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## Was Plague an Exclusively Urban Phenomenon? Plague Mortality in the Seventeenth-Century Low Countries

Much current scholarship argues that in early modern northwestern Europe, plagues not only were less severe than the seventeenth-century plagues that ravaged Italy; they were also far less territorially pervasive—remaining mainly in the cities and not spreading easily into the countryside. Such a view connects to a long historiography about early modern plague in northwestern Europe that largely establishes the disease as an urban phenomenon, a narrative that is still dominant.

This view adds further weight to the “urban graveyards” notion that depicts early modern cities as death traps. From this perspective, extreme rural cases of plague, such as the famous examples of Colyton (Devon) in 1645/6 or Eyam (Derbyshire) in 1665/6 in England, look exceptional, unrepresentative of general epidemiological trends. Scholars are more likely to attribute high early modern rural mortality rates to more environmentally specific diseases, such as malaria or intestinal infections from the marshlands, as causes than plague. Only recently has a counter-argument appeared, hinting at plague’s capacity to hit isolated areas of the countryside in northwestern Europe—for example, the rural Highlands of Scotland—yet systematic research on the subject is still lacking.<sup>1</sup>

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1 For the more territorially pervasive Italian plagues, see Guido Alfani, “Plague in Seventeenth-Century Europe and the Decline of Italy: An Epidemiological Hypothesis,”

This article tests the validity of the long-established claim that northern Europe's experience with early modern plague was largely an urban affair. It employs a new database of mortality information taken from hundreds of burial records across the seventeenth-century Low Countries. Understanding the nature and extent of this phenomenon is important, since a putative reason for northwestern European cities' resilience in the wake of plague epidemics was the reservoir of rural people available to replenish the depleted cities. The seventeenth-century Low Countries are an appropriate laboratory for testing these views since, aside from the availability of source material for the cities and countryside, the Low Countries had sharp contrasts between areas of high urbanization, such as Holland, and areas of relatively low urbanization and commercialization. By employing a regional comparison within the Low Countries, this article shows that plague epidemics in the core commercial and urban zones were not as severe as those in the regions that were far less-developed.

THE BURIALS DATABASE Systematic comparisons between burial records in the seventeenth-century Low Countries remain limited and restricted to small regions, or even to individual plague eruptions or cities. Even the premier book about early modern plague in Holland—"De Gave Gods": *De pest in Holland vanaf de late middeleeuwen*

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*European Review of Economic History*, XVII (2013) 408–430; for early modern plague as urban, Ian G. Doolittle, "The Effects of Plague on a Provincial Town in the Sixteenth and Seventeenth Centuries," *Medical History*, XIX (1975), 340; Paul Slack, *The Impact of Plague in Tudor and Stuart England* (London, 1985), 99, 110, 152, 159; E. Anthony Wrigley and Roger Schofield, *The Population History of England 1541–1871: A Reconstruction* (London, 1981), 668; Jean-Noël Biraben, *Les hommes et la peste en France et dans les pays Européens et Méditerranéens* (Paris, 1975), I, 299–302; William G. Naphy and Andrew Spicer, *The Black Death: A History of Plagues 1345–1730* (Stroud, 2001); for the high-mortality regime of early modern cities, Robert Woods, "Urban–Rural Mortality Differentials: An Unresolved Debate," *Population and Development Review*, XXIX (2003), 29–46; Gregory Clark and Neil Cummins, "Urbanization, Mortality, and Fertility in Malthusian England," *American Economic Review*, XCIX (2009), 242–247; Nico Voigtländer and Hans-Joachim Voth, "The Three Horsemen of Riches: Plague, War and Urbanization in Early Modern Europe," *Review of Economic Studies*, LXXX (2013), 774–811; for the extreme rural examples of Colyton and Eyam, Schofield, "An Anatomy of an Epidemic: Colyton, November 1645 to November 1646," in Slack (ed.), *The Plague Reconsidered* (Cambridge, 1977), 95–126; Leslie Bradley, "The Most Famous of All English Plagues: A Detailed Analysis of the Plague at Eyam 1665–6," *ibid.*, 63–94; for high rural mortality associated with other diseases, Mary Dobson, *Contours of Death and Disease in Early Modern England* (Cambridge, 1997); for rural plague in the Highlands, Richard D. Oram, "'It Cannot Be Decernit Quha Are Clean and Quha Are Foulle': Responses to Epidemic Disease in Sixteenth- and Seventeenth-Century Scotland," *Renaissance and Reformation*, XXX (2006/7), 13–38.

(Bergen, 1988) by Leo Noordegraaf and Gerrit Valk—concentrated more on culture, religion, and popular attitudes than on economic or demographic effects. Although it ventured rough estimates of plague deaths in its appendixes, it contained no systematic use of the burial records. Scholars may have avoided the burial records because of their flaws, which make the calculation of aggregate, absolute mortality figures virtually impossible. Indeed, church burial records did not routinely record every death. Relatives did not always have the finances to pay for a church or cemetery burial; in times of plague particularly, when many household members died quickly and unexpectedly, procuring the necessary funds could be a struggle. The scattered church accounts that recorded people buried in churchyards or cemeteries separately from those listed as receiving only the basic rights of a “church bell toll” are revealing in this respect. For example, in the town of Harderwijk from 1598 to 1622, only 708 people (44 percent) out of 1,628 with rights to the bells had paid for a grave. In the plague years of 1601 to 1604, the number decreased to less than 40 percent, and many of those only on the bells list were explicitly recorded as paupers. Many of the people who died in special plague houses (*pesthuizen*) were buried neither in nor around the church.<sup>2</sup>

2 The main regional demographic material about plague in the Low Countries includes Ronald Rommes, “Pest in perspectief: Aspecten van een geveerde ziekte in de vroegmoderne tijd,” *Tijdschrift voor Sociale Geschiedenis*, XVI (1990), 244–266; Claude Bruneel, *La mortalité dans les campagnes: le duché de Brabant aux XVIIe et XVIIIe siècles* (Louvain, 1977); Hans Van Werveke, “La mortalité catastrophique en Flandre au XVIIe siècle,” in Paul Harsin and Etienne Helin (eds.), *Actes du Colloque International de Démographie Historique: Problèmes de mortalité* (Paris, 1965), 457–464; Helin, “Recherches sur la mortalité dans la région liégeoise (XVe–XIXe siècles),” *ibid.*, 155–184; M. Amould, *Mortalités et épidémies sous l’Ancien Régime dans le Hainaut et quelques régions limitrophes* (Liège, 1965); Erik Thoen and Isabel Devos, “Pest in de Zuidelijke Nederlanden tijdens de Middeleeuwen en de Moderne Tijden,” in *De Pest in de Nederlanden* (Brussels, 1999), 109–133; Ad van der Woude, “Demografische ontwikkeling van de Noordelijke Nederlanden 1500–1800,” in Dirk Peter Blok (ed.), *Algemene Geschiedenis der Nederlanden* (Haarlem, 1982), V, 123–139; A. C. M. Kappelhof, “Pest en rode loop in de Baronie van Breda in de tweede helft van de 17e eeuw (1660–1680),” *Jaarboek van de Geschied- en Oudheidkundige Kring van Stad en Land van Breda*, XXVI (1973), 75–90; for individual cities, Rommes, “Op het spoor van de dood: De pest in en rond Utrecht,” *Jaarboek Oud-Utrecht* (1991), 93–120; George Alter, “Plague and the Amsterdam Annuitant: A New Look at Life Annuities as a Source for Historical Demography,” *Population Studies*, XXVII (1983), 23–41; Jacques Charlier, *La peste à Bruxelles de 1667 à 1669 et ses conséquences démographiques* (Brussels, 1969); Jozef Geldhof, “De pestepidemie in Brugge, 1665–1667,” *Biekorf*, LXXV (1974), 305–328; G. Mentink and van der Woude, *De demografische ontwikkeling te Rotterdam en Cool in de 17e en 18e eeuw* (Rotterdam, 1965); Willem Frijhoff, “Gods gave afgewezen: Op zoek naar genezing van pest: Nijmegen 1635–1636,” *Volkskundig Bulletin*, XVII (1991), 143–164; J. Klinkenberg, “‘Die quade sieckte’: De

The value of the burial records, however, is that they permit the comparison of burials during crisis, or plague, years with burials from previous years. The number of burials in previous years is calculated by skipping back a year and taking an average of the burial figures (dropping the highest and lowest) for five consecutive years past. The burial figure of the year in question is then divided by the average burials figure for the previous years, multiplied by 100, and subtracting 100 from the result, to determine an overall increase or decrease in burials by percentage. A figure of 50 percent is an increase of half, a figure of 100 percent a doubling, and a figure of 900 percent a tenfold increase over the previous years. This technique gives an indication of plague severity for various locations within the seventeenth-century Low Countries. It is preferable to methods pioneered and elaborated by a tradition of (mainly) French historical demographers and rural historians for three reasons: (1) It has recently acquired a high profile; (2) it accords well with the purposes of seventeenth-century burial records, which tend to have gaps and missing years; and (3) it requires no information apart from the burial data.<sup>3</sup>

The database of the seventeenth-century burial records draws from 904,615 burials in 201 different settlements in the Low Countries (100 settlements in the Dutch Republic and 101 in the Spanish Netherlands; see Tables 1–3). Some figures are taken from secondary literature or printed transcriptions, though the main sources are archival manuscripts from multiple areas throughout the Low Countries in an attempt to achieve an equitable

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pest in Maastricht in de zestiende en zeventiende eeuw,” *Tijdschrift voor Sociale Geschiedenis*, XVI (1990), 267–286; Harm Nijboer, “De Slaande Ingel gie om de Aldehou: Eat oer de pest yn Ljouwert,” *De Vrije Fries*, LXXV (1995), 61–78; for the premier work about plague in the early modern Low Countries, Leo Noordegraaf and Gerrit Valk, *De Gave Gods: de pest in Holland vanaf de late Middeleeuwen* (Bergen, 1988); for the Harderwijk example, NG Overledenen, 1592–1625, no. 838.1, Gelders Archief Arnhem (hereinafter GAA).

