Malthus: Mortality or Marriage? English Population Growth in the Eighteenth Century.

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INTRODUCTION

Malthus is the most important influence on thinking about the relationship between economic and demographic development. In his theoretical work, he emphasized the impact of economic factors on fertility and population levels, through shifts in the incidence of marriage. He had been influenced by Adam Smith, who had argued that "the demand for men, like that for any other commodity, necessarily regulates the production of men; quickens it when it goes on too slowly, and stops it when it advances too fast."[1] Malthus's work in turn influenced Ricardo, Marx, Marshall and other classical economists, who all assumed the primacy of economics over demography. The exception was Keynes, who accepted that population affected levels of aggregate demand – he was a strong admirer of Malthus – but had little or nothing to say about the impact of population growth on the supply side, in particular the supply of labour.[2]

Malthus's writings reflected the anxieties of his contemporaries in their concern to prevent a decline in their standard of living and economic privileges. His "preventative" method applied particularly to the middle and upper classes, whereas the "positive" checks were mainly applicable to the poor. Malthus's theory of population stressed the economic basis of marriage and fertility, with a growth in income leading to earlier marriage and a rise in fertility. However, there was a contradiction between his theoretical conclusions and his

[1] A. Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, Volume 1, p. 98.

[2] J.M. Keynes, *Essays in Biography (ed.) G. Keynes*), 2010; J.M. Keynes, *The Collected Writings of John Maynard Keynes, Volume 7*, 2012.

analysis of England's population history. Malthus attempted to engage with empirical evidence from parish registers and censuses, but given the unknown reliability of the raw data was forced to make arbitrary assumptions about correction ratios.[3] He also made theoretical statements which may have been correct for the time of writing, but were not accurate for an earlier period. For example, he wrote that "the higher classes ... often want the inclination to marry, from the facility which they can indulge themselves in an illicit intercourse with the sex. And others are deterred from marrying by the idea of the expenses that they must retrench ..."[4] However, in the seventeenth century the aristocracy and other wealthy groups in England married almost universally and at a very young age.[5]

It is possible to construct from his writings on England an account similar to that in a demographic transition model. In this he emphasized the role of mortality rather than fertility in shaping changes in population levels:

> It would appear, by the present proportion of marriages, that the more rapid increase of population, supposed to have taken place since the year 1780, has arisen more from the diminution of deaths than the increase of the births.[6]

He elsewhere amplified this summary statement:

> … there is good reason to believe that not only in London, but the other towns in England, and probably also country villages, were at the time [the 1760s] . . . less healthy than at present. Dr William Heberden remarks that the registers of the ten years from 1759 to 1768, from which Dr Price calculated the probabilities of life in

[3] T. R. Malthus, *An Essay on the Principle of Population*, 1826, pp. 404, 421, 427, 431.
[4] Ibid, p. 397.
[5] See T.H. Hollingsworth, 'The demography of the British peerage', *Population Studies*, Supplement Volume 18, 1965, and data later in this paper.
[6] T. R. Malthus, *An Essay on the Principle of Population*, 1803, p. 311.

> London, indicate a much greater degree of unhealthiness than the registers of late years. And the returns pursuant to the Population Act [of 1801], even after allowing for great omissions in the burials, exhibit in all our provincial towns, and in the country, a degree of healthiness much greater than had before been calculated . . . The returns of the Population Act in 1811 . . . showed . . . a greatly improved healthiness of the people, notwithstanding the increase of the towns and the increased proportion of the population engaged in manufacturing employments.[7]

He concluded that disease environment played a critical role in shaping mortality levels: "A married pair with the best constitutions, who lead the most regular and quiet life, seldom find that their children enjoy the same health in towns as in the country."[8]

Malthus in his writings gave a sociological rather than an economic analysis of marriage: "It is not . . . among the higher ranks of society, that we have most reason to apprehend the too great frequency of marriage . . . [it is] squalid poverty . . . [which] prompt universally to early marriages . . ."[9] He argued that the "carelessness and want of frugality observable among the poor, so contrary to the disposition generally to be remarked among petty tradesmen and small farmers,"[10] and that

> poverty itself, which appears to be the great spur to industry, when it has once passed certain limits, almost ceases to operate. The indigence which is hopeless destroys all vigorous exertion … It is the hope of bettering our condition, and the fear of want, rather than want itself, that is the best stimulus to industry, and its' most constant and best directed efforts will almost invariably be found among a class of people above the class of the wretchedly poor.[11]

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[7] T. R. Malthus, *An Essay on the Principle of Population*, 1989, Volume 1, pp. 256, 267..
[8] Ibid, p. 257.
[9] Ibid, p. 438; Volume 2, pp. 114, 150.
[10] Ibid, Volume 1, p. 359.
[11] Ibid, p. 439.

It was this emphasis on "bettering our condition" that led Malthus to stress education as the best way of encouraging the postponement of marriage:

> . . . to better the condition of the lower classes of society, our object should be to . . . [cultivate] a spirit of independence, a decent pride, and a taste for cleanliness and comfort among the poor. These habits would be best inculcated by a system of general education and, when strongly fixed, would be the most powerful means of preventing their marrying . . . [and] consequently raise them nearer to the middle classes of society.[12]

Malthus is expressing here the insight which has informed much of the literature on modern birth control practices: that education − particularly of women − combined with economic opportunity, is the most powerful way of encouraging fertility reduction.

His conclusion was that falling mortality had led to a reduction in the incidence of marriage:

> … the gradual diminution and almost total extinction of the plagues which so frequently visited Europe, in the seventeenth and the beginning of the eighteenth centuries, produced a change [in the incidence of marriage] … in this country [England] it is not to be doubted that the proportion of marriages has become smaller since the improvement of our towns, the less frequent returns of epidemics, and the adoption of habits of greater cleanliness.[13]

This was an early form of demographic transition theory, and in order to evaluate this argument, it is necessary to examine in detail England's demographic history in the eighteenth century.

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[12] Ibid, Volume 2, p. 155.

[13] Ibid, Volume 2, p. 198. See also Ibid, Volume. 1, p.193 and Volume 2, p.115.

THE RELIABILITY OF PARISH REGISTERS

There is an element of uncertainty in all historical demographic measures, including local and regional variations. In the absence of reliable national data, it is necessary to adopt a methodology of the triangulation of data. This allows independent checking of all findings, important where these findings are unexpected and potentially controversial. An example of this is the finding that virtually all women were married in England during the seventeenth century, contradicting the theoretical notion of a European marriage pattern.[14] This conclusion was reached by using five different sources – censuses, church court depositions, burial registers, wills and family genealogies.[15] Likewise, the finding of the halving of adult mortality in the eighteenth century is based on the analysis of apprenticeship indentures, marriage registers, family genealogies, and data on elite groups such as Members of Parliament.[16]

The same methodological principle applies to the measurement of parish register reliability. Central to all discussion of population history before the introduction of civil registration in 1837 is the reliability of parish registers. Nine objective methods measuring burial register reliability are available, involving the triangulation of data.[17] The most important two methods are: (i) the same-name technique and (ii) the comparison of individual entries in probate and burial registers.

The same-name technique is based on a custom in England which gave the name of a dead child to a subsequent child of the same sex. Evidence from local censuses and other listings suggests that there were no living children with the same names in

[14] J. Hajnal, 'European marriage patterns in perspective' in D.V. Glass and D.E.C. Eversley (eds.), *Population in History: Essays in Historical Demography,* 1965, p. 101.

[15] P.E. Razzell, *Mortality, Marriage and Population Growth in England, 1550-1850*, 2016, pp. 60-70,

[16] Ibid, pp. 45-60.

[17] Ibid, pp. 15, 16.

individual families in the period 1676-1849.[18] However, according to probate data for different parts of England during the period 1600-1649 there were thirteen living same-name children out of a total of 2,144 – 0.6 per cent – although some of these children may have been step-siblings.[19]

Where two children of the same family were baptised with an identical name, it is therefore possible to measure the completeness of burial registration by searching for the first same-name child in the burial register. The technique can only be applied to families with at least two recorded baptisms of children of the same sex, but it is a valuable method of assessing the quality of burial registration.

