

### Early death and long life in history: establishing the scale of premature death in Europe and its cultural, economic and social significance

Lee, Robert

Veröffentlichungsversion / Published Version

Zeitschriftenartikel / journal article

**Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:**

GESIS - Leibniz-Institut für Sozialwissenschaften

#### Empfohlene Zitierung / Suggested Citation:

Lee, R. (2009). Early death and long life in history: establishing the scale of premature death in Europe and its cultural, economic and social significance. *Historical Social Research*, 34(4), 23-60. <https://doi.org/10.12759/hsr.34.2009.4.23-60>

#### Nutzungsbedingungen:

Dieser Text wird unter einer CC BY Lizenz (Namensnennung) zur Verfügung gestellt. Nähere Auskünfte zu den CC-Lizenzen finden Sie hier:

<https://creativecommons.org/licenses/by/4.0/deed.de>

#### Terms of use:

This document is made available under a CC BY Licence (Attribution). For more information see:

<https://creativecommons.org/licenses/by/4.0>

# Early Death and Long Life in History: Establishing the Scale of Premature Death in Europe and its Cultural, Economic and Social Significance

*Robert Lee* \*

**Abstract:** »*Früher Tod und langes Leben in historischer Perspektive. Der vorzeitige Tod in Europa und seine kulturelle, ökonomische und soziale Bedeutung*«. Up until the late-eighteenth century and beyond, premature death was a constant reality for individuals and their families irrespective of their social standing rather than an exceptional occurrence. Premature death is a theme which has given rise to wide-ranging discussions relating to its economic and social significance, its interpretation and commemoration, its cultural and political representation, and the role of medical practitioners and other professional groups in limiting its familial and societal impact. This paper will analyse the process by which the scale of premature death was scientifically established from the early eighteenth century onwards; examine the key factors which influenced the growing concern over the extent of truncated longevity; explore the ways in which private perceptions of premature death evolved over time; assess the role of human agency in responding to an avoidable loss of life; and discuss the cultural, economic and social significance of premature death.

**Keywords:** premature death, population science, political economy, private perceptions, commemoration, longevity.

## Introduction

This year marks the 500th anniversary of the accession of Henry VIII to the English throne, an event which has given rise to a range of celebratory events, including a major exhibition designed to provide new insights into one of the country's most memorable monarchs. From the perspective of this conference, however, his accession is highly instructive. If it had not been for the premature death of Prince Arthur at the age of 15, Henry would never have become the king of England. Moreover, of the eight children of Henry VII and his wife, Elizabeth of York, four (namely Elizabeth, Edmund, Edward and Katherine) also died prematurely as infants or young children: in two cases in their first year of life. It is known that the death of the Prince of Wales in 1502 was followed by a period of heartfelt mourning both at the court and particularly

---

\* Address all communications to: Robert Lee, School of History, University of Liverpool, 9 Abercromby Square, Liverpool, L69 7WZ United Kingdom; e-mail: W.R.Lee@liverpool.ac.uk.

within the royal family, but fears over the ultimate succession to the throne (with Henry as the sole possible heir) and the potential threat to the retention of power by the Tudors also prompted a decision by the King and his wife to secure a replacement. A child was quickly conceived, but Elizabeth of York herself died in childbirth in 1503 at the age of 37 years. The history of Henry Tudor and his wife confirms the reality that even the royal family was not immune from the ravages of premature death: their marriage was prematurely disrupted by the death of the Queen and only three children survived into adulthood. Henry VIII, himself, died in 1547 at the age of 55 years. Although he enjoyed a longer life than either of his two surviving siblings (Margaret and Mary who reached the ages of 51 and 37 years respectively), even this was well short of the biblical span of three score years and ten. Premature death, in this case, may well have been the result of excessive over-indulgence and a diet which required in later life the periodic fashioning of a new suit of armour to accommodate the king's growing girth (Brown 2009, 16). But his search for a male heir led not only to a sequence of six marriages with significant dynastic and religious consequences, but also to the premature demise of three of his wives: Ann Boleyn (at approximately 33 years of age) was executed on 19<sup>th</sup> May 1536 on what can only be regarded as unconvincing grounds of adultery and incest; Jane Seymour died in 1537 aged c.28 shortly after having given birth to her son (Edward VI); and Catherine Howard (then only 19-20 years old) was beheaded on 13th February 1542 as a result of alleged adultery after just 17 months of marriage.