3 The method comes from Lorenzo Del Panta and Massimo Livi Bacci, “Chronologie, intensité et diffusion des crises de mortalité en Italie: 1600–1850,” *Population*, XXXII (1977), 401–445, recently resurrected in Alfani, “Plague.” For French historical-demography approaches to mortality crisis, see Jean Meuvret, “Les crises de subsistances et la démographie de la France d’Ancien Régime,” *Population*, IV (1946), 271–278; Jean-Michel Chevet, “Les crises démographiques en France à la fin du XVIIe et au XVIIIe siècle: un essai de mesure,” *Histoire and Mesure*, VIII (1993), 117–144; Jacques Dupâquier, “L’analyse statistique de crises de mortalité,” in Hubert Charbonneau and André Larose (eds.), *The Great Mortalities: Methodological Studies of Demographic Crises in the Past* (Liège, 1979) 83–112.

Table 1 Structure of the Burials Database, Dutch Republic

CATEGORY	NUMBER OF SETTLEMENTS WITH DATA	SETTLEMENTS (%)	NUMBER OF BURIALS	BURIALS (%)	AVERAGE BURIALS PER SETTLEMENT PER YEAR
CRISIS YEARS					
1624/5	43	26	18,743	34	436
1635/6	47	28	21,808	40	464
1664–1666	76	46	13,988	26	184
URBAN–RURAL					
Rural	69	69	88,646	14	21
Urban	31	31	542,693	86	295
Total	100	100	631,339	100	105

NOTES For the crisis years, the number of burials comes from the individual year of a settlement with the highest increase in the specific crisis period. For urban–rural and total, the number of burials comes from all of the years in the seventeenth century with burial data, crisis or not, including extra settlements with burial data but none for crisis periods.

SOURCES All of the source material for the seventeenth-century burials database is listed in Appendix 1, available at <https://leidenuni.academia.edu/DanielCurtis>.

geographical spread (see Figure 1). Nonetheless, places such as Brabant and Limburg, for example, offer far more data than places such as Luxembourg or Drenthe. Not all of the burial records cover the entire seventeenth century, and thus not all of the settlements provide data for every possible seventeenth-century crisis.

Table 2 Structure of the Burials Database, Spanish Netherlands

CATEGORY	NUMBER OF SETTLEMENTS WITH DATA	SETTLEMENTS (%)	NUMBER OF BURIALS	BURIALS (%)	AVERAGE BURIALS PER SETTLEMENT PER YEAR
CRISIS YEARS					
1624/5	26	16	2,474	16	95
1635/8	55	33	5,875	38	107
1667–1669	86	52	7,306	47	85
URBAN–RURAL					
Rural	88	87	110,360	40	18
Urban	13	13	162,916	60	179
Total	101	100	273,276	100	39

NOTES For the crisis years, the number of burials comes from the individual year of a settlement with the highest increase in the specific crisis period. For urban–rural and total, the number of burials comes from all of the years in the seventeenth century with burial data, crisis or not, including extra settlements with burial data but none for crisis periods.

SOURCES All of the source material for the seventeenth-century burials database is listed in Appendix 1, available at <https://uu.academia.edu/DanielCurtis>.

Table 3 Structure of the Burials Database, All of the Low Countries

CATEGORY	NUMBER OF SETTLEMENTS		NUMBER OF BURIALS	AVERAGE BURIALS PER SETTLEMENT PER YEAR	
	WITH DATA	SETTLEMENTS (%)		BURIALS (%)	PER YEAR
CRISIS YEARS					
1624/5	69	21	21,217	30	285
1635–166(8)	102	31	27,683	39	275
1664–166(9)	162	49	21,294	30	156
URBAN–RURAL					
Rural	157	78	199,006	22	20
Urban	44	22	705,609	78	256
Total	201	100	904,615	100	70

NOTES For the crisis years, the number of burials comes from the individual year of a settlement with the highest increase in the specific crisis period. For urban–rural and total, the number of burials comes from all of the years in the seventeenth century with burial data, crisis or not, including extra settlements with burial data but none for crisis periods.

SOURCES All of the source material for the seventeenth-century burials database is listed in Appendix 1, available at <https://uu.academia.edu/DanielCurtis>.

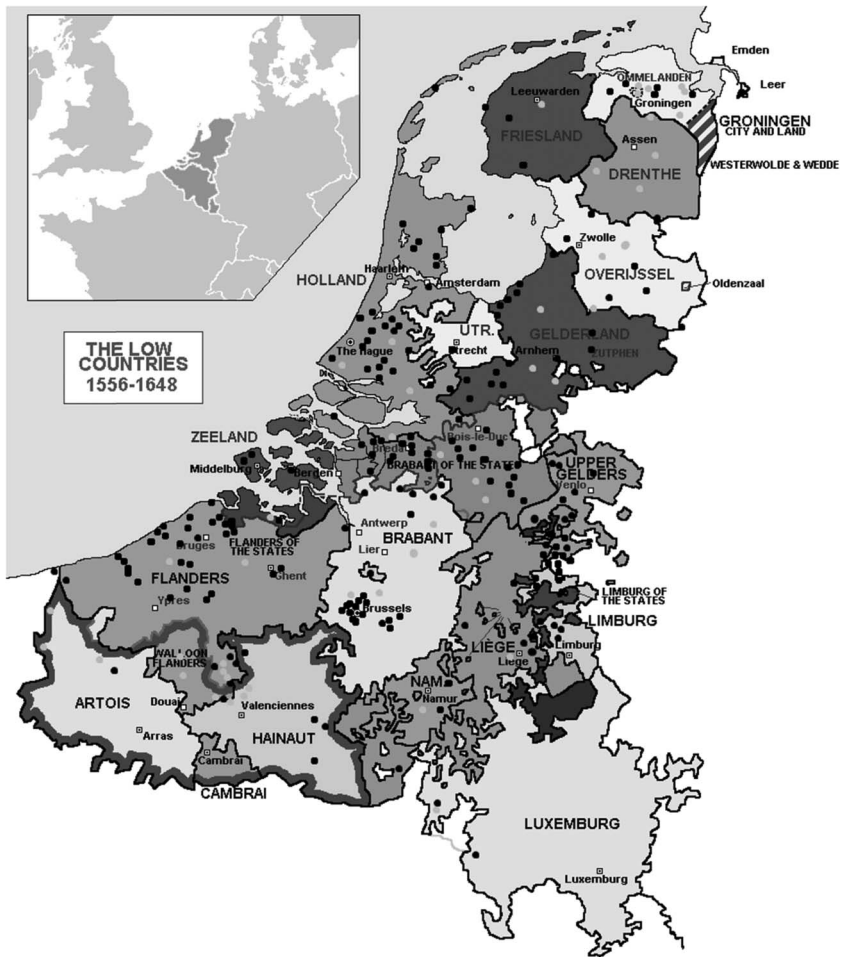
A single increase or decrease in burials was sufficient justification to include data for any one seventeenth-century mortality crisis.

The settlements that did not qualify for the database, despite offering burial information, were those in which the time series presented serious gaps within the relevant years, according to the completeness tests that Wrigley and Schofield used for their data in *The Population History of England 1541–1871*. This problem became more acute during plagues; the clerics who recorded burials often died themselves or fled, leaving series that stop before an outbreak and resume just after the worst effects had subsided. Calculated increases or decreases in burials were performed only for settlements in those years with a minimum of six burials recorded.<sup>4</sup>

WHEN WERE THE PLAGUES? Figure 2 shows the consolidation of the average annual increases and decreases in burials (%) in the Dutch Republic and the Spanish Netherlands according to the entire seventeenth-century burial-records database. Because the recovery of accurate and reliable seventeenth-century population figures for every settlement in the database was not feasible, the averages have been weighted against each settlement's average annual number of burials in the seventeenth century as a proxy. The

4 For the completeness tests, see Wrigley and Schofield, *Population History*, 19–23.

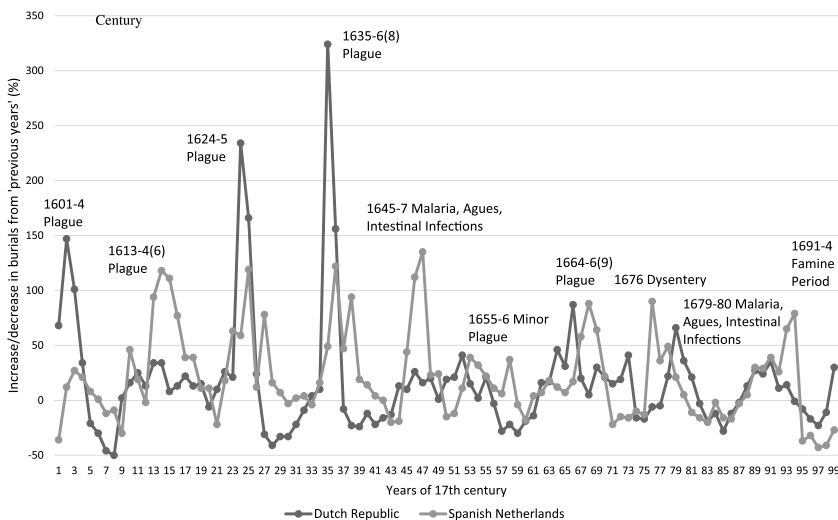
Fig. 1 Geographical Distribution of the Settlements in the Seventeenth-Century Burials Database



main mortality peaks in the Dutch Republic occurred in 1601–1604, 1624/5, 1635/6, 1664–1666, 1679/80, with minor ones in 1613/4, 1652, and to a lesser extent, 1691 and 1699. Peaks in the Spanish Netherlands occurred at similar points, albeit in greater numbers—1613–1616, 1623–1625, 1635–1638, 1645–1647, 1667–1669, 1676, and 1691–1694, with minor ones in 1653, 1658, and 1677/8 (after the initial harsh shock of 1676). In truth, the period 1601–1604 was likely a period of raised mortality in the Spanish



Fig. 2 Average Annual Increase/Decrease in Burials from Previous Years across Low Countries, Seventeenth Century



Netherlands, just as in the Dutch Republic, but it does not appear in Figure 2 because of the lack of burial data for the south during the early seventeenth century.