The most important work on England's demographic history using parish registers is that carried out by E.A Wrigley and colleagues of the Cambridge Group. Their main findings were that after a period of stagnation in the second half of the seventeenth and first half of the eighteenth century, population began to grow rapidly after the middle of the eighteenth century, with about two-thirds of the population increase due to a rise in fertility, and one

[18] Galley, Garrett, Davies and Reid initially argued that there were some living same-name English children enumerated in the 1695 Marriage Duty Census, but subsequently conceded that these same-name siblings were a consequence of transcription errors. C. Galley, E. Garrett, R. Davies and A. Reid, 'Living same-name siblings and English historical demography: a final comment', *Local Population* Studies, Number 88, 2012, p.82. See also C. Galley, E. Garrett, R. Davies, A. Reid, 'Living same-name siblings and English historical demography: a reply to Peter Razzell', *Local Population Studies*, Number 87, 2011; P.E. Razzell, 'Living same-name siblings in England, 1439-1851, *Local Population* Studies, Number 87, 2011; P.E. Razzell, 'Living same-name siblings in England, 1439-1851: a commentary, *Local Population* Studies, Number 88, 2012. Galley et.al successfully established that there were some living same-name children in Highland Scotland at this time, but all the research reviewed in this paper relates to English demographic experience.

[19] See P.E. Razzell, 'Living same-name siblings in England, 1439-1851, *Local Population* Studies, Number 87, 2011, p. 67 for a list of the places and dates involved.

third to decreasing mortality.[20] They have argued that the growth of population was mainly the result of the increase in fertility associated with a fall in the age of marriage, which in turn was due to growing real incomes lagged over time, a conclusion largely confirming the theoretical work of Malthus.

Because of deficiencies in parish registration, it was necessary to inflate the number of burials, baptisms, and marriages in order to establish reliable measures of deaths, births, and marriages. During the period in which the Cambridge Group's research was carried out there were no methods available to independently measure the reliability of inflation ratios. This was recognized by Wrigley et.al when they concluded that "the lack of a reliable alternative data source makes it impossible . . . to test effectively the completeness of Anglican registration", resulting in "arbitrary" inflation ratios which can only be based on "internal plausibility and internal consistency of the results obtained."[21]

However there are now available new objective methods of measuring parish register reliability. The following table summarizes a same-name analysis of 15 Cambridge Group reconstitution parishes during the period 1650-1837.

Table 1: Proportion of Untraced Same-Name Cases in 15 Cambridge Group Reconstitution Parishes, 1650-1837.[22]

Period	*Total Numbe of Same-Name Cases*	*Number of Same-Name Cases Traced in Burial Registers*	*Proportion of Untraced Case*
1650-99	1,160	873	24.7%
1700-49	1,533	1,246	18.7%
1750-99	1,227	903	26.4%
1800-37	907	705	22.3%

[20] E.A. Wrigley, R.S. Davies, J.E. Oeppen, R.S. Schofield, *English Population History from Family Reconstitution, 1580-1837*, 1997, p. 126.

[21] E.A . Wrigley, R.S. Schofield, *The Population History of England, 1541-1871*, 1989, p. 137; Wrigley, Davies, Oeppen, Schofield, *English Population*, pp. 91, 92.

[22] Source: Reconstitution data in Cambridge Group archive.

There appears to have been a slight improvement in burial registration reliability in the first half of the eighteenth century, although other data suggests no significant change in the period between 1650 and 1837.[23]

Research comparing probate with burial register data covering 147 parishes indicates that there were no significant changes in burial registration reliability in the parish register period.[24] The most detailed research available is on the county of Bedfordshire, where a study of all 124 parishes has been carried out.

Table 2: Proportion of Probate Cases Traced in 124 Bedfordshire Burial Registers, 1543-1849.[25]

Period of Probate	*Total Number of Probate Cases*	*Proportion of Burials Untraced*
1543-99	610	26%
1600-49	3731	21%
1650-99	4626	26%
1700-49	6030	23%
1750-99	3744	22%
1800-49	3303	27%
Total	22044	24%

Using digital data transcribed by the Bedfordshire Family History Society, it is possible to calculate same-name untraced cases for 87 parishes for the period 1580-1849. There were 91 untraced cases out of a total of 307 – 30% - indicating that the untraced cases in

[23] Razzell, *Mortality*, pp. 18-23.

[24] Probate data tends to exclude the poorest members of a community, but data for Bedfordshire suggests that the poorest occupational group – labourers – experienced similar levels of burial under-registration as the rest of the population. P.E. Razzell, C. Spence, M. Woollard, 'The evaluation of Bedfordshire burial registration, *Local Population* Studies, Number 84, 2010, p. 45.

[25] Source, Razzell, *Mortality*, p. 18.

Table 2 yield a somewhat conservative figure of missing burials in the parish register period.[26]

Wrigley and Schofield had assumed in their aggregative research that other than defective periods, burial registration was perfect in the period leading up to the middle of the seventeenth century and only deteriorated significantly at the end of the eighteenth century.[27] This is reflected in the inflation ratios they used to translate burials into deaths which were as follows: 1540-99: 0%; 1600-49: 0%; 1650-99: 1.9%; 1700-49: 4.6%; 1750-99: 10.0%: 1800-39: 25.8%.[28] Data on same-name and probate/burial register research, indicates that at least 25% of all burials were missing from parish registers in the period 1600-1837, with no clear linear trends in register reliability over time.

The absence of significant changes in burial register reliability is similar to the findings of research on baptism register reliability. This involved research comparing information in censuses and baptism registers, including an evaluation of the quality of the census data through cross-matching censuses at different dates.[29] There was no linear trend found in the eighteenth century, with about 29 per cent of all births missing from the baptisms registers.[30]

Wrigley and Schofield's inflation ratios for baptisms in the period 1710-1836 are as follows: 1710-42: 11.5%; 1743-62: 13.9%; 1763-80: 16.4%; 1781-1800: 26.0%; 1801-20: 42.9%; 1821-36: 39.1%.[31] They assumed that birth under-registration was relatively

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[26] I would like to thank the Bedfordshire Family History Society for providing CDs of the baptisms and burials for the whole county. The breakdown of the figures of untraced cases by half-century, with the total number of cases in brackets, was as follows: 1580-1648 :44% (39); 1652-99:32% (76); 1700-49: 24% (83);1750-99: 32% (65); 1801-49: 20% (44). The sample sizes are too small to make a meaningful comparison with the figures in Table 2.

[27] Wrigley, Schofield, *The Population*, p. 561.

[28] Ibid.

[29] P. E. Razzell, *Essays in English Population History*, 1994, pp. 84-89.

[30] Razzell, *Mortality*, pp. 22, 23.

[31] Wrigley, Schofield, *The Population*., pp. 541-44.

low in the period 1710-80, but deteriorated sharply from the 1780s onwards, particularly after 1801. This assumed pattern is at variance with the findings outlined above, which essentially show no major changes in the eighteenth and early nineteenth century.

There is also evidence of a high level of marriage under-registration which is confirmed by Baker in his study of eighteenth century Cardington in Bedfordshire. He with colleagues attempted to trace both native and other adults who had migrated from all parts of the county, and found that 40.1% of baptisms, 31.5% of marriages and 24.9% of burials could not be traced in parish registers.[32] According to a range of evidence, this non-registration of births, marriages and deaths was mainly due to the negligence of clergyman and clerks in compiling parish registers.[33]

Wrigley and colleagues attempted to address the problems of parish register reliability by constructing a complex mathematical back projection model. The model suffers from a range of arbitrary assumptions, including the sharp inflation of baptisms and burials at the end of the eighteenth and beginning of the nineteenth century. Additionally, these models are very sensitive to changes in assumption. For example, as a part of their back projection programme, Wrigley and Schofield reduced the size of the age group 90-94 enumerated in the 1871 Census by 44%; if they had chosen instead to reduce this by 40%, their estimate of the English population in 1541 would have been 9% larger.[34]

ESTIMATES OF POPULATION GROWTH

Given that there were no major changes in parish register unreliability in the parish register period, the most valuable data created by the Cambridge Group are the raw uncorrected national

[3232] D. Baker, *The Inhabitants of Cardington*, 1973, p. 18.
[33] Razzell, *Essays*, pp. 108-11.
[34] R. Lee and D. Lam, 'Age distribution adjustments for English censuses, 1821 to 1931', *Population Studies*, Volume 37, 1983, p. 446.

figures of baptisms, marriages and burials. These raw national figures provide the basis for the calculation of population changes in the eighteenth century, but with the assumption of zero net migration. For the purposes of this analysis, it is assumed that 29% of births and 28% of deaths went unregistered in the eighteenth century.[35] These figures are used as correction factors because they yield appropriate population growth figures in the eighteenth century between the 1695 marriage duty census and the first national census of 1801. Applying these correction ratios to the raw national data yields the following population figures.

