^e siècles. La vie, la mort, la foi*, Maloine, Paris.

J.G. Dijkstra 1921, *Een epidemiologische beschouwing van de Nederlandsche pest-epidemieën der XVII^de eeuw*, Proefschrift Universiteit van Amsterdam, Amsterdam.

E.A. Eckert 1978, *Boundary Formation and Dif-*

fusion of Plague: Swiss Epidemics from 1562 to 1669, «Annales de Démographie historique», pp. 49-80 (= *La mortalité du passé*).
W. Frijhoff 1991, *Gods gave afgewezen. Op zoek naar genezing van de pest: Nijmegen, 1635-1636*, «Volkskundig Bulletin», 17, 143-170.
W.Th.E.A. Frijhoff *et alii* (redaktie) 1989, *Geschiedenis van Zutphen*, Walburg Pers, Zutphen.
W. Frijhoff, H. Nusteling, M. Spies (redaktie) 1998, *Geschiedenis van Dordrecht van 1572 tot 1813*, Uitgeverij Verloren, Hilversum.
S. Haensch, R. Bianucci, M. Signoli, M. Rajerison, M. Schultz 2010, *Distinct Clones of* Yersinia Pestis *Caused the Black Death*, «PLoS Pathogens», vol. 6, 10, 1-8.
P.D. 't Hart 1990, *Utrecht en de cholera, 1832-1910*, De Walburg Pers, Zutphen (Stichtse Historische Reeks, 15).
P. Holthuis 1993, *Frontierstad bij het scheiden van de markt. Deventer militair, demografisch, economisch 1578-1648*, Arko, Houten/Deventer.
P.C.M. Hoppenbrouwer 1992, *Een middeleeuwse samenleving. Het land van Heusden (ca. 1360-ca. 1515)*, Nederlands Agronomisch-Historisch Instituut, Groningen («A.A.G. Bijdragen», 32).
J. ten Hove 2005, *Geschiedenis van Zwolle*, Waanders, Zwolle.
F. Huisman 1992, *Stadsbelang en standsbesef. Gezondheidszorg en medisch beroep in Groningen 1500-1730*, Erasmus Publishing, Rotterdam.
W. ten Kate 1922, *De pestkeuren te Kampen*, «Nederlandsch Tijdschrift voor Geneeskunde», 66, 1655-1660.
J. Klinkenberg 1990, *Die quade sieckte. De pest in Maastricht in de zestiende en zeventiende eeuw*, «Tijdschrift voor Sociale Geschiedenis», 16, 3, 267-286.
E. Kuijpers 2005, *Migrantenstad. Immigratie en sociale verhoudingen in 17e-eeuws Amsterdam*, Uitgeverij Verloren, Hilversum.
J. Kuys, L. de Leeuw, V. Paquay, R. van Schaïk (ingel. en vert. door) 1983, *De Tielse kroniek. Een geschiedenis van de Lage Landen van de Volksverhuizing tot het midden van de vijftiende eeuw met een vervolg over de jaren 1552-1566*, Uitgeverij Verloren, Amsterdam.
R. Ladan 2012, *Gezondheidszorg in Leiden in de late middeleeuwen*, Uitgeverij Verloren, Hilversum.
C. Lesger 2006, *Variaties in de herkomstpatronen van nieuwe burgers in de Nederlandse steden omstreeks het midden van de zeventiende eeuw*, «Tijdschrift voor Sociale en Economische Geschiedenis», 3, 4, 118-139.
J. van Lottum 2007, *Across the North Sea. The Impact of the Dutch Republic on International Labour Migration, c. 1550-1850*, Aksant, Amsterdam.
P. Lourens, J. Lucassen 1997, *Inwoneraantallen van Nederlandse steden ca. 1300-1580*, Neha, Amsterdam.
J. Lucassen 1987, *Migrant Labour in Europe, 1600-1900. The drift to the North Sea*, Croom Helm, London.
K.O. Meinsma 1924, *De zwarte dood 1347-1352*, Thieme, Zutphen.
G.J. Mentink, A.M. van der Woude 1965*, De demografische ontwikkeling te Rotterdam en Cool in de 17e en 18e eeuw*, Rotterdams Gemeentearchief, Rotterdam.
L. Noordegraaf, G. Valk 1988, *De gave Gods. Pest in Holland vanaf de late middeleeuwen*, Uitgeverij Octavo, Bergen (1996², Bert Bakker, Amsterdam).
H. Nusteling 1979, *Binnen de vesting Nijmegen. Confessionele en demografische verhoudingen ten tijde van de Republiek*, Walburg Pers, Zutphen.
H.P.H. Nusteling 1985, *Welvaart en werkgelegenheid in Amsterdam 1540-1860. Een relaas over demografie, economie en sociale politiek van een wereldstad*, De Bataafsche Leeuw, Amsterdam-Dieren.
J. Revel 1970, *Autour d'une épidémie ancienne: la peste de 1666-1670*, «Revue d'Histoire moderne et contemporaine», XVII, 953-983.
R. Rommes 1990, *Pest in perspectief. Aspecten van een gevreesde ziekte in de vroegmoderne tijd*, «Tijdschrift voor Sociale Geschiedenis», 16, 3, 244-266.
R. Rommes 1991, *Op het spoor van de dood. De pest in en rond Utrecht*, «Jaarboek Oud-Utrecht», pp. 93-120.
R. Rommes 1998, *Oost, west, Utrecht best? Driehonderd jaar migratie en migranten in de stad Utrecht begin 16e-begin 19e eeuw*, Amsterdamse Historische reeks, Amsterdam.
R. van Schaïk 1987, *Belasting, bevolking en bezit in Gelre en Zutphen (1350-1550)*, Uitgeverij Verloren, Hilversum.
L. Sicking, H. de Bles, E. des Bouvrie (editors) 2004, *Dutch Light in the Norwegian night . Maritime Relations and Migration Across the North Sea in Early Modern Times*, Uitgeverij Verloren, Hilversum.
P. Slack 1985, *The Impact of Plague in Tudor and Stuart England*, Routledge and Kegan Paul, London.