How do we know which peaks were caused by plague? First of all, although plague from the second pandemic lingered in a number of areas in Europe (often port towns) during the eighteenth and even early nineteenth centuries, plague certainly began to disappear from the Low Countries in the final third of the seventeenth century. The high mortality of 1676 in the Spanish Netherlands (roughly encompassing the modern-day territory of Belgium), especially in the Duchies of Brabant and Limburg, was caused by a terrible dysentery epidemic (a by-product of the Franco-Dutch War); the term *rode loop* or *rode melisoen* (bloody diarrhea) frequently appeared in the burial records. The resolutions of the Council of the State make explicit reference to the mortality caused by dysentery in the Brabant Generality, where the leases on farms and mills had to be renewed on account of tenants' deaths. A less intense peak came later in the Dutch Republic (roughly encompassing the modern-day territory of the Netherlands) around 1679/80, though mainly (though not exclusively) in the coastal areas, suggestive of an environmentally specific disease, such as



malaria or agues. For example, the exceptionally hot spell in the summer of 1679, together with a lack of wind, produced putrid stagnant water on the River Zaan (north of Amsterdam), leading to fever-related deaths from August to October.<sup>5</sup>

The mortality spike in the early 1690s was undoubtedly due to the harvest failures caused by a particularly cold and wet period in northwestern Europe, creating nutritional deficiencies that resulted in diseases like typhus, especially among the landless and the poor. The significance of this shock was well known with regard to France, where the total death toll was an estimated 1.3 million people, roughly 6 percent of the population (an underestimation given burial-record under-registration). In the Low Countries, however, increased mortality was more significant for the Spanish Netherlands, possibly because the Nine Years' War, which had key battles fought on southern soil, occurred at the same time. Parts of the Dutch Republic seemed to be affected more moderately; the average weighted burial increase for the previous years was just 47 percent in Holland from 1691 to 1694.<sup>6</sup>

We still have to account for the mortality peaks in the first two-thirds of the seventeenth century. The spike of 1645–1647 that occurred only in the Spanish Netherlands most likely was not a result of the plague. In only two of the burial records consulted so far for this period has the term *pest* appeared, whereas it appears in the positively identified plague periods described below much more frequently. Similarly, no plague ordinances were passed during the mid-1640s in the Spanish Netherlands, and

5 For the Brabantine dysentery of 1676, see Bruneel, *La mortalité*; Kappelhof, "Pest"; for farm vacancies through dysentery mortalities, Resoluties Raad van State, 178, no. 220, fo. 435v., Brabants Historisch Informatie Centrum (hereinafter BHIC); for fevers and agues in 1679–1680, George C. Kohn, "European Malaria Epidemic of 1678–82," in *idem* (ed.), *Encyclopaedia of Plague and Pestilence: From Ancient Times to the Present* (New York, 2008), 118; for coastal-specific diseases, Otto S. Knottnerus, "Malaria rond de Noordzee," in Gerold Wefer et al. (eds.), *Climatic Development and History of the North Atlantic Realm* (Berlin, 2002), 339–353; for the stagnant Zaan, Bert Koene, *De Caeskopers: een Zaanse koopmansfamilie in de Gouden Eeuw* (Hilversum, 2011), 65.

6 For the cold and wet 1690s, see John A. Eddy, "'The Maunder Minimum': Sunspots and Climate in the Reign of Louis XIV," in Geoffrey Parker and Leslie M. Smith (eds.), *The General Crisis of the Seventeenth Century* (London, 1998), 226–269; for the 1690s famine as a phenomenon of northwestern Europe, Cormac Ó Gráda and Chevet, "Famine and Market in Ancien Régime France," *Journal of Economic History*, LXII (2002), 706–733; for French mortality figures, Marcel Lachiver, *Les années de misère: La famine du temps du Grand Roi, 1680–1720* (Paris, 1991), 453.

few medical treatises or religious/moral pamphlets emerged. The seasonal burials from 1645 to 1647 did not (generally) follow patterns associated with diseases like plague—the high-mortality intensity in the late summer to early autumn period, which is evident in a comparison of Figure 8 with Figures 5 to 7 and 9 below. Furthermore, increased burials were not even a general feature of the Spanish Netherlands; they mainly (though not entirely) concentrated in the County of Flanders, especially by the coast. This finding suggests that such environmentally specific diseases as malaria, agues, fevers, and intestinal infection (dysentery turns up in some 1647 burial records) were more likely. Local increases in mortality may have been exacerbated by the final throes of the Thirty Years' War in the Spanish Netherlands.<sup>7</sup>

The 1650s also remain curious. Increased burials were seen in some places across the Low Countries in the early 1650s, although plague is seldom mentioned explicitly in the sources. A man in the criminal records at Oirschot (Brabant), who was punished for vagrancy, begging and thievery, was said to have had the “*Roije Millesoen*” (dysentery) in 1653—just one example of what could have led to raised mortality. Again, in Namur, people were prohibited from making the pilgrimage to Notre-Dame de Hal, on account of an epidemic raging in the city (as well as in Brussels and Nivelles). None of the evidence, however, justifies attributing that epidemic to plague. Not until overall burials declined during the mid-1650s did plague begin to receive explicit notice in the records, accompanied by the re-opening of plague houses, the drafting of plague ordinances, and the registration of plague deaths in orphanages. These mentions of plague are odd in the broader context of northwestern Europe, since plague was absent from England, France, and neighboring parts of Germany during the 1650s. More curiously, plague once again vanished from the Spanish Netherlands in 1657, although burials increased again there in 1658 for reasons that remain mysterious.<sup>8</sup>

7 For mention of plague in burial records in 1647, when dysentery also occurred, see Roeselare, Parochie Sint-Michiël, Overlijdens- en begrafenisakten, Rijksarchief te Brugge (hereinafter RTB); (not in burials database) Mannekensvere, Parochie Onze-Lieve-Vrouw, Overlijdensregisters, RTB.

8 For early 1650s mortality, see Jurjen Vis, *650 jaar ziekenezorg in Alkmaar 1341–1991* (Hilversum, 1991), 69; Rommes, “Plague in Northwestern Europe: The Dutch Experience, 1350–1670,” *Popolazione e Storia*, XVI (2015), 47–71; for the man in the criminal records with dysentery,

Plague, if present in the Low Countries during the 1650s, probably occurred in the middle of the decade, surrounded by increased mortality due to other diseases and events at the beginning and end of the decade. But this outbreak was limited in its geographical scope (the worst of it apparently confined to Holland and Utrecht), resulting in no significant increase in burials within the consolidated figures. Its severity in the individual places likely afflicted by it in 1655/6, such as Utrecht or Amersfoort, must have been weak—if it was, in fact, a plague epidemic at all—the weakest and most localized of the seventeenth-century Low Countries.<sup>9</sup>

The period from 1601 to 1604 was likely a period of plague in the Low Countries, as confirmed by regional and local studies. According to the physician Theodorus Velius in 1604, around 5,000 people died of plague in the town of Hoorn, as much as 40 percent of the population. A remembrance sign outside a church at Muiden, a small town close to Amsterdam, notes that 650 of the 900 inhabitants died in 1602. The first few years of the seventeenth century produced a number of “eyewitness” accounts of the plague from Amsterdam, including some famous rhetorical literature, such as Zacharias Heyns’ *Pest-Spieghel* (1602). Raised mortalities were also discernible from 1613 to 1616, especially in the south, where local literature and a number of plague ordinances suggest that the impact in Hainaut and Artois was especially severe. Both of these mortality crises have been omitted from the database for this article, however, because not enough settlements in the seventeenth-century Spanish Netherlands have burial figures that date so early. In the Dutch Republic, only cities tended to have

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Criminele Processtukken, 165–01, no. 1823, Archief van de Bossche Schepenbank, Stadsarchief Den Bosch; for the aborted pilgrimage in Namur, F. Jacquet-Ladrier, “Les épidémies de peste aux XVIe–XVIIe siècles: l’exemple de Namur,” *Cahiers de Sambre et Meuse*, IV (2007), 127.

9 For mentions of plague in 1655/6, see Rommes, “Op het spoor”; J. Steendijk-Kuypers, *Volksgezondheidszorg in de 16e en 17e eeuw te Hoorn* (Rotterdam, 1994), 221; Frank Huisman, *Stadsbelang en standsbesef: Gezondheidszorg en medisch beroep in Groningen 1500–1730* (Rotterdam, 1992), 281; W. F. M. van Rootselaar, *De pest in Amersfoort in 1655* (Amersfoort, 1895); H. G. H. Brunner, “Pest-epidemiën van de 15<sup>e</sup> tot de 17<sup>e</sup> eeuw te Rotterdam,” *Nederlandsch Tijdschrift voor Geneeskunde*, XC (1946), 622. Direct mentions of “pest” in the burial records are rare for the mid-1650s, though they are found for Zalk-Vecaten in Overijssel. See DTB Zalk en Vecaten, *Begraafboek NG 1503–1833*, no. 576, Historisch Centrum Overijssel Zwolle (HCOZ). Magistrates mention plague in the late 1650s, but evidence is not widespread. See C. L. J. Leuris, “De pest in Hapert, Hoogeloon en Casteren (1656–1659),” *Campinia*, III (1973/4), 176–177; O. Versebroeven, “Toen de pest heerste te Deume en Borgerhout in de Jaren 1657–1661,” *Heemkundig Handboekje voor de Antwerpse Randgemeenten*, V (1958), 10–14.

such early burial figures, permitting no systematic comparison of urban and rural environments.<sup>10</sup>

After the removal of all mortality peaks that either were definitely not from plague or were too incomplete for systematic comparative research, the remaining spikes—1624/5, 1635/6 (1635–1638 in the Spanish Netherlands) and 1664–1666 (9)—were certainly due to plague. The indirect evidence in these cases points to plague, or at least to other vector-borne epidemics; little evidence suggests that the mortality peaks from 1600 to 1670 in the Low Countries derived from dearth or harvest failure. At the very least, we can be assured that mortality due to subsistence issues was limited during this time.