Table 3: Estimated Population Sizes of England, 1695-1801.[36]

	Births	*Deaths*			
Period	*Baptisms x 100/71*	*Burials x 100/72*	*Births Minus Deaths*	*Population Date*	*Population Size*
				1695	4632000
1695-99	1029677	951322	78355	1700	4710355
1700-09	2100998	1840774	260224	1710	4970579
1710-19	2079920	1922863	157057	1720	5127636
1720-29	2225579	2349728	-124149	1730	5003487
1730-39	2402912	2094161	308751	1740	5312238
1740-49	2306889	2151421	155468	1750	5467706
1750-59	2437382	1999636	437746	1760	5905452

[35] These proportions are based on figures discussed previously, with about twenty-nine per cent of births missing from baptism registers in the eighteenth century. Approximately twenty-five per cent of deaths in same-name and probate parish samples were untraced in the period 1650-1837, but the number of untraced cases in urban areas appears to have been higher. For example the proportion of untraced cases in London and Liverpool in the period 1700-49 was significantly higher than elsewhere in the parish register period. P.E. Razzell, *Population and Disease: Transforming English Society, 1550-1850*, 2007, pp.134, 138.

[36] Source: Wrigley, Schofield, *The Population*, pp. 517-52, 577, 588. The population in the start date in 1695 is based on David Glass's reworking of Gregory King's estimate of population at that date.

1760-69	2607904	2280840	327064	1770	6232516
1770-79	2903273	2247785	655488	1780	6839889
1780-89	3085997	2478624	607373	1790	7447262
1790-99	3414119	2466510	947609	1800	8394871
1800-01	631897	528639	103258	1801	8498129

The estimated population figure for 1801 – 8,498,129 – is slightly smaller than the figure that Rickman calculated for 1801 – 8.561 million.[37] Given that the above estimates do not make any allowance for changes in migration levels, and that the population figure for 1695 is somewhat arbitrary, the data in Table 3 represent a plausible pattern of population growth in the eighteenth century.

The Table indicates that population diminished in the 1720s but increased gradually after that period, accelerating rapidly at the end of the eighteenth and beginning of the nineteenth century. The raw data suggests that it was a fall in mortality rather than a rise in fertility that was responsible for the increase in population.

Table 4: English Baptism and Burial Rates (Per 1000) in England Calculated from Cambridge Group Data.[38]

Period	*Estimated Population*	*Baptism Rate*	*Burial Rate*
1701-40	5,160,000 (1721)	30.4	28.7
1741-80	6,054,000 (1761)	30.3	25.9
1781-1820	8,667,000 (1801)	29.4	20.6

It is only because Wrigley & Schofield disproportionately inflated the number of baptisms in the period 1781-1820 that they concluded that there was a rise in the crude baptism rate in this period, and yet as we have seen the direct evidence on baptism

[37] Ibid, p. 577.

[38] Source: Baptism and burial totals Wrigley, Schofield, *The Population*, pp. 541-44, 549-52; population figures taken from Table 3.

registration reliability suggests that there were no significant changes in this period. Gregory King's work on the age structure of the English population in 1695 indicates it was very similar to that in 1821 based on national enumeration returns,[39] suggesting that there was no long-term change in age-specific fertility during this period.

Table 4 indicates that it was falling mortality that fuelled population growth, but in order to further clarify the exact demographic changes in the eighteenth century, it is necessary to consider in detail the empirical evidence on mortality, nuptiality and fertility in the parish register period.

THE HISTORY OF INFANT AND CHILD MORTALITY

Most studies of infant and child mortality have suffered from the lack of an objective method of measuring burial registration reliability.[40] The same-name method allows objective measurement, stating its procedures in advance and not making adjustments to resulting findings. I have used the technique for the analysis of 11 Cambridge reconstitution parishes, as well as in 15 rural parishes from other areas of England. [41]

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[39] D.V. Glass and D.E.C. Eversley (eds.), *Population in History: Essays in Historical Demography*, 1965, pp. 212-13.

[40] There are a number of historical studies of infant and child mortality which suffer from this difficulty. See R.E. Jones, 'Further evidence on the decline of infant mortality in pre-industrial England: north Shropshire, 1561-1810', *Population* Studies, Volume 34,, 1980, pp. 239-50; J. Landers, 'London mortality in the long eighteenth century', *Medical History, Supplement Number 7*, 1991; R. Houston, 'Mortality in early modern Scotland: the life expectancy of advocates', *Continuity and* Change, Volume 7, 1992; P. Huck, 'Infant mortality in nine industrial parishes in northern England, 1813-36', *Population* Studies, Volume 48, 1994; M. Dobson, *Contours of Death and Disease in Early Modern* England, 1997; C. Galley, *The Demography of Early Modern Towns; York in the Sixteenth and Seventeenth* Centuries, 1998.

[41] Source: Reconstitution data in the Cambridge Group archive; parish registers in the Society of Genealogists library. Same-name correction ratios

Table 5: Infant and Child (1-4) Mortality (per 1000) in 11 Cambridge Group and 15 Rural Parishes, 1700-1837.

Period	*Number of Infants at Risk*	*Number of Children at Risk*	*IMR*	*CMR*
11 Cambridge Group Parishes				
1700-49	11933	8842	174	110
1750-99	12591	9897	148	97
1800-37	15362	9230	110	99/
15Rural Parishes				
1700-49	8332	5603	182	128
1750-99	9629	6950	150	126
1800-37	9375	6183	94	81

The pattern of mortality in the two samples is similar, although the reductions in mortality between 1700-49 and 1800-37 are greater in the rural areas than in the Cambridge Group sample. This may be partly a function of population size, as the mean population in 1801 of the Cambridge Group parishes was 1,349 and that of the rural sample 589. The average national mean size of the English population in 1801 was about 860,[42] and so the rural parishes are slightly more representative than the Cambridge Group ones.

From research on birth-baptism intervals and infant mortality, it is estimated that a maximum of 5% of children died before baptism in the period 1761-1834. However, many 'sickly' children were privately baptised, reducing mortality before baptism.[43] The infant mortality rates in both samples in 1800-37

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have been applied to raw IMR and CMR figures. The 11 Cambridge Group parishes are: Alcester; Aldenham; Austrey; Banbury; Bottesford; Colyton; Dawlish; Great Oakley; Ippleden; Morchard Bishop. The 15 rural parishes are: Ackworth; Ampthill; Arrington; Barton-in-the-Clay; Beeley; Breamore; Canewden; Cusop; Eaton Hastings; Kemerton; Sandy; Stow Maries; Truro; Weston Colville; Woodchurch; Youlgreave.

[42] Wrigley, Davies, Oeppen , Schofield, *English Population*, p. 20

[43] Razzell, *Essays,* pp. 106-07.

were relatively low – 110/1000 and 94/1000 – and this may be partly a function of the exclusion of infants dying before baptism. Woods estimated that the infant mortality rate in rural areas during the Victorian period was 97 per 1,000 as against 218 per 1,000 in urban areas, with a national average of 150 per 1,000.[44] He calculated the rural rate from data for Dorset, Hertfordshire and Wiltshire, southern counties like those forming the basis of the samples in Table 5. Similar consideration are likely to apply to child mortality rates, for although the child mortality rate for the age group 1-4 nationally in 1838-54 was 134 per 1,000,[45] it is likely to have been significantly less of that in rural areas, similar to that depicted in Table 5.