The picture which emerges from this brief overview of the family dynamics of the first two Tudor monarchs reflects the reality of a society where premature death was all too common: infant and child mortality rates were high; the mean duration of marriage was often comparatively short (often less than 20 years) as a result of a high incidence of maternal mortality (or in extreme cases the legally sanctioned execution of royal wives); and the life expectancy of the élite was no higher, and probably worse, than the national average (Anderson 1980, 20; Loudon 1992). Indeed, in terms of the wider social and economic implications of premature death the mortality conditions of the early-sixteenth century continued to be prevalent for a considerable period of time, certainly until the late-eighteenth century and the initial onset of the health transition in parts of Western Europe (Riley 2001, 7). If average life expectancy before 1800 was still relatively low both in England and Wales and in France, it is fair to assume that most world regions would have been characterized by a life expectancy of no more than 20 to 30 years, while outbreaks of bubonic plague or other epidemic disease could reduce life expectancy in the short-run to five years or less (Riley n.d.). According to Carr-Saunders, life expectancy in Sweden in the third quarter of the eighteenth century was still no higher than 33.9 years (1755-1775), while prior to the mid-nineteenth century the mean expectation of life at birth in England and Wales was only 39.9 years (1838-1854)

despite evidence of an upward trend (Carr-Saunders 1976, 74-75). Despite a significant fall in maternal mortality in England and Wales from 1650-1699 to 1800-1837, mortality rates tended to remain 'on a high plateau' until the end of the nineteenth century, a phenomenon which was also evident in Sweden and the United States, although Sweden did experience a further fall largely as a result of the role of highly competent midwives attending home deliveries (Wrigley 2004, 83; Loudon 2000, 241-246; Högberg, 2004). As far as class-specific mortality experience was concerned, the model developed by Antonovsky (1967) based on estimated life expectancy at birth (and therefore ignoring the changing age-specific components of mortality) posited an initial widening of the social class mortality differential between 1650 and 1850, with significant relative gains for members of élite groups, followed by a significant closing of the gap (Woods and Williams 1995). In fact, the available evidence suggests that life expectancy at age 30 for members of the British aristocracy in the early eighteenth century was actually lower than for the population as a whole: whereas members of the British peerage from the birth cohort 1700-1724 could expect to live for a further 28 years, the comparative figure for the average population was 30 years and adults in Colyton, a small-scale population in the rural south-west, could look forward to approximately 35 further years of life (Hollingsworth 1977; Wrigley and Schofield 1982, 230; Wrigley 1968, 561-562; Johansson 1991). As far as the relative risk of premature death was concerned, the position of other élite groups was not dissimilar. In the case of English barristers, for example, their life chances in the period between 1590 and 1639 were only comparable with those of their less privileged fellow countrymen, while life expectancy at age 30 amongst Scottish advocates from 1532 to 1699 was initially no better than for the adult population as a whole (Table 1) (Houston and Prest 1995; Houston 1992).

Table 1: Advocates' expectation of life at ages 25 and ( $e_{25}$ ) and 30 ( $e_{30}$ )

Cohort entering	N <sup>a</sup>	Imputed mean age at entry	$e_{25}$	$e_{30}$
1532-1649	187/22	27.3	28.8	25.7
1650-1699	230/74	27.5	31.1	27.4
1700-1749	334/161	24.0	38.0	33.9
1750-1799	350-230	23.3	38.1	34.0
TOTAL	1,101/487			

<sup>a</sup> The first number is the total number of advocates entering for whom entry and death date is known, the second is the number of these for whom birth, entry and death rates are known.

Source: R. Houston, 'Mortality in early modern Scotland: the life expectancy of advocates', *Continuity and Change*, 7, 1, 1992, p. 51.

To this extent, up until the late-eighteenth century premature death throughout Western Europe was more a constant reality for both individuals and families irrespective of their social standing, rather than an exceptional occurrence. The situation in other regions of the world was almost certainly very similar, if not worse, although there is very little reliable data available on life expectancy for the period before 1800 (and in many countries prior to the end of the nineteenth century) (Riley 2001, 32-33). Premature death is a theme which has given rise to a wide-ranging discussion relating to its economic and social significance, its interpretation and commemoration, its cultural and political representation, and the role of medical practitioners and other professional groups in limiting its familial and societal impact. This paper has a more modest agenda, but one that will hopefully provide a framework for locating debate and discourse within an appropriate setting. It will analyse the process by which the scale of premature death was scientifically established from the mid-eighteenth century onwards; examine the key factors which influenced the growing concern with the extent of truncated longevity; explore the way in which private perceptions of premature death evolved over time; and assess the role of human agency in structuring the response to such an avoidable loss of life and creating the preconditions for an extended life expectancy.

### Establishing the scale and extent of premature death

Today, it is comparatively straightforward to assess the extent of premature death. At the end of the twentieth century, average world life expectancy stood at 66.7 years, although the estimated differential at a national level remained very marked. At one extreme the population of Japan enjoyed an overall life expectancy of 80 years, but at the other end of the spectrum the citizens of Sierra Leone had a life expectancy of no more than 37 years, reflecting the extent to which the cumulative gains in survivorship