A long historiography attests to the fact that harvest failures played little role in these seventeenth-century mortality crises in the Dutch Republic (even the episode of the early 1690s was moderate). Amsterdam's favorable connection to international grain markets, especially from the Baltic, may well have been a factor. Notwithstanding questions about the role of the international grain trade, recent research shows that severe famines began to disappear from the Republic during the final third of the sixteenth century, not returning until the very end of the seventeenth century.

As seen in Table 4, most years with high prices occurred only in years without strong mortality peaks. Only the moderate 1652 mortality peak can be convincingly linked to a prior period of high prices, from 1649 to 1651. Although several scholars have suggested that subsistence crises may have been worse for the Spanish Netherlands, few of the mortality peaks in Figure 2 correspond with the main years of high prices that other scholars have cited. Of all of the years in which Bruneel found price increases in Brabant—1625/6, 1630/1, 1639/40, 1648–1651, 1661/2, 1684–1686, 1692–1694, and 1696–1698—only

10 For a local study of the 1601–1604 plague, see J. Kannegieter, “Pest te Amsterdam in 1602,” *Maandblad Amstelodanum*, LI (1964), 197–205; for plague in Hoorn, F. Kwaad (ed.), *Kroniek van Hoorn uit 1604 door Theodorus Velius* (Hoorn, 1979); for the remembrance sign at Muiden, Rommes, “Plague”; for eyewitness accounts and popular rhetorical literature, J. van Toorenenbergen (ed.), “Herinneringen uit eene pest-epidemie te Amsterdam (1601–1602),” *Amsterdamsch Jaarboekje* (1898), 13–27; Noordegraaf, “Zacharias Heyns’ Pest-Spieghel uit 1602,” in Willem de Blécourt, Frijhoff, and Marijke Gijswijt-Hofstra (eds.), *Grenzen van genezing: Gezondheid, ziekte en genezen in Nederland, zestiende tot begin twintigste eeuw* (Hilversum, 1993), 155–171; for the severe impact of plague from 1613 to 1616 in the far south, Arnould, “La peste de 1615 à Lessines,” *Annales du Cercle Archéologique de Mons*, LXII (1950–1953), 337–342; Karl Petit, *Saint Macaire et la Peste Mons en 1615* (Gembloux, 1946).

Table 4 Price Rises in the Seventeenth-Century Dutch Republic

YEARS OF HIGH PRICES	WEST			NORTH		EAST			SOUTH		
	AMSTERDAM	LEIDEN	UTRECHT	GRONINGEN	COEVORDEN	KAMPEN	ARNHEM	NIJMEGEN	MAASTRICHT	BREDA	ROERMOND
1622–23	71		59				94	98	65	<b>122</b>	
1626	28	25	28				16	24	<b>171</b>	53	68
1630	81	58	66				<b>109</b>	74	24	61	26
1649–51	77	<b>101</b>	66	92			87	82	58	74	<b>105</b>
1661–62	95	<b>126</b>	<b>114</b>	<b>157</b>	<b>211</b>		<b>124</b>	<b>121</b>	<b>155</b>	<b>117</b>	<b>119</b>
1675–76	91	<b>110</b>	60	78	<b>110</b>	71	72	94	<b>182</b>	83	<b>142</b>
1692–94	85	63	78	88	<b>141</b>	83	92	<b>128</b>	<b>109</b>	<b>110</b>	<b>119</b>
1698–99	<b>101</b>	<b>103</b>		94	<b>137</b>	<b>168</b>	<b>134</b>	<b>164</b>	<b>104</b>	<b>130</b>	<b>154</b>

NOTES Percentage increases above the previous years were calculated as a nine-year moving average, skipping highest and lowest figures. For periods of high prices covering more than one year, the figures for the year with the most severe increase are provided. Increases of a doubling or more over the normal rate are in bold.

SOURCES Adapted from Curtis, Jessica Dijkman, Eric Vanhaute, and Thijs Lambrecht, “Famines in the Northern and Southern Netherlands, 14th to 19<sup>th</sup> C.,” in Guido Alfani and Cormac Ó Gráda (eds), *Famines in Premodern Europe, 14th to 19th Centuries* (New York, 2016). Prices were compiled by Jessica Dijkman.

1625/6 coincided with a major mortality spike before 1670. Similarly, in West Flanders, the years of high prices (1651/2 and 1661/2, for example) do not match up with the mortality peaks in Figure 2.<sup>11</sup>

Four types of direct evidence tie these three mortality spikes in the Low Countries to plague: (1) The spikes align with the main years of plague in other parts of Western Europe—1664–1666 in England and Germany and 1624/5 and 1635/6 practically

11 For the absence of famine in the seventeenth-century Dutch Republic, see J. A. Faber, *Dure tijden en hongersnoden in pre-industrieel Nederland* (Amsterdam, 1976); Noordegraaf, *Hollands welvaeren? Levensstandaard in Holland 1450–1650* (Bergen, 1985); *idem*, “Dearth, Famine and Social Policy in the Dutch Republic at the End of the Sixteenth Century,” in Peter Clark (ed.), *The European Crisis of the 1590s: Essays in Comparative History* (London, 1985), 67–83; Rudolf Dekker, *Holland in beroering: oproeren in de 17<sup>de</sup> en 18<sup>de</sup> eeuw* (Baarn, 1982), 22, 28; for recent confirmation of chronology, Curtis et al., “Famines in the Northern and Southern Netherlands, 14th to 19th C.,” in Alfani and Ó Gráda (eds.), *Famine in European History* (forthcoming, 2017); for the Baltic grain trade and Amsterdam, Milja van Tielhof, *The “Mother of All Trades”: The Baltic Grain Trade in Amsterdam from the Late Sixteenth to the Early Nineteenth Century* (Leiden, 2002); for price increases in the Spanish Netherlands, Bruneel, *La mortalité, 577–598*; D. Dalle, *De bevolking van Veume-Ambacht in de 17de en 18de eeuw* (Brussels, 1963), 165–176.

Table 5 Publication Years of Plague Ordinances, Theological Tracts, Medical and Moral Pamphlets, and Instructions to Plague Masters in the Seventeenth-Century Low Countries

	NUMBER OF DOCUMENTS	DOCUMENTS (%)
Appeared in 1601–4, 1613–6, 1624/5, 1635–8, 1664–9	65	78
Appeared other times in the seventeenth century	18	22
Total	83	100
Appeared other times in the seventeenth century (without 1655/6)	10	12

NOTE The references to plague come from a sample of eighty-three ordinances and tracts, but many more remain to be found in the various archives across the Low Countries.

everywhere but most significantly in France, England, and Germany. (2) For the periods 1624/5, 1635/6 (8), and 1664–1666 (9) (as well as the 1601–1604 and 1613–1616 periods), burial records often explicitly identified plague victims with the word *peste* or simply a *p* after their names, sometimes also noting other diseases, such as *rode loop* and *pokken* (pox). In few other years did burial records refer to plague (see Appendix 2 for the rare instances at <https://leidenuni.academia.edu/DanielCurtis>). The term *pest* never appears in the burial records after 1670. (3) Plague ordinances and instructions for plague houses, as well as theological and medical commentaries about plague, were most common during plague years; these documents were less revealing in the seventeenth-century Low Countries (see Table 5). Even if they happened to occur in places without an ostensible outbreak of plague, such writings were most likely signs that plague had emerged as a threat somewhere else. The fact that no literary or official sources mention plague after 1670 suggests that by the late seventeenth and eighteenth centuries, contemporaries had learned not to mistake other diseases for it. (4) In these singularly high-mortality years, the death of family members in quick succession was a pattern redolent of plague, exacerbated by the practice of policing, isolating, and even boarding up infected households.<sup>12</sup>

12 For plagues recorded in regions near the Low Countries—for example, in 1625, 1636, and 1665/6 London—see Cummins, Morgan Kelly, and Ó Gráda, “Living Standards and Plague in London 1560–1665,” *Economic History Review*, LXIX (2016), 3–34; for 1636

Another strong piece of evidence is the seasonality of death in the high-mortality years. Most burials in these plague years occurred from August to October; this seasonal clustering was common to the vector-borne epidemic diseases prevalent in both the rural settlements (Figures 5–7) and large cities (Figures 3–4) of northern Europe for the plague years 1624/5, 1635/6 (8), and 1664–1666 (9), as seen from a sample of settlements from the burials database presented in the figures below. These results can be contrasted with the seasonality of death in the famine of the early 1690s (Figure 10), which does not show an autumnal spike, and the many winter burials, which were due to diseases of nutritional deficiency.<sup>13</sup>

Even if plague was the main cause of mortality during these seventeenth-century mortality peaks in the Low Countries, however, deaths from other causes may have occurred at the same time in some places. Indeed, the patterns associated with household contagion and the seasonality of deaths are good evidence for epidemic disease but not necessarily for plague per se, since other diseases such as dysentery and typhus could display similar characteristics (see the 1676 dysentery seasonality in Figure 9). Many instances of plague cannot easily be separated from those of other diseases. For instance, the terrible plague in Tilburg and Namur in

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Newcastle, Keith Wrightson, *Ralph Taylor's Summer: A Scrivener, His City and the Plague* (New Haven, 2012); for 1665/6 Eyam, Bradley, "Most Famous"; for 1624 Reims, Robert Benoit, *Vivre et mourir à Reims au Grand Siècle (1580–1720)* (Arras, 1999); for 1624/5, 1636, and 1668/9 Amiens, Pierre Deyon, *Amiens capitale provinciale, étude sur la société urbaine au 17<sup>e</sup> siècle* (Paris, 1967), 21–40; for 1669 Rouen, E. Plantrou, "La peste à Rouen 1348–1669," unpub. Ph.D. diss. (Univ. of Rouen, 1980); for 1668/9 Haute Normandie, A. P. Trout, "The Municipality of Paris Confronts the Plague of 1668," *Medical History*, XVII (1973), 418–423; for 1666–1670 northern France, Jacques Revel, "Autour d'une épidémie ancienne: la peste de 1666–1670," *Revue d'Histoire Moderne et Contemporaine*, XVII (1970), 953–983; for 1623–1625 and 1666–1668 Bremen, Klaus Schwarz, *Die Pest in Bremen: Epidemien und freier Handel in einer deutschen Hafenstadt 1350–1713* (Bremen, 1996); for the distinction between diseases and recognition of signs and symptoms in the seventeenth century, Noordegraaf, *De Gave Gods*, 27; for household mortality patterns and plague, Samuel Cohn and Alfani, "Households and Plague in Early Modern Italy," *Journal of Interdisciplinary History*, XXXVIII (2007), 177–205; Schofield, "The last Visitation of the Plague in Sweden: The Case of Bräkne-Hoby in 1710–11," *Economic History Review*, LXIX (2016), 600–626. The data in this article support previous suggestions that roughly half of the families with plague had only one death in the household. See Bruneel, *La mortalité*, 491–492; Lia van Zalinge-Spooren, "Die contagieuse sieckte der peste is graserende . . . De pest in Helmond in 1636," *Helmonds Historisch Jaarboek: De Vlasbloem*, XIV (1994), 78.