However, the sample sizes are small and are not necessarily representative of the whole country. They do not include any northern parishes or large towns, and under-represent industrial villages.[46] Infant and child mortality was much higher in large towns than in rural and provincial parishes in the seventeenth and eighteenth centuries. The infant and child mortality rates in 18 rural reconstitution parishes in 1650-1699 were 151/1000 and 106/1000 respectively; the equivalent rates in London, Norwich, Ipswich and Canterbury in a similar period were 304/1000 and 237/1000.[47] Urban infant and child mortality was twice of that in rural and provincial parishes in the late seventeenth century, but by the nineteenth century the average infant mortality rate in these urban areas had reduced to 179 per 1000.[48] However, there is some evidence to indicate that infant mortality grew in some urban and industrial parishes in the first

[44] Woods, op. cit., pp. 260-61.
[45] Register General Supplement, *45th Annual Report*, p. v
[46] A reconstitution study of Ackworth in Yorkshire for the period 1687-1812 indicates that the pattern of infant and child mortality was similar to that in Table 5, although at a somewhat lower level. The figures are as follows: 1687-1749: IMR: 166, CMR: 114; 1750-1812: IMR: 82, CMR: 77. Razzell, *Mortality,* p.34.
[47] Ibid, p. 34.
[48] Ibid.

half of the nineteenth century,[49] although the scale of reductions during the eighteenth century in the four urban parishes greatly outweighed the relatively modest increases in urban areas in the nineteenth century.

The pattern of infant and child mortality in the most important urban area – London – is indicated by the results of reconstitution studies of 16 City of London parishes in the period 1539-1849.

Table 6: Infant and Child (1-4) Mortality (Per 1000) in 16 London Parishes, 1650-1849.[50]

Period	*IMR*	*CMR*
1650-99	256	282
1700-49	409	176
1750-99	263	270
1800-49	141	118

Infant mortality increased significantly between 1650-99 and 1700-49, before falling very sharply after the middle of the eighteenth century. There was a similar pattern in child mortality, except for the rise in mortality in the second half of the eighteenth century.

SOCIO-ECONMIC STATUS AND INFANT AND CHILD MORTALITY

[49] W.A. Armstrong, 'The end of mortality in Carlisle between the 1780s and the 1840s: a demographic contribution to the standard of living debate', *Economic History Review*, Volume 34, 1981; P. Huck, 'Infant mortality in nine industrial parishes in northern England, 1813-36', *Population Studies,* Volume 48, 1994*;* S. Szreter, G. Mooney, 'Urbanization, mortality and the standard of living debate: new estimates of the expectation of life at birth in nineteenth century British cities', *Economic History Review*, Volume 51, 1998.

[50] Source: Razzell, *Population*, pp, 13, 134.

One further way of exploring the factors shaping infant and child mortality is to analyse the relationship between socio-economic status and mortality.

Table 7: Infant and Child (1-4) Mortality (Per 1,000) amongst Elite and Control Families in 17 Cambridge Group Parishes, 1650-1799.[51]

Period	*Elite Families*		*Control Families*	
	IMR	CMR	IMR	CMR
1650-99	158	143	180	132
1700-49	177	106	223	146
1750-99	113	69	159	134

An elite family – gentlemen, professionals and merchants – was matched with the next control family in the baptism register, most of whom were artisans and labourers. There was little difference between the two groups in the late seventeenth century, but a sharp divergence thereafter, particularly in child mortality rates. Other sources indicate a variation in findings, although overall it would appear that these forms of early mortality reduced first amongst wealthy families and only later amongst the general population in the eighteenth century.[52] Lower infant and child mortality levels amongst the wealthy continued throughout the nineteenth century,[53] although at significantly reduced levels than in the seventeenth century. However, areas with different socio-economic profiles showed if everything a reverse pattern. This can be illustrated with reference to London, where the Registrar-General provided data on mortality by registration sub-district. He classified districts by poverty levels as measured by average rateable value.

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[51] Source: Razzell, *Mortality*, p. 37.

[52] Razzell, *Population,* pp. 91, 103-05, 111,-12; 133; Razzell, *Mortality,* pp. 37-41.

[53] Razzell, *Population,* pp. 112-14.

Table 8: Infant, Child and Adult Mortality per 1000 in London by Rateable Value of Registration District, 1839-44.[54]

Registration Districts	*Mean Annual Value of Rated Property*	*IMR*	*CMR*	*Adult (25-44) Male Mortality*
10 districts with lowest rateable value	£15	153	52	13
10 districts with medium rateable value	£26	168	59	15
10 districts with highest rateable value	£58	167	58	13

Most of the poor districts were in the East End of London, and the wealthy ones in the West End.[55] The lack of an association between socio-economic status and infant mortality is supported by evidence on Quakers, who by the nineteenth century were mainly wealthy merchants and professionals. The infant mortality rate amongst Quakers in London in 1825-49 was 150 per 1000, similar to the rate amongst the total population in equivalent registration districts in 1838-44.[56]

These surprising findings are replicated in other districts of England. In the period 1851-60, mortality levels in the wealthy towns of Bath, Cheltenham, Richmond and Brighton were significantly higher than in poorer districts in the same county.[57] The wealthy areas were towns, and the poorer areas rural districts, indicating that disease environment was more important in these instances than poverty in shaping mortality levels.[58]

To summarize, in rural and provincial areas infant mortally fell sharply between the first half of the eighteenth and nineteenth centuries, nearly halving in some areas. Child mortality in these districts was more stable, although there

[54] Source: Ibid, p. 136.
[55] Source: Ibid, p. 136.
[56] Razzell, *Population*, p. 137; Landers, op. cit.
[57] Razzell, *Mortality*, p. 41
[58] See Woods *The Demography*, pp. 170-202 for an analysis of the mortality differences between urban and rural districts in this period.

appears to have been a significant fall in some rural areas at the beginning of the nineteenth century. In London and in other urban districts there were marked falls in both infant and child mortality. Child mortality amongst the wealthy reduced in rural and provincial areas at an earlier period – from the beginning of the eighteenth century onwards – than it did among the general population.

It is less clear what the influence of socio-economic status was on urban infant and child mortality, and in London by the mid-nineteenth century there appears to have been little or no association between poverty and these forms of mortality. Also, as we have seen, in a number of provincial districts mortality was significantly lower in poor than in wealthy areas in the 1850s.

The general timing and extent of reductions in early childhood mortality cannot fully explain the scale of population increase in the eighteenth century. For a full explanation of this surge in population growth we must look elsewhere.

THE HISTORY OF ADULT MORTALITY

There are a number of problems with the reconstitution study of adult mortality, in particular the unreliability of raw burial registration data. Only about ten per cent of the original sample can be included in the analysis, which is not likely to be socially or demographically representative of the total population.[59] There is also the difficulty of establishing accurate nominal record linkages between baptisms/marriages and subsequent burials, as most parish registers only list the names of people buried without further identifying information. There are however a number of sources which allow the direct measurement of adult mortality, the most important of which are: i. apprenticeship indenture records, and ii. marriage licences.

[59] Razzell, *Mortality,* p. 43

In the year 1710 the government introduced a national tax on apprenticeship indentures – the Inland Revenue Register (INR Register) – which was in existence until the early nineteenth century. Details of these indentures have survived and are currently being digitised by the Society of Genealogists.[60] The indentures in the early period provide the following information on fathers: name, place of residence, occupation, and whether or not they were alive or dead. Additionally the name of the apprentice was recorded along with the amount paid for the indenture.