J. Steendijk-Kuypers 1994, *Volksgezondheidszorg in de 16e en 17e eeuw te Hoorn. Een bijdrage tot de beeldvorming van sociaal-geneeskundige structuren in een stedelijke samenleving*, Erasmus Publishing, Rotterdam.

J. Theilman, F. Cate 2007, *A Plague of Plagues: the Problem of Plague Diagnosis in medieval England*, «Journal of Interdisciplinary History», XXXVII, 3, 371-393.

E. Thoen, I. Devos 1998, *Pest in de Zuidelijke Nederlanden tijdens de middeleeuwen en de modern tijden. Een status questionis over de ziekte in haar sociaal-economische context*, *De pest in de Nederlanden: medisch-historische beschouwingen 650 jaar na de Zwarte Dood*, Vierde symposium Geschiedenis der Geneeskundige Wetenschappen, Verhandelingen Koninklijke Academie voor Geneeskunde van België, Brussel, 19-43.

M. van Tielhof 2002, *The Mother of all Trades. The Baltic Grain Trade in Amsterdam from the late 16th to the early 19th Century*, Brill, Leiden-Boston-Köln.

S.E. Veldhuijzen (redaktie) 1993, *David Beck. Spiegel van mijn leven; een Haags dagboek uit 1624*, Uitgeverij Verloren, Hilversum.

G.N.M. Vis 1991, *650 jaar ziekenzorg in Alkmaar 1341-1991*, Uitgeverij Verloren, Hilversum.

J. de Vries 1978, *Barges and Capitalism. Passenger Transportation in the Dutch Economy, 1632-1839*, «A.A.G. Bijdragen», 21, 33-398.

J. de Vries, A. van der Woude 1995, *Nederland 1500-1815. De eerste ronde van moderne economische groei*, Uitgeverij Balans, Amsterdam.

R.T.H. Willemsen 1988, *Enkhuizen tijdens de Republiek. Een economisch-historisch onderzoek naar stad en samenleving van de 16e tot de 19e eeuw*, Uitgeverij Verloren, Hilversum.

A.M. van der Woude 1982, *Population Developments in the Northern Netherlands 1500-1800 and the Validity of the Urban Graveyard effect*, «Annales de Démographie historique», 55-75 (= *Villes du passé*).

J.L. van Zanden 1988, *Op zoek naar de missing link. Hypothesen over de opkomst van Holland in de late Middeleeuwen en vroeg-moderne tijd*, «Tijdschrift voor Sociale Geschiedenis», 14, 4, 359-386.

J.L. van Zanden, M. Prak 2012, *Demographic Change and Migration Flows in Holland between 1500 and 1800*, in M. van der Linden, L. Lucassen (edited by), *Working on Labor. Essays in honor of Jan Lucassen*, Brill, Leiden-Boston, 237-246.

Summary

Plague in Northwestern Europe. The Dutch experience, 1350-1670

Like other European countries, the Netherlands were struck by plague since the middle of the 14th century. The disease returned frequently, until it finally disappeared in the late 1660s. The relatively high levels of urbanization and of population density, the active involvement in international trade and the fairly continual warfare favoured the spread of the disease. In the cities plague often lingered for many years, especially in specific, poorer neighbourhoods. Data from the 17th century show that plague mortality in the major cities usually stayed well below the levels experienced by many Italian cities in that period, but there were exceptions with local mortality reaching up to 50%. However, in the core area of the country plague mortality couldn't stop urbanization nor general population growth, because of the long distance migration from other parts of Northwestern Europe.

Riassunto

La peste nell'Europa nordoccidentale. L'esperienza olandese, 1350-1670

Come altre parti d'Europa, i Paesi Bassi furono colpiti dalla peste sin dalla metà del XIV secolo. La malattia fece frequente ritorno, fino alla sua sparizione alla fine degli anni Sessanta del XVII secolo. I tassi di urbanizzazione e la densità demografica relativamente elevati, l'impegno attivo nel commercio internazionale e lo stato di guerra pressoché continua favorirono il diffondersi della malattia. Nelle città, la peste spesso si trattenne per molti anni consecutivi, specialmente in alcuni precisi quartieri - i più poveri. I dati relativi al XVII secolo mostrano che la mortalità per peste nelle maggiori città di solito rimase ben al di sotto dei livelli tipici di molte città italiane nello stesso periodo, ma vi furono eccezioni con tassi di mortalità che toccarono il 50%. Tuttavia, nelle principali regioni del Paese la mortalità non poté arrestare l'urbanizzazione né la crescita generale della popolazione, a causa della migrazione a lunga distanza proveniente da altre parti dell'Europa nord-occidentale.

Keywords
Plague; Population growth; Urbanization; Netherlands; Long distance migration.

Parole chiave
Peste; Crescita demografica; Urbanizzazione; Paesi Bassi; Migrazione a lunga distanza.