13 For the seasonality of deaths in North European climates, see Andrew Appleby, *Famine in Tudor and Stuart England* (Stanford, 1978), 95–108.



Fig.3 Seasonality of Burials in Plague Years 1624 and 1635, Leiden

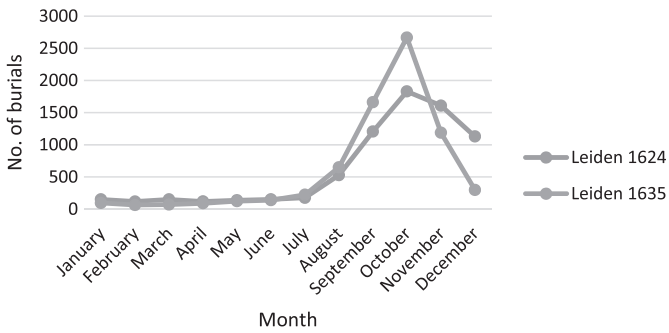


Fig.4 Seasonality of Burials in Plague Years 1637 and 1668, Valenciennes

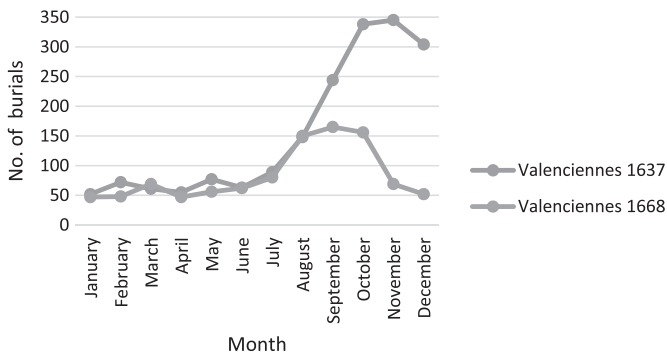


Fig.5 Seasonality of Burials in Plague Year 1625

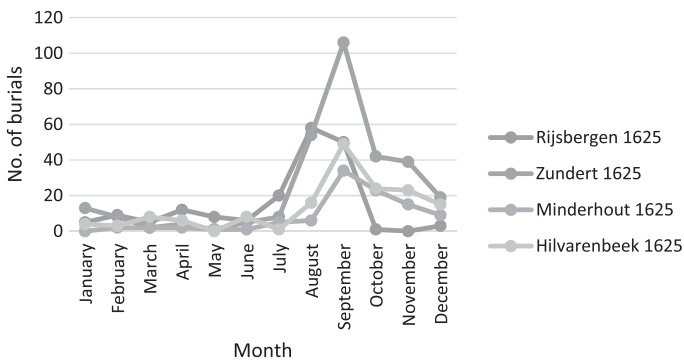


Fig. 6 Seasonality of Burials in Plague Year 1635

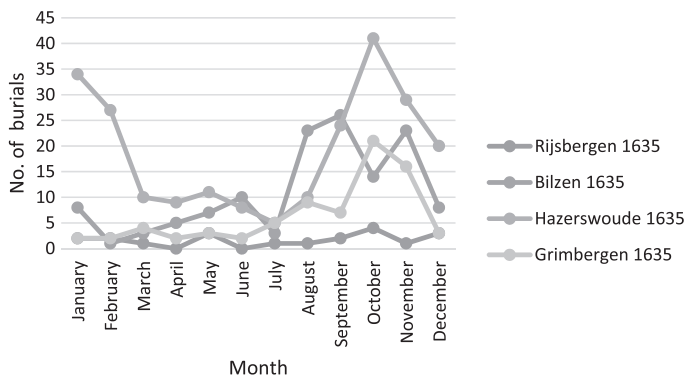


Fig. 7 Seasonality of Burials in Plague Years 1666–1669

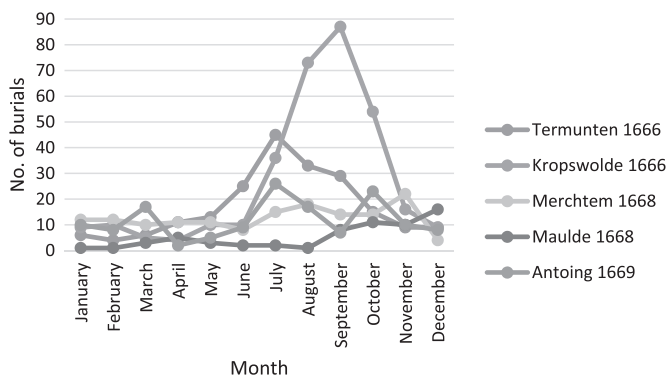


Fig. 8 Seasonality of Burials in High Mortality Years 1646/7 (in Spanish Netherlands)

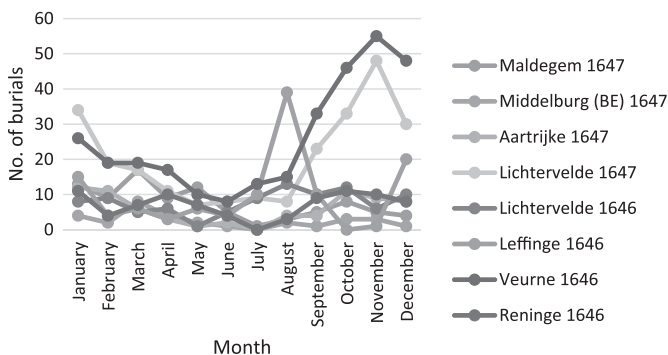


Fig. 9 Seasonality of Burials in Dysentery Year 1676

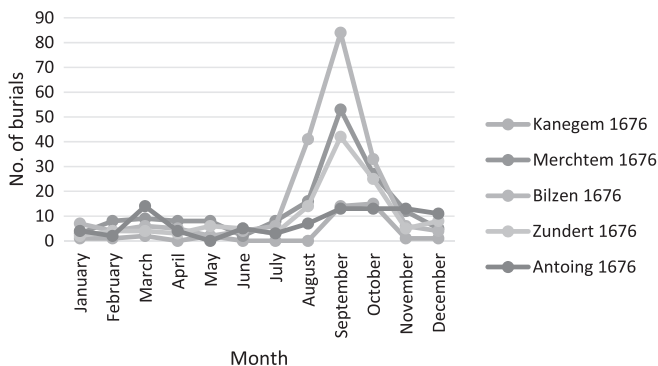
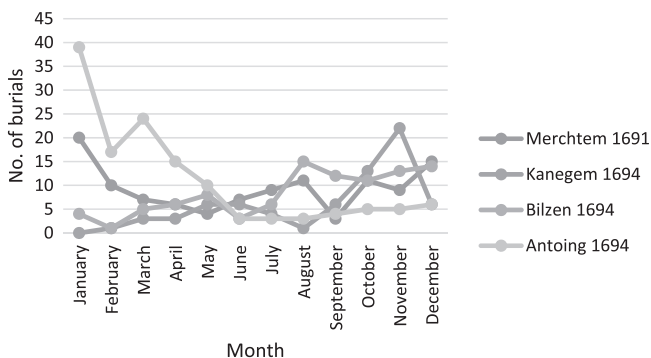


Fig. 10 Seasonality of Burials in Famine Years 1691–1694



1624/5 closely followed a bout of dysentery in 1622/3, and dysentery sometimes trailed plague during the late 1660s, especially in Limburg and Brabant. Spanish soldiers were said to have brought *rooden loop* to Antwerp from Holland in 1666. The urban and rural burial records sometimes offered different disease classifications in close proximity. In the far northeastern village of Midwolda in the Oldambt of Groningen, for example, the plague deaths of 1636/7 came right after the pox cases of 1634/5. Elsewhere it was vice-versa: In the Betuwe village of Zoelen, the plague cases of 1626 preceded the children's pox (*kinderpox*) of 1628; in the Overijssel village of Goor, the plague of 1665 preceded the *kinderpox*. In

the Brabantine village of Eersel, plague and pox cases were mentioned together in 1636; in the village of Korbeek-Dijle, plague and dysentery occurred simultaneously.<sup>14</sup>

Some of the non-plague diseases were spread by troops fighting in the Dutch Revolt, the Thirty Years' War, and the Second Anglo-Dutch War. The arrival of soldiers into villages raised burial figures even higher, since non-residents were also listed in the burial records. Ultimately, this article has no practical solution for this mixing of diseases, since we cannot systematically separate those who died from plague from those who did not in periods when plague was raging. The problem, however, is not completely insurmountable. The point remains that the mortality rises of 1624/5, 1635/6, and 1664–1666 affected almost every region in the Low Countries. These periods of high mortality could hardly have been the product of environmentally specific diseases originating in the coastal, marsh, or inland zones. Nor could they have been, say, cases of typhus or smallpox, at the time; these illnesses would have had merely localized effects. With its wide geographical reach and well-aligned timing between settlements, only plague epidemics can explain the mortality peaks in these specific periods (even if individual settlements could feasibly have suffered additional deaths through local outbreaks of other diseases).