A sample of 1,578 cases was selected from the national register, and data on the mortality status of fathers was established. It is estimated that a minimal annual mortality rate for England in 1710-13 was 20.9 per 1,000, which can be compared to figures published by the Registrar-General for a similar age group – 25-44 – in the period 1838-42 – 11 per 1000.[61] This indicates that male adult mortality approximately halved in the period between the early eighteenth and middle of the nineteenth century, a conclusion borne out by a number of other sources.[62]

Marriage licences are one of the most informative sources, covering between 30 and 90 per cent of the population.[63] For children under the age of 21, they required parental permission, and where a father was dead, permission of a widowed mother or guardian was required. The licences are available from the beginning of the seventeenth to the end of the eighteenth century, and an analysis of available licences yields the following results:

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[60] I would like to thank the Society of Genealogists for making available the digital version of the INR Register, covering the surnames beginning with the letters A to M.

[61] Mitchell and Deane, *Abstracts*., p. 38

[62] Razzell, *Mortality,* pp. 45-56.

[63] Razzell, *Population,* pp. 62, 63

Table 9: Fathers of Spinsters under Twenty-One: Proportions Dead in English Regions, 1600-1799.[64]

Period of marriage	*London*	*South of England*	*East Kent Diocese*	*Durham Diocese*
1600-46	46%	40%	47%	-
1661-99	47%	44%	43%	-
1700-09	48%	47%	50%	-
1710-19	47%	44%	48%	-
1720-29	45%	39%	48%	-
1730-39	46%	39%	34%	-
1740-49	55%	45%	37%	42%
1750-59	40%	41%	27%	28%
1760-69	35%	35%	22%	27%
1770-79	39%	31%	24%	29%
1780-89	31%	32%	28%	25%
1790-99	31%	27%	22%	-

According to this table, male adult mortality nearly halved in all regions in the eighteenth century.[65] As the figures relate to fathers who were alive on average nineteen years before the marriage of their daughters, mortality first began to fall in East Kent between 1710 and 1730, and in London, the South of England and Durham between 1730 and 1750.

According to Table 9 there were gains in life expectancy throughout the whole of the eighteenth century, although in East Kent most of this took place in the first half of the century. Other evidence indicates that reductions of mortality in Nottinghamshire also appear to have occurred mainly in this period, with the estimated paternal death rate falling from 22 per 1,000 in 1661-63 to 14 per 1,000 in 1754-58 and 10 per 1,000 in 1791-93.[66]

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[64] Source: Razzell, *Mortality,* p. 48.
[65] Ibid.
[66] Ibid, p. 49.

However data on the fathers of masons' apprentices who lived in all areas of the country, suggests paternal mortality fell progressively throughout the eighteenth century.

Table 10: Mortality Amongst Fathers Of London Indentured Masons' Apprentices.[67]

	Fathers Residing In London			Fathers Residing Out Of London		
Period	Number Of Fathers	Number Of Fathers Dead	Proportion Of Fathers Dead	Number Of Fathers	Number Of Fathers Dead	Proportion Of Fathers Dead
1663-99	223	94	42.2%	450	167	37.1%
1700-49	375	124	33.1%	250	76	30.4%
1750-99	202	43	21.3%	96	18	18.8%

Most of these fathers were artisans and tradesmen, and overall lived equally in and outside of London, with many of the latter residing in every county and country of Great Britain. Mortality was slightly higher in London than in areas outside the capital, but the pattern of falling mortality was nearly identical in the two regions, suggesting that disease environment was not critical in the reduction of mortality.

Evidence from the marriage licences and apprenticeship indentures suggest that adult mortality was higher amongst the wealthy than the poor, and this may have been the case until the end of the nineteenth century.[68] This was probably due to the 'hazards of wealth' – the consumption of very rich food and alcoholic drinks, and a relative lack of exercise – as well as the result of avoiding childhood infections such as smallpox, which took their toll in adulthood.[69]

However, this reverse socio-economic gradient appears to have been established in the eighteenth century, as revealed by the association between occupation and mortality in East Kent during the period between 1619-46 and 1751-1809.

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[67] Source: C. Webb, *London Livery Company Registers, Volume 27: Masons Company, 1663-1805.* (1999).
[68] Razzell, *Population,* pp. 197-226.
[69] J.C. Riley, *The Eighteenth Century Campaign to Avoid Disease*, 1987.

Table 11: Proportion of Dead Fathers of Spinsters Marrying Under 21, by Occupation of Husband in East Kent, 1619-1809.[70]

Occupation	*Period*		
	1619-46	*1661-1700*	*1751-1809*
Gentlemen, Merchants & Professionals	39%	38%	28%
Yeomen & Farmers	41%	42%	15%
Tradesmen & Artisans	46%	49%	26%
Husbandmen	50%	39%	19%
Mariners & Fishermen	42%	45%	24%

Mortality declined significantly during the eighteenth century, approximately halving in most occupational groups. In the seventeenth century gentlemen, merchants and professionals appear to have lower mortality than other groups, but by 1751-1809 the position had been reversed, with this elite group having the smallest reduction in mortality.

These conditions and practices inevitably led to a high incidence of disease and levels of mortality, in spite of the wealth of these privileged populations. There is now evidence that mortality levels of the wealthy were very high in the earlier period, but changed significantly during the eighteenth century. Perhaps the best illustration of this is the changing life expectancy of Members of Parliament during this period. The data is of a very high quality, with about 95 per cent of information on birth and death dates during the period 1660-

[70] Source: Razzell, *Essays,* p. 197. For higher paternal mortality amongst gentlemen and professionals than in other groups in Nottinghamshire and Sussex during 1754-1800 see Razzell, *Population*, p. 117.

1820.[71] Members of Parliament came from all areas of the country, and their socio-economic status as owners of estates did not change during the period covered by the following table.[72]

Table 12: Mean Number of Years Lived by Members of Parliament, 1660-1820 (Number of Cases in Brackets).[73]

Period of First Entry	*Age at First Entry*		
	29 Years and Under	*30-39 Years*	*40 Years Plus*
1660-1690	25.7 (429)	22.6 (458)	17.9 (633)
1691-1714	28.1 (520)	25.4 (402)	18.3 (438)
1715-1754	30.8 (541)	28.2 (422)	18.5 (347)
1755-1789	37.1 (480)	29.9 (354)	21.2 (431)
1790-1820	38.1 (571)	32.0 (432)	22.4 (572)

All age groups experienced mortality reductions, but the greatest mortality gains were amongst the youngest age cohort aged 29 and under. There was an increase in life expectancy of over 12 years in this group, distributed evenly in the entry period between 1660 and 1789. There were also substantial gains in the 30-39 age cohort – of about 10 years – but these were mainly confined to the entry period between 1660 and 1754. There was a modest increase in life expectancy of nearly 5 years in the oldest 40+ group, which was fairly evenly spread between 1660 and 1820. The above pattern of adult mortality is similar to that found by Hollingsworth in his study of the aristocracy.[74] Although all the evidence considered on adult mortality is for males, his study of

[71] See the online History of Parliament website.
[72] Ibid.
[73] P. Razzell, *Essays in Historical Sociology*, 2021, p. 169. Table 12 also has extra information on the 1691-1714 cohort.
[74] Hollingsworth, *The Demography*, p. 56

the aristocracy suggests that females experienced even more mortality reductions in the eighteenth century.[75]

The timing of the reduction in adult mortality was different from the falls in infant and child mortality which appear to have occurred mainly in the second half of the eighteenth century, and given that life table models assume that infant/child and adult mortality move in the same direction, this suggests that these models are not a reliable basis for understanding eighteenth century mortality trends. The Cambridge Group have used such models in calculating figures of adult mortality, but different assumptions may have been one of the reasons why their figures have changed significantly in recent years. In 1997 Wrigley et.al published life expectancy figures for men aged twenty-five as follows: 1640-89: 30.4 years; 1750-1809: 35.4 years.[76]

More recently in 2004, Wrigley has claimed that 'reconstitution data suggest that adult mortality moved from the equivalent of level 5 in model North in the period 1640-89 to the equivalent of level 9 in 1750-1809, or a rise of 10 years.'[77] The latter figure represents a very significant increase over earlier estimates, and is now compatible with the marriage licence and other data reviewed earlier.[78] Wrigley concluded that 'there seems little reason to suppose that the evidence relating to male adult mortality drawn from marriage licences and that drawn from reconstitution are at odds'[79], representing a welcome new consensus.

EXPLAINING MORTALITY REDUCTIONS

[75] Ibid, p. 57.
[76] Wrigley, Davies, Oeppen, Schofield, op. cit., p. 291.
[77] E.A. Wrigley, *Poverty, Progress and Population*, 2004, pp. 427, 428
[78] According to calculations prepared by Jim Oeppen using the East Kent marriage licence data, there was an increase of 9 years in life expectancy at age 25 between 1650-99 and 1750-1800. Razzell, *Essays*, p. 201.
[79] Wrigley *Poverty*., p. 431.

The factors responsible for mortality levels are complex. For example, smallpox became much more virulent between the sixteenth and nineteenth century: case fatality rates amongst unprotected children in London rose from about 5% to 45% in this three hundred year period. It is possible that the increasing fatality of smallpox was the result of the importation of more virulent strains with the growth of world trade. It was only the practice of inoculation and vaccination that prevented the disease from destroying a large part of the population.[80] Smallpox also varied in its age incidence between different areas of the country: in the South of England it was a disease of both adults and children, whereas in the North and elsewhere it affected mainly young children. This is important as case-fatality rates differed markedly between different age groups.[81]

To some extent, disease had its own internal logic, so that for example the disappearance of the plague in England in the 1660s does not appear to be the result of any environmental or other improvements. However, it is known that environmental factors did influence the incidence of disease. Mortality was higher in marshland areas, in industrial and urban districts, in certain coastal and estuarine regions, and lower in isolated rural areas with the right geographical and ecological characteristics.[82]

It is possible that the lower levels of infant mortality amongst the wealthier socio-economic groups in Table 7 are partly a function of wealth, although falling elite mortality in the second half of the eighteenth century suggests that non-economic factors were responsible.[83] The rapid fall in child mortality in elite families in the eighteenth century, at a time when it was stable amongst the control population, indicates that this reduction of mortality was exogenous to economic development.

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[80] P. E. Razzell, *The Conquest of Smallpox*, 2003.

[81] Ibid, pp. xi-xix.

[82] Dobson, *Contours*.; Razzell, *Population,* pp. 98, 99.

[83] Also, the level of infant mortality in Bedfordshire was higher amongst the elite than the control population in 1700-49. See Razzell, *Population*, p. 133.

Also, the lack of an association between socio-economic status and child mortality in the mid-nineteenth century depicted in Table 8 and found elsewhere, suggests that disease environment rather than poverty was the most important factor in shaping the level of mortality.

The explanations of these trends are complex: the wealthy are known to have fled London and other towns during the plague, to have escaped childhood diseases such as smallpox by moving away from areas known to be affected by the disease, and to have avoided marsh areas known to suffer from endemic malaria.[84] It is possible among other factors that by the mid-nineteenth century the avoidance of disease was no longer important in protecting wealthy groups from infection, particularly when they lived in urban areas.

The falls in infant mortality in rural and provincial parishes from the middle of the eighteenth century may have been in part due to an autonomous reduction in disease incidence,[85] as well as the result of a variety of health improvements. These included better breastfeeding practices, inoculation/ vaccination against smallpox, and improved personal and domestic hygiene,[86] linked to growing literacy amongst women.

The dramatic reduction of infant mortality in London was also probably a result of major improvements in public health – increased water supplies, better drainage, and rebuilding of the urban landscape – as well as much better maternal and neo-natal care.[87]

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[84] Riley, *The Eighteenth Century*; Dobson, *Contours.*

[85] J. D. Chambers, *Population, Economy and Society in Pre-Industrial England*, 1972.

[86] E.L. Jones and M.E. Falkus, 'Urban improvement and the English economy in the seventeenth and eighteenth centuries' in P. Borsay 'Cleaning up the Great Wen: public health in eighteenth century London', in W.F. Bynum and R. Porter (eds.), *Living and Dying in London: Medical History Supplement*, Number 11, 1991; Razzell *Essays*, pp. 224-29; Razzell, *The Conquest.*

[87] M. D. George, *London Life in the Eighteenth Century*, 1966,, p. 61;

Although most of these measures were not the result of economic developments, clearly economic change did have an indirect influence on mortality. Agricultural improvements led to the drainage of marshland which may have contributed to the elimination of malaria,[88] and the production of cheap cotton cloth enabled working class families to improve their standard of personal hygiene. There was also an economic element in some of the other factors responsible for mortality decline: for example, the rebuilding of houses and house floors in brick and stone. The increasing use of coal enabled water to be boiled more easily, important for personal and domestic hygiene.[89] However, elite social groups had always had the economic resources necessary for these improvements, and the majority of them probably resulted from new attitudes towards disease, personal hygiene and the environment.[90] These changes in attitude and belief appear to have first influenced the educated and wealthy, and gradually spread to the general population later in the eighteenth and nineteenth centuries.

However, the reduction in adult mortality occurred more-or-less equally amongst all areas of the country and in all socio-economic groups, suggesting that there was an 'autonomous' fall in the adult death rate from the early eighteenth century onwards.[91]

I. Loudon, *Death in Childbirth: an International Study of Maternal Care and Maternal Mortality, 1800*-1950, 1992; I. Loudon, *The Tragedy of Childbed Fever*, 2000, p.61.

[88] Dobson, 1997.

[89] I would like to thank Tony Wrigley for pointing out the potential importance of coal in boiling water for improving personal hygiene. For the use of boiling water and milk in preventing infant diseases see I. Marks and M. Worboys, *Migrants, Minorities and Health,* 1997, p. 192.

[90] This shift in attitudes was partly associated with the eighteenth century enlightenment movement. The Royal Society's statistical investigation in the 1720s into the effectiveness of inoculation − comparing natural smallpox mortality with that amongst the inoculated − is perhaps the first historical example of a scientific assessment of a medical treatment. Razzell, *The Conquest*, pp. 172-74.

[91] Chambers, *Population*.

THE HISTORY OF NUPTIALITY ND FERTILTY

The Cambridge Group data in Table 5 suggest that there was no long-term rise in fertility in the eighteenth century, as there were no significant changes in baptism registration reliability or changes in the age structure of the national population. However, the factors shaping fertility are complex and need to be examined in some detail. The Cambridge Group found from their reconstitution research that there was a decline of about two-and-a-half years in the average age of marriage of spinsters during this period.[92] This finding is somewhat contradicted by data from marriage licences – which indicate that average age of marriage rose by about a year in the eighteenth century – but these licences tended to exclude the poorest socio-economic groups.[93]

There is a difficulty with reconstitution calculation of marriage ages. Marriage registers in the early period rarely give information on the marital status of grooms or brides, and there was a major shift in marital status during the eighteenth century. Wrigley and Schofield concluded that "perhaps as many as 30 per cent of all those marrying were widows or widowers in the mid sixteenth century … By the mid nineteenth century, in contrast, it is clear from civil registration returns that a comparable proportion was much lower at 11.27 per cent."[94] Marriage Licence data confirm this conclusion, but it represents a problem for reconstitution research on marriage ages. During the late seventeenth century about 26 per cent of spinsters in East Kent married widowers, and on average they married 3.8 years later than spinsters marrying bachelors.[95] A twenty per cent

[92] Wrigley, Davies, Oeppen, Schofield, *English Population*, p. 149.
[93] Razzell, *Mortality,* p. 71.
[94] Wrigley and Schofield, *The Population*, pp. 258, 259.
[95] Razzell., *Population,* p. 131.

reduction in the number of widower marriages would lead to a fall of 0.76 years – 3.8 x 1/5 – in the overall marriage age of spinsters, and this would be the result of the changing marital status of grooms and brides during this transition period.