THE SEVERITY AND EXPANSE OF THE PLAGUE The first order of business is to classify plague by its severity. One recent suggestion is that plague had discernible effects for a particular community whenever “a short-term perturbation of mortality reduce[d] the dimensions of the generations so much that they [were] unable to reproduce themselves entirely even when making full use of their potential for recovery.” Thus, a community that could not return to its former size, despite the rise in nuptiality that often

14 For cases of dysentery and plague together, see Luud de Brouwer, “‘De aenlevende sieckte’: De pest in Tilburg voor 1630,” *Tilburg*, XIII (1995), 3–13; Parochie Sint-Bartholomeus, Overlijdens- en Begrafenisakten, 1633–1674, Rijksarchief te Leuven, Korbeek-Dijle (Bertem); Jacquet-Ladrier, “Les épidémies,” 128; A. Van Schevensteen, “Over pestepidemie te Antwerpen in vroeger tijden,” *Verslagen en Mededelingen van de Koninklijke Vlaamse Akademie voor Taal- en Letterkunde* (1932), 1087; for cases of “pox” and plague together, Kerkeboek 1596–1811, Midwolda, 124, no. 294, Groninger Archieven; Zoelen NG, DTO boek, no. 1858c; HCOZ, Kerkeboek Goor, 1656–1807, Overlijden/Begraven 1656–81, GAA; Eersel RK Begraafboek 1602–46, 8034, no. 1, BHIC.

followed the shock, had suffered a mortality crisis. According to Del Pantà and Livi-Bacci, a rise in burials 50 percent or higher than the previous years was enough to prevent the generation born in the crisis year to replenish the population. Hence, their first category—the absence of a mortality crisis—denotes an increase of less than 50 percent in burials per settlement due to plague; their second, *moderate plague*, an increase of 50 to 299 percent; their third, *severe plague*, an increase of 300 to 899 percent; and their fourth, *extreme plague*, an increase of 900 percent or more. All of these classifications are based on the shock that plague's short-term mortality had on the medium- and long-term reproductive capacities of societies to regenerate. Other scholars suggested that a 20 percent increase in burials was sufficient to indicate a genuine mortality effect, albeit without a developed rationale like Del Pantà and Livi-Bacci's. More to the point, if we were to use a classification based on the 20 percent marker, Figure 2 would show a mortality crisis almost annually!<sup>15</sup>

Tables 6 and 7 show that plagues were not all the same and did not exhibit universal features. Curiously, the Dutch Republic exhibited a harsher seventeenth-century epidemiological pattern of plague than did the Spanish Netherlands: 23 percent of the plagues there were severe or worse, whereas only 15 percent reached the same status in the south. Contrary to recent literature about plague in sixteenth- and seventeenth-century London, outbreaks in the Low Countries did not have the same virulence. The weakest of them were the last ones of the 1660s: Only 11 percent of plagues were severe or extreme in the Dutch Republic for this final round, whereas a meagre 7 percent of plagues had the same status for the Spanish Netherlands. A plague with a 900 percent increase in burials was nowhere to be found from 1667 to 1669.

The most damaging eruption in the Low Countries during the seventeenth century were those of 1624/5 and 1635/6 in the Dutch Republic. The 37 percent of places in the Republic that suffered a severe or extreme shock in 1624/5 approaches

15 For the long-term effects of mortality shocks, see Alfani, "Plague," 418; for the 50% increase in mortality rationale, Del Pantà and Livi-Bacci, "Chronologie"; for suggested rates of 20%, see Rudolph Ladan, *Gezondheidszorg in Leiden in de late middeleeuwen* (Hilversum, 2012); Thoen and Devos, "Pest."

*Table 6* Plague Severity in the Seventeenth-Century Dutch Republic (D.R.) and Spanish Netherlands (S.N.)

PLACE AND PLAGUE YEARS	NUMBER OF SETTLEMENTS WITH DATA	BURIAL INCREASES							
		< 50	%	50–299	%	300–899	%	900 +	%
D.R., 1624/5	43	2	5	25	58	13	30	3	7
D.R., 1635/6	47	10	21	23	49	10	21	4	9
D.R., 1664–1666	76	25	33	43	57	3	4	5	7
Total	166	37	22	91	55	26	16	12	7
S.N., 1624/5	26	7	27	15	58	1	4	3	12
S.N., 1635–1638	55	8	15	31	56	15	27	1	2
S.N., 1667–1669	86	10	12	70	81	6	7	0	0
Total	167	25	15	116	70	22	13	4	2
Total D.R. and S.N.	333	62	19	207	62	48	14	16	5

the 44 percent recently recorded for northern Italy from 1629 to 1630, which Alfani described as the harshest by far in early modern Western Europe. In 1635/6, 30 percent of the plagues were severe or worse in the Dutch Republic, though, as Table 7 shows, the Republic had the highest average burial increase based on the data from all of the settlements, duly weighted. The plague of 1624/5 may have hit more settlements severely in the Dutch Republic than did any other seventeenth-century outbreak (the most settlements and the worst outbreaks of anywhere in the Low Countries at the time), though the 1635/6 bout seems to have hit the more populous settlements harder.

*Table 7* Plague Severity in the Low Countries (Calculated through Weighted Averages in Burial Increases)

PLACE	PLAGUE PERIOD	YEAR WITH HIGHEST FIGURE	WEIGHTED AVERAGE IN BURIAL INCREASE	PLAGUE SEVERITY RANKING
Dutch Republic	1624/5	1624	234	2
Spanish Netherlands	1623–1625	1625	119	4
Dutch Republic	1635/6	1635	324	1
Spanish Netherlands	1635–1638	1636	122	3
Dutch Republic	1664–1666	1666	87	6
Spanish Netherlands	1667–1669	1668	88	5

NOTE For the number of burials and settlements per plague period, see Tables 1–3.

Given that an average annual death rate in normal times is roughly 4 percent of the population, an average burial increase of 324 percent in 1635/6 over the previous years should have led to an average death rate of 17 percent of the population. In reality, this figure could have been higher: To take just one example, in the small village of Ciergnon in the County of Namur, the average number of burials from 1620 to 1635 was only two per year before the burials suddenly shot up to seventy-four in 1636. No increase or decrease in burials could be calculated for 1636, however, because, as stated already, a minimum of six burials is required for inclusion in this study. Small hamlets were frequently in this predicament. Interestingly, although the intensity of the epidemic in the Spanish Netherlands was not as high as in the Dutch Republic, which had short, sharp shocks of one to two years, the plague incidents in the south tended to have a moderate, less-intense effect that lingered for as many as four years.<sup>16</sup>

The disastrous effect of plagues was not measured solely by severity. What was so distinctive about the plagues from 1629 to 1630 and from 1656 to 1658 in Italy, for example, was their ability to reach the most isolated corners of the countryside. We can use the same system to calculate expanse as we did to assess severity. Any place that did not witness an increase in burials of 50 percent or more in a plague year avoided the significant effects of the plague; that is, it did not experience a mortality crisis during a plague year. Accordingly, a ratio for likelihood of being spared is calculable for a particular geographical area. Given what has been written about plague in early modern northwestern Europe as an urban phenomenon, we might expect this ratio to have been especially high for the Low Countries. Indeed, Slack set the chances of a settlement in the English County of Devon being able to escape the plague from 1565 to 1666 at 44 percent.<sup>17</sup>

16 For the similar severity of plague outbreaks in early modern London, see Cummins, Kelly, and Ó Gráda, "Living Standards," 1; for the severe plague of 1629–1630 in Northern Italy, Alfani, "Plague." Van der Woude, "Demografische ontwikkeling," 144–145, suggested a "normal" mortality rate in Holland of 3.5% of the population, but earlier he had suggested a higher 4.5%. See Mentink and *idem*, *De demografisch ontwikkeling te Rotterdam*, 54. This article uses a rough compromise of 4%. For the Ciergnon case, see RP, *Actes de Décès/Sépultures, Ciergnon (Houyet), Paroisse Saint Martin*, 9999/998, no. 0394, Archives de l'Etat à Namur.

17 For the wide territorial spread of seventeenth-century Italian plagues, see Alfani, "Plague"; for the Devon figures, Slack, *Impact of Plague*, 109.



*Table 8* Territorial Extent of Plague in the Seventeenth-Century Dutch Republic (D.R.) and Spanish Netherlands (S.N.)

PLACE AND PLAGUE YEARS	NUMBER OF SETTLEMENTS WITH DATA	NUMBER OF CONFIRMED PLAGUES	LIKELIHOOD OF BEING SPARED (%)
D.R., 1624/5	43	41	5
D.R., 1635/6	47	37	21
D.R., 1664–1666	76	51	32
Total D.R.	166	129	22
S.N., 1624/5	26	19	27
S.N., 1635–1638	55	47	15
S.N., 1667–1669	86	76	12
Total S.N.	167	142	15
Total D.R. and S.N.	333	271	19

What Table 8 shows, however, is that settlements in the Low Countries found it difficult to avoid the significant effects of a plague during the seventeenth century; their likelihood of doing so was just 19 percent when every recordable plague outbreak and every settlement is taken into account. A settlement's chances of avoiding the plague entirely during the seventeenth century were probably little better than zero. As the plagues' levels of severity differed, so too did their spread and pervasiveness. Whereas 32 percent of settlements in the Dutch Republic were able to escape the worst effects from 1664 to 1666, only 5 percent of settlements there in 1624/5 escaped. Even the plague bouts of the same period diverged between geographical areas: The 32 percent of settlements spared in the 1664 to 1666 outbreak in the Republic was substantially higher than the 12 percent seen in the Spanish Netherlands from 1667 to 1669. If the overall database had more data from the earlier two plagues than the later, weaker, one in the 1660s, the likelihood of being spared may have been as low as 10 to 12 percent. To provide some context for this figure, Alfani cited his figure of 9 percent for the likelihood of being spared from the plague of 1629/30 in northern Italy as evidence for "high territorial pervasiveness." Ultimately, the findings in this section about the severity and extent of the plague lead into the claim of the next section, that the disease had a greater effect upon rural societies in early modern northwestern Europe than scholars have hitherto acknowledged.