Nevertheless, new evidence suggests that the fall in the average marriage age of spinsters found by the Cambridge Group is largely genuine. Although there is a lack of reliable national data, marriage licences indicate that there was a radical shift in the relative ages at which the wealthy and the poor married in the seventeenth and eighteenth centuries. In Nottinghamshire and Gloucestershire during the seventeenth century the average age of spinsters marrying labourers and husbandmen was over 26 years, whereas the average for yeomen, gentlemen and professionals was between 22 and 24 years.[96] These figures include spinsters marrying both bachelors and widowers, but an analysis of the 100 first cases of spinsters marrying bachelors reveals a similar pattern:

Table 13: Marriage Ages of Spinsters Marrying Bachelors in the Diocese of Nottinghamshire, 1672-1685.[97]

Gentlemen & Professionals	*Yeomen*	*Artisans & Tradesmen*	*Labourers*
Mean = 23.0 Years	Mean = 23.5 Years	Mean = 24.1 Years	Mean = 25.2 Years
Proportion under 21 = 29%	Proportion under 21 = 23%	Proportion under 21 = 9%	Proportion under 21 = 5%

The high marriage age of spinsters marrying labourers is confirmed by a reconstitution study of their marriages occurring in Bedfordshire in the period 1650-1749. It was possible to trace 77 marriages in the baptism register, yielding a mean age at

[96] Ibid, pp. 242-43.

[97] Source: T.M. Blagg and F.A. Wadsworth (eds.), *Abstracts of Nottinghamshire Marriage Licences 1577-1700,* 1930.

marriage of 26.7 years with 18 per cent marrying under the age of 21.[98] The mean age is higher than that listed in Table 13 for labourers, and this may be because it included marriages to widowers as well as bachelors.

A transition in this pattern occurred in the eighteenth century and was very marked in the Archdeaconary of Chichester, as revealed by the proportions of spinsters marrying under the age of 21:

Table 14: Proportion of Spinsters Marrying Under 21 in the Archdeaconary of Chichester, Sussex, 1754-1799.[99]

Period	*Labourers*		*Yeoman, Gentlemen & Professionals*	
	Number	Proportion Under 21	Number	Proportion under 21
1754-69	142	9%	142	22%
1770-99	163	25%	163	14%

By the nineteenth century there were significant differences in marriage ages between these socio-economic groups. Marriage ages were sometimes included in civil registration returns, and an analysis of Surrey and Bedfordshire parishes where such information was recorded, yielded the following differences.

[98] The analysis was carried out on data in the Bedfordshire Family History Database covering 124 parishes in the county, selecting all marriages where the groom was listed as a labourer and the bride as a spinster.

[99] Source: Razzell, *Population,* p. 244.

Table 15: Marriages of Brides Marrying Bachelors in Surrey and Bedfordshire, 1837-71.[100]

Grooms Occupation	*Proportion of Brides Signing the Marriage Register*	*Mean Age of Marriage (Years)*	*Proportion Marrying under Twenty-One*
Surrey			
Labourers	68.0%	23.0	31.4%
Artisans & Tradesmen	90.0%	24.4	17.2%
Farmers	96.0%	26.1	12.9%
Elite Occupations	99.4%	25.3	17.8%
Bedfordshire			
Labourers	34.2%	22.2	37.6%
Artisans & Tradesmen	67.0%	23.0	26.4%
Farmers	83.3%	25.1	10.5%
Elite Occupations	100%	27.8	15.8%

There was approximately a three year difference in the mean age of marriage between labourers and farmers/ elite occupations, with artisans and tradesmen occupying an intermediate position.

[100] Source: Marriage civil registers in the Surrey and Bedfordshire Record Offices. The marriages were selected from parishes in alphabetical sequence up to the parish of Ham in Surrey and Potsgrove in Bedfordshire for the period 1837-71. The numbers of marriages in the calculation of marriage ages were as follows: Surrey: labourers: 1,759; artisans & tradesmen: 2,039; farmers: 102; elite occupations (gentlemen, professionals & merchants): 102. Bedfordshire: labourers: 1,955; artisans & tradesmen: 1,268; farmers: 102; elite occupations: 38.

There were similar differences in marriage ages of spinsters in England & Wales in 1884-85. The mean age of brides marrying bachelor labourers was 23.7 years, farmers 28.9 years, and professionals 26.4 years.[101] This is the reverse to what was found in the seventeenth century, as a result of labourers' marriage ages falling significantly and those of elite occupations rising during the eighteenth and early nineteenth centuries.

This was the socio-economic pattern of marriage described by Malthus, with the poor marrying at a much earlier age than the wealthy. He was born in the parish of Wotton, Surrey, where in later life he became curate, and his family home was in the neighbouring village of Albury.[102] He was very familiar with the marriages of the poor of these parishes, as well as the marriage habits of his wealthier contemporaries. It is probable that reduced adult mortality led to the rich to marrying much later, contrasted with the poor marrying much earlier as a result of pauperisation.[103] The artisan and tradesmen class appear

[101] Woods *The Demography*, p. 86.

[102] P. James, *Population Malthus: His Life and Times*, 1979, pp. 13, 34, 40.

[103] As we saw earlier, Malthus stressed the link in England between poverty and early marriage. There is no consensus on patterns of real income and economic inequality in the eighteenth and early nineteenth century. For example, see G. Clark, 'The long march of history: farm wages, population, and economic growth, England 1209-1869' *Economic History Review*, Volume 6, 2007; G. Clark, 'The Consumer Revolution: Turning Point in Human History, or Statistical Artifact', *Department of Economics, University of California, Davis, Working Paper*, 2010; S. Broadberry, B.M.S. Campbell, A. Klein, M. Overton, B. Van Leewen, *British Economic Growth, 1270-1870*, 2015. However, the increasing pauperisation of labourers at the end of the eighteenth and beginning of the nineteenth century was described by nearly all contemporaries, including Horatio Nelson. See N.H. Nicolas, *The Dispatches and Letters of Vice Admiral Lord Viscount Nelson, Volume 1, 1777-94*, 1845, p. 295. See also J. Howlett, *Examination of Mr Pitt's Speech in the House of Commons ... February 12th, Relative to the Condition of the Poor*, 1796; D. Davies, *The Case of Labourers in Husbandry*, 1796; W. Cobbett, *Rural Rides*, 2001; J. and B. Hammond, *The Village Labourer,* 1911; J. and B. Hammond, *The Town Labourer,* 1917; J. and B. Hammond, *The Skilled Labourer,* 1919; G. Taylor, *The Problem of Poverty,* 1969; B. Inglis, *Poverty and the Industrial*

to have occupied an intermediate position, with little change in their marriage ages. However, the frequency of marriage was also a major determinant of fertility, and as Wrigley and colleagues have concluded "until the middle of the eighteenth century the substantial swings in nuptiality were produced almost exclusively by wide variations in the proportion of women never marrying."[104]

There is now evidence that marriage was nearly universal in the seventeenth century. Shepard and Spicksley have compiled data from church court depositions covering nearly all areas of England, showing that only about 3 per cent of women aged above 45 were single.[105] Information from a range of other sources – censuses, church court deposition, burial registers, wills and family genealogies – confirm this conclusion.[106] This changed during the eighteenth century as illustrated by data for the London Consistory Court.

Table 16: Proportion of Female Deponents Single in the London Consistory Court, 1583-1817.[107]

Period	*Age Group – Proportion Single*			
	15-24	25-34	35-44	45+
1586-1611	62%	15%	1%	0%
1703-1713	72%	25%	7%	4%
1752-1783	77%	43%	14%	5%
1792-1817	76%	53%	13%	15%

Revolution, 1972*;* E.P. Thompson, *The Making of the English Working* 1980; D. Vincent, *Bread, Knowledge and Freedom: a Study of Nineteenth Century Working Class Autobiography,* 1981*;* J. Humphries, 'The lure of aggregates and the pitfalls of the patriarchal perspective: a critique of the high wage interpretation of the British industrial revolution', *Economic History Review*, Volume 66, 2013.

[104] Wrigley and Schofield, *The Population*, p. xix.

[105] Razzell, *Mortality*, p. 65.

[106] Ibid, pp. 60-70.

[107] Source: Ibid, p. 67.

There were significant reductions in the frequency of marriage in all age groups during the eighteenth century, and this was also the case in Yorkshire and other areas of England. [108] The explanations for this trend are complex but it appears that it occurred particularly amongst the wealthy and the well-educated.[109] There were major changes in literacy levels amongst wealthy women in the eighteenth century, as illustrated by the proportion of women signing wills in London.

Table 17: Proportion of Women Signing London Wills, 1599-1851.[110]

Period	*Proportion Signing Wills*	*Number of Cases*
1599-1601	2%	100
1639-1641	15%	100
1699-1701	38%	100
1749-1751	64%	100
1799-1801	77%	100
1849-1851	86%	100

However, literacy was not a sufficient condition to sustain a single marital status, as in the late eighteenth century many of the poor were literate but with very high levels of marriage frequency.[111] It was important to have the economic resources to be able to sustain a single marital status, although these are complex issues requiring further clarification.

[108] Ibid, pp. 60-70. Recently Szreter and Garrett have argued that there was a decline in the frequency of marriage from the middle of the eighteenth century onwards. S. Szreter, E. Garrett, 'Reproduction, compositional demography, and economic growth: family planning in England before the fertility decline', *Population and Development Review,* 2000, p. 67.

[109] Razzell, *Mortality,* pp. 74-77.

[110] Source: Ibid, p. 86. The figures are based on the first 100 women leaving wills selected alphabetically in the periods in question.

[111] Ibid, pp. 75-77.

The socio-economic patterns of marriage age and the frequency of marriage had a direct impact on fertility levels. The general relationship between status and fertility was widely recognised by contemporaries in the nineteenth century, summarised by Wrong as follows:

> In England most of the writers who took part in the Malthusian controversy in the early part of the nineteenth century were full aware of the existence of a negative relationship between fertility and socio-economic status. It was referred to by Malthus himself, by William Godwin, John Stuart Mill, Harriet Martineau, and Nassau Senior, to mention only a few of the better know intellectual figures of the day.[112]

Glass was the first to analyse the relationship between socio-economic status and fertility which occurred in the middle of the nineteenth century. He found a strong correlation between the social status of a London registration district and its gross reproduction rate in the period 1849-51, even allowing for the presence of servants.[113] There were similar associations in other wealthy and poor districts, with the wealthy areas having higher literacy and lower fertility rates.[114] Data for Bedfordshire indicates that fertility was particularly high amongst labourers compared to other occupational groups:

Table 18: Bedfordshire Baptism Fertility Rates, 1849-51.[115]

Occupational Group	*Number of Baptisms 1849-51*	*Number of Men Living Aged 20-50 in 1851*	*Annual Fertility Rate per 100 living*

[112] J. Wrong, 'Class fertility differentials before 1850', *Social Research*, Volume 25, 1958, p. 67.
[113] D.V. Glass, 'Fertility and economic status in London', *Eugenics Review*, Volume 30, 1938, p. 118.
[114] Razzell, *Mortality*, pp. 81-83.
[115] Source: Ibid, p. 84.

Labourers	5,280	10,887	16.2
Artisans, Tradesmen	3,008	11,120	9.0
Farmers	294	1,148	8.5

The findings on status and fertility are consistent with the evidence on the relationship between status and marriage previously discussed. The overall impact of marriage patterns and fertility levels is more difficult to assess. The falling mean age of marriage amongst labourers – and they formed a large part of the total population – has to be contrasted with the declining frequency of marriage amongst other groups. The best evidence on changing fertility levels in the eighteenth century is provided by Table 4, which indicates that there was no significant change during this period, suggesting that the decline in mean marriage age was balanced by an overall reduction in the frequency of marriage.

CONCLUSION

Contrary to his well-known theory, Malthus presented evidence to show that population growth in eighteenth century England was largely caused by falling mortality rather than rising fertility, and that the frequency of marriage diminished as a result of this reduced mortality. This was an early form of the demographic transition theory, and data is produced in this paper to confirm this conclusion. Adult mortality approximately halved from the beginning to the end of the century, with reductions occurring amongst all socio-economic groups and in all areas of the country. Infant and child mortality fell at a later date from the middle of the eighteenth century onwards, reducing first amongst the wealthy.

New evidence suggests that nearly all women were married in the seventeenth century, contradicting Hajnal's theoretical notion of a European marriage pattern. As predicted by Malthus, the reduction in mortality led to a fall in the

incidence of marriage. The proportion of married women diminished during the eighteenth century in all age groups, particularly amongst the wealthy and literate, linked to a major increase in female literacy. This was counter-balanced by a decrease in the mean age at marriage amongst the poor, compared to an increasing age of marriage amongst the wealthy. The net effect of these developments was the stabilisation of fertility.

It is argued that the reduction in mortality was largely independent of economic growth. This conclusion is supporter by Wrigley and Schofield's conclusion that ' the dominant influence on mortality trends appear to have been exogenous to the economic system, or at least not to have been regularly and substantially affected by changes in living standards.'[116] The fall in mortality probably resulted from an autonomous reduction in disease virulence, along with a number of medical innovations and an improvement in personal and public hygiene.

A detailed review of the evidence on England's population growth in the eighteenth century indicates that it was Malthus's more empirical analysis rather than his theoretical arguments that were valid for this period. It was a time in which a demographic transition was taking place, with mortality falling largely as a result of changes in the disease environment. The autonomous reduction in disease severity as suggested by Malthus, is indicated in the decline in mortality among both European and other countries without economic development.[117]

Adult mortality approximately halved amongst all socio-economic groups and in all areas of the country from the early eighteenth century onwards, confirming Malthus's analysis. However, infant and child mortality reduced from the middle of the eighteenth century which is not consistent with Malthus's prediction of a decline of infectious diseases at the beginning of the century. These forms of mortality first reduced amongst the

[116] Wrigley and Schofield, *The Population*, p. 354.
[117] Jack Goldstone, 'Capitalist origins of the English revolution' *Theory and Society,* 1983, p. 173.

wealthy, suggesting that economic factors were not primary in shaping these mortality patterns.

Also as predicted by Malthus, there was a significant reduction in the incidence of marriage. There were also changes in the age of marriage, with the wealthy and middle classes marrying at a significantly later date, and the poor marrying at an increasingly earlier age. It appears that labourers and the poor suffered increasing pauperisation resulting from growing life expectancy and population numbers, leading to demoralization and early marriage. The later marriage of the wealthy and middle classes was probably largely the result of reduced mortality, although there is evidence that the growing education and literacy of women may have also played a role. This is similar to findings about the influence of women's education on fertility levels in developing countries in the twentieth century.

New research indicates that nearly all women were married in the seventeenth century, contradicting Hajnal's notion of a European marriage pattern. This changed in the eighteenth century particularly amongst the elite, and combined with shifts in class based marriage ages, this resulted in a significant socio-economic gradient in fertility levels in the first half of the nineteenth century. As with marriage ages the incidence of marriage was probably linked to the growing literacy of women.

This is consistent with demographic transition theory, different from Malthus's theoretical arguments about the relationship between economic development and population growth for which he is famous. The transformation of mortality levels without significant economic development is similar to the twentieth century experience of poor countries such as Sri Lanka, Cuba, Kerala, Costa Rica and Albania.[118] Although the

[118] S.B. Halstead, J.A. Walsh, K. S. Warren, *Good Health at Low Cost*, 1985; J. Caldwell, 'Routes to low mortality in poor countries', *Population and Development Review*, Volume 12, 1986; A. Gjonca, *The Paradox of Mortality Transition in Albania, 1950-90*, 1991; R.A. Easterlin, 'How beneficent is the market? A look at the modern history of mortality', *European Review of Economic History*, Volume 3, 1999; D.M. Cutler, A.S.

Cambridge Group has argued that Malthus's theoretical arguments are largely valid for England in the eighteenth century, the evidence reviewed in this paper indicates that it was diminishing mortality rather than increasing fertility that was the prime reason for population growth in this period.

Demography has been seen traditionally by economists and other social scientists as a function of economics, but the evidence presented in this paper shows that population has acted in England during the eighteenth century largely through changes in disease patterns as an independent force in helping to shape England's economic and social development.

Deaton, A. Llera-Muney, 'The determinants of mortality', *Journal of Economic Perspectives*, Volume 20, 2006; R.A. Easterlin, 'Cross sections are history' *Population and Development Review*, Volume 38, 2012.