PLAGUE INTENSITY BETWEEN CITY AND COUNTRYSIDE To demonstrate the fact that early modern plague in northwestern Europe was not always an urban phenomenon, we need to separate the severity and territorial pervasiveness of plagues in the Low Countries between city and countryside. In this article, *urban* applies to settlements that had more than 2,000 inhabitants by c. 1600. Although this figure has an element of arbitrariness about it, it is the lowest one suggested in recent significant work; Clark's study of European urbanization cites it as the lower limit for early modern small-town status in northwestern Europe.<sup>18</sup>

As Table 9 shows for the three main plague outbreaks in the Low Countries during the seventeenth century, more urban settlements failed to register a discernible mortality effect than did rural settlements; the likelihood of a city being spared was 21 percent and the countryside 17 percent. Virtually no rural settlement could avoid at least one encounter with plague during the seventeenth century, and many settlements experienced many more than one. But the plague did not just pay a slight visit to the countryside. Separating the severity of the plague between cities/towns and rural areas of the seventeenth-century Low Countries reveals that plagues attacked the countryside with a vengeance. As the data set for the Low Countries as a whole shows in Table 10, mortality crises in plague years were much alike in the cities and the countryside—20 percent of rural plagues being severe or extreme and 19 percent being so in urban environments. In the Dutch Republic (Table 11), this difference in severity between city and countryside proved to be less discernible, however, than in the Spanish Netherlands (Table 12), where this difference was more pronounced—18 percent of rural plagues being severe or worse, compared to 7 percent in cities and towns.

Over-emphasis of any differences between urban and rural plague severity detected in this article would be ill-advised. After all, they may be due, at least in part, to the exclusion rates of the cities' burial registers. Because cities sometimes had separate records for plague-house burials, the number of deaths listed in their

18 For population estimates regarding the Dutch Republic, see Jan de Vries, *European Urbanization 1500–1800* (New York, 1984); for the Spanish Netherlands, Paul Klep, "Population Estimates of Belgium, by Province (1375–1831)," in *Historiens et populations: Liber Amicorum Etienne Hélin* (Louvain-la-Neuve, 1991), 485–508; for the 2,000 small towns, see Peter Clark, *European Cities and Towns 400–2000* (New York, 2009).

*Table 9* Territorial Pervasiveness of Seventeenth-Century Plague in Urban and Rural Settlements of the Dutch Republic (D.R.) and the Spanish Netherlands (S.N.)

PLACE AND PLAGUE YEARS	NUMBER OF SETTLEMENTS WITH DATA	NUMBER CONFIRMED PLAGUES	LIKELIHOOD OF BEING SPARED (%)	PLACE AND PLAGUE YEARS	NUMBER OF SETTLEMENTS WITH DATA	NUMBER CONFIRMED PLAGUES	LIKELIHOOD OF BEING SPARED (%)
Rural D.R., 1624/5	26	25	4	Rural S.N., 1624/5	20	14	30
Rural D.R., 1635/6	31	26	16	Rural S.N., 1635–1638	44	39	11
Rural D.R., 1664–1666	51	34	33	Rural S.N., 1667–1669	74	64	14
Total Rural D.R.	108	85	21	Total Rural S.N.	138	117	15
Urban D.R., 1624/5	17	16	6	Urban S.N., 1624–5	6	5	17
Urban D.R., 1635/6	16	11	31	Urban S.N., 1635–8	11	8	27
Urban D.R., 1664–1666	25	17	32	Urban S.N., 1667–9	12	12	0
Total Urban D.R.	58	44	24	Total Urban S.N.	29	25	14
Total Rural Low Countries	246	205	17	Total Urban Low Countries	87	69	21

*Table 10* Plague Severity in Rural and Urban Settlements of the Low Countries during the Seventeenth-Century

PLACE AND PLAGUE YEARS	NUMBER OF SETTLEMENTS WITH DATA	BURIAL INCREASES							
		< 50	%	50-299	%	300-899	%	900 +	%
Total Rural Low Countries	246	44	18	154	63	36	15	12	5
Total Urban Low Countries	87	18	21	53	61	12	14	4	5

*Table 11* Plague Severity in Rural and Urban Settlements of the Dutch Republic during the Seventeenth-Century

PLACE AND PLAGUE YEARS	NUMBER OF PLAGUE YEARS WITH DATA	BURIAL INCREASES							
		< 50	%	50-299	%	300-899	%	900 +	%
Rural, 1624/5	26	1	4	15	58	8	31	2	8
Rural, 1635/6	31	5	16	17	55	7	23	2	7
Rural, 1664-1666	51	17	33	29	57	1	2	4	8
Total Rural	108	23	21	61	57	16	15	8	7
Urban, 1624/5	17	1	6	10	59	5	29	1	6
Urban, 1635/6	16	5	31	6	38	3	19	2	13
Urban, 1664-1666	25	8	32	14	56	2	8	1	4
Total Urban	58	14	24	30	52	10	17	4	7

*Table 12* Plague Severity in Rural and Urban Settlements of the Spanish Netherlands during the Seventeenth-Century

PLACE AND PLAGUE YEARS	NUMBER OF PLAGUE YEARS WITH DATA	BURIAL INCREASES							
		< 50	%	50-299	%	300-899	%	900 +	%
Rural, 1624/5	20	6	30	10	50	1	5	3	15
Rural, 1635-1638	44	5	11	25	57	13	30	1	2
Rural, 1667-1669	74	10	14	58	78	6	8	0	0
Total Rural	138	21	15	93	67	20	15	4	3
Urban, 1624/5	6	1	17	5	83	0	0	0	0
Urban, 1635-1638	11	3	27	6	55	2	18	0	0
Urban, 1667-1669	12	0	0	12	100	0	0	0	0
Total Urban	29	4	14	23	79	2	7	0	0

church burial records were not definitive; many rural villages had no such separate listings. City populations were also more transient and fluid in their social composition than was the countryside, with more recent migrants; the death of those who lived in abject poverty, without strong familial or friendship networks, were more likely to be unrecorded in the burial records. Another potentially significant factor is the smaller number of burials in the rural settlements, the logic being that fewer burials per year made deviations from previous years' figures more likely. This factor, however, turns out not to be meaningful: Calculation of a correlation coefficient between average number of burials per settlement per year and highest increase in burials during plague periods does not show a strong negative correlation; in fact, it shows no correlation—+0.03 for the Dutch Republic and -0.01 for the Spanish Netherlands. Notwithstanding the limitations inherent in the sources and the exercise of due caution regarding conclusions, the unmistakable finding herein is that rural societies in the Low Countries were strongly afflicted by plague (not to mention other diseases) during the seventeenth-century, just like cities were.

EXPLAINING RURAL PLAGUES IN THE SEVENTEENTH-CENTURY LOW COUNTRIES The notion that plague did not touch the countryside likely derives from a research tradition in economic, social, and demographic history that favors urban over rural history, as well as by a research tradition in rural history that focuses inordinately on small localities. Yet, the idea that the rural Low Countries could escape the effects of early modern plague is counter-intuitive, given recent literature emphasizing plague's contagiousness and the possible role of transmission between people.<sup>19</sup>

Many parts of the Low Countries were not only largely urban but also densely populated; the distance between rural settlements, as well as between villages and towns, was usually short. The movement and interaction of people, often considered responsible for spreading epidemic diseases such as plague, was easily facilitated

19 For the limitations of rural social and economic history in the Low Countries, see Curtis, "Trends in Rural Social and Economic History of the Pre-Industrial Low Countries: Recent Themes and Ideas in Journals and Books of the Past Five Years (2007–2013)," *Low Countries Historical Review*, CXXVIII (2013), 60–95.

by excellent road and water transport. Indeed, many of the agricultural regions of the Low Countries had become highly commercialized compared to other regions of Western Europe. By the late Middle Ages, large tenant farms were already established in Frisia, coastal Flanders, the Dutch River area, and other places where farmers exploited the demand for produce in the Flemish and Dutch towns. The sixteenth and seventeenth centuries saw people migrating long distances (often from the east) to take seasonal work as agricultural laborers. According to the physician Pieter van Foreest, the plague that came to Delft in 1557 originated with the farmers from the surrounding countryside who supplied the town with produce. Diary extracts from 1598 report that because of the plague's severity in the countryside of the Over-Betuwe (Dutch River area), not enough laborers were left to take in the harvest on time.<sup>20</sup>

Rural commercialization, migration, and close links between city and countryside all point toward a commerce- or trade-based explanation of the pervasiveness of plague in the countryside, but they do not shed any light on why rural plagues exhibited levels of severity that were similar (or sometimes even greater) than those in the cities. Commercial relations might be able to explain the diffusion of plague into the countryside, but the large urban centers should have been more susceptible, at least theoretically, to severe outbreaks because of their international connections. The constant departures and arrivals of ships, whether those of the Dutch East India Company (VOC) to and from East Asia or grain shipments to and from the Baltic, would seem to have made many of the significant port towns and harbors an easy target for the spread of new bacteria. Nor did this danger escape contemporaries. In 1563, Amsterdam imposed quarantine measures on English ships because of plague fears, and a year later, Kampen, another port town, aimed preventive measures at ships from plague-stricken Gdansk. The situation was reversed a century later when foreign governments quarantined Dutch ships to guard against the plague epidemic that struck Amsterdam in 1664. Remember also that urban growth (both relative and absolute) in seventeenth-century

20 For early and substantial rural commercialization in the Low Countries, see Bas van Bavel, *Manors and Markets: Economy and Society in the Low Countries, 1500–1600* (New York, 2010); for the Delft example, Ralph Burri (ed.), *Die Delfter Pest von 1557 nach den Beobachtungen von Petrus Forestus* (Zurich, 1982); for the Over-Betuwe example, Gisb Brom and L. A. Van Langeraad (eds.), *Diarium van Arend van Buchell* (Amsterdam, 1907), 474.

Holland was not the result of natural increase but largely influenced by migration from afar—the Spanish Netherlands, France, Germany, and even further afield. Many of the new migrants became poor laborers, often herded into cramped, crowded, and insalubrious neighborhoods.<sup>21</sup>

To explore the impact of rural commercialization on the severity and the expanse of plague outbreaks in seventeenth-century rural areas of the Low Countries, we perform systematic regional comparisons. In its comparison of plague outbreaks by settlement in four different areas of the Low Countries, Table 13 shows that the most commercialized region of Holland had the least severe. Even when taking into account only the worst seventeenth-century outbreak in each settlement there, only 19 percent of these towns suffered a mortality rate of severe or extreme in Holland. The number of places with severe plagues or worse in the far north (Groningen, Frisia, and Drenthe) was 60 percent, in the east (the Duchy of Guelders and the Brabant Generality) 47 percent, and in the south (the Campine, Upper Guelders, and the Duchy of Limburg) 30 percent. Even for rural settlements only, the trend did not change—20 percent in Holland, 51 percent in the far north, 40 percent in the east, and 30 percent in the south. The only exception to the generally moderate plague in Holland was the case in Leiden in 1635/6, which exhibited a more than tenfold increase in burials during this period. Since inland regions such as the Campine and the Duchy of Guelders were hardly beacons of commerce, the easy equation of Low Countries trade with seventeenth-century plague does not hold as an explanation.<sup>22</sup>

None of the top ten places with the most damaging plagues in the database were located in any core commercialized regions of

21 For trade, commerce, and urbanization as the favored explanation of repeat plague epidemics, see Noordegraaf and Valk, *De Gave Gods*, 224; for the quarantine in Amsterdam, *ibid.*, 201; for the quarantine in Kampen, W. ten Kate, “De pestkeuren te Kampen,” *Nederlandsch Tijdschrift voor Geschiedenis*, LXVI (1922), 1657; for the quarantine of Dutch ships in 1664, Rommes, “Plague,” 7.

22 For the commons-dominated, less commercial regions of the Campine, see M. De Keyzer, “The Common Denominator: The Survival of the Commons in the Late Medieval Campine Area,” unpub. Ph.D. diss. (Univ. of Antwerp, 2014); E. Van Onacker, “Leaders of the Pack? Village Elites and Social Structures in the Fifteenth- and Sixteenth-Century Campine Area,” unpub. Ph.D. diss. (Univ. of Antwerp, 2014); for caution regarding commercial explanations of plague mortality and spread, Ann Carmichael, “Plague Persistence in Western Europe: A Hypothesis,” *Medieval Globe*, I (2014), 157–191.



Table 13 Regional Divergences in Plague Severity in the Low Countries during the Seventeenth Century

PLACE	NUMBER OF SETTLEMENTS WITH DATA	BURIAL INCREASES (IN MOST SEVERE CASES OF PLAGUE)							
		< 50	%	50–299	%	300–899	%	900 +	%
Holland	27	5	19	17	63	4	15	1	4
Far north	10	0	0	4	40	2	20	4	40
The east	36	2	6	17	47	13	36	4	11
The south	34	7	21	17	50	6	18	4	12
Holland (rural only)	15	3	20	9	60	3	20	0	0
Far north (rural only)	8	0	0	4	50	1	13	3	38
The east (rural only)	25	2	8	13	52	8	32	2	8
The south (rural only)	33	7	21	16	49	6	18	4	12

the Low Countries (Leiden in 1635/6 narrowly missing). In the list were villages or near poorly commercialized, commons-dominated areas of the Campine, such as Zundert, Rijsbergen, Minderhout, or Lille; villages in the eastern reaches of the inland Republic, such as Arcen, Zalk-Veecaten, and Coevorden; and villages in the isolated far north of Groningen, such as Kropswolde or Midwolda. The plagues that devastated the populations in these areas were not due to trade interactions so much as to incessant conflicts—the Dutch Revolt, the Thirty Years’ War, and the Second Anglo-Dutch War, all of which affected rural communities more than they did towns. The purely military casualties were low, but exposure to new bacteria led to the spread of plague, dysentery, and typhus, as well as other diseases. For example, the town accounts of Helmond from 1635/6 explicitly note that lodging soldiers under the command of Jan van Nassau brought plague to the house of Thomas de Kuijper.<sup>23</sup>

Why did the mobility and interaction of new people via trade and commerce fail to generate the strong plagues that the mobility of

23 For the stronger impact of warfare on rural areas than on cities in the early modern Low Countries, see Myron Gutmann, *War and Rural Life in the Early Modern Low Countries* (Princeton, 1988); Marjolein ‘t Hart, *The Dutch Wars of Independence: Warfare and Commerce in the Netherlands, 1570–1680* (London, 2014); Leo Adriaenssen, *Staatsvormend geweld: Overleven aan de frontlinies in de meierij van Den Bosch, 1572–1629* (Tilburg, 2007); for the Helmond example, Van Zalinge-Spooren, “Die contagieuse sieckte,” 64.

troops did? At present, we can answer only with educated guesses. Definitive conclusions will have to await further research. Yet, a promising avenue of research concerning the relationship between living standards and plague has produced speculation that the stress caused by the Great Famine of 1315–1322 might have exacerbated people's vulnerability to the Black Death of 1347–1352. Could the devastation of agricultural land, the usurpation of goods, the uprooting of families, the forced lodging, and the heavy taxes that continuous warfare brought to the Low Countries during the seventeenth century have had a deleterious effect on the rural populations' physical capacity to resist plague?<sup>24</sup>

Furthermore, urbanization and trade may have conferred on townspeople a degree of resistance to the spread of outside bacteria. By contrast, the sudden shock of new troops appearing in less-cosmopolitan communities, not inured to such exposure, may have weakened people's resistance to plague and other serious epidemic diseases. This hypothesis demonstrates that the findings in this article do not necessarily contradict the well-established view of the larger cities of Holland as "urban graveyards." Rather than sharp spikes in burials, what Holland actually evinces in the seventeenth century are numerous small spikes, indicative of destitute people crowded into unhealthy urban neighborhoods where endemic, recurring diseases (of a lower intensity) were a common feature. This constant exposure to pathogens may have helped people to acquire an immunity that limited the scale of plague epidemics that were much more intense elsewhere in the Low Countries. Thus could Holland exhibit some of the highest general death rates in normal times but some of the shallowest epidemic spikes in times of crisis.<sup>25</sup>

24 For the potential connection between stress and plague resistance, see Paul Slavin, "The Great Bovine Pestilence and Its Consequences in England and Wales, 1318–50," *Economic History Review*, LXV (2012), 1263; Sharon DeWitte and Slavin, "Between Famine and Death: England on the Eve of the Black Death: Evidence from Paleoepidemiology and Manorial Accounts," *Journal of Interdisciplinary History*, XLIV (2013), 37–60; DeWitte, "Setting the Stage for Medieval Plague: Pre-Black Death Trends in Survival and Mortality," *American Journal of Physical Anthropology*, CLVIII (2015), 441–451.

25 For the possibility of (temporary) acquired immunity from plague, see Cohn, "Epidemiology of the Black Death and Successive Waves of Plague," *Medical History*, XXVII (2008), 85; Stephen R. Ell, "Immunity as a Factor in the Epidemiology of Medieval Plague," *Review of Infectious Diseases*, VI (1984), 866–879; Susan Scott and Christopher Duncan, *Biology of Plagues: Evidence from Historical Populations* (New York, 2001) 45; for the possibility of plague

The plagues in Holland did not hamper the province's development; from the final third of the sixteenth century to the middle of the seventeenth century, the cities and towns of the region grew through migration processes that were exogenous to the epidemiological regime. The number of immigrants to Holland's cities from the Spanish Netherlands, France, Germany, and further away was more than four times that from its rural hinterlands. No other cities and towns of the Low Countries, however, could rely on this exogenous immigration during the seventeenth century. Most of the immigrants to these places came from the surrounding countryside, where this article locates the most damaging plague epidemics to have occurred—the likes of the Duchy of Limburg, the Brabant Generality, and the Duchy of Guelders. These regions also experienced the greatest contraction of their urban populations across the seventeenth century. The severe and pervasive nature of the seventeenth-century plagues there destroyed the rural migrant base necessary to replenish the nearby cities, and, in effect, may have inadvertently exacerbated a widening inequality between the booming and the stagnant urban economies of the Low Countries.<sup>26</sup>

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resistance being connected to different environmental factors, diet, and other economic conditions, Fabian Crespo and Matthew Lawrenz, "Heterogeneous Immunological Landscapes and Medieval Plague: An Invitation to a New Dialogue between Historians and Immunologists," *Medieval Globe*, I (2014), 229–258; for the original work on "urban graveyards" in Holland, van der Woude, "Population Developments in the Northern Netherlands (1500–1800) and the Validity of the 'Urban Graveyard' Effect," *Annales de Démographie Historique* (1982), 55–75.

26 For immigration to Holland's cities from outside, see Maarten Prak and Jan Luiten van Zanden, "Demographic Change and Migration Flows in Holland between 1500 and 1800," in Marcel van der Linden and Leo Lucassen (eds.), *Working on Labor* (Leiden, 2012), 237–245; for the greatest urban contraction in the listed areas, de Vries, *European Urbanization*; Klep, "Population Estimates"; 't Hart, "Town and Country in the Dutch Republic, 1550–1800," in Steven Epstein (ed.), *Town and Country in Europe, 1300–1800* (New York, 2001), 80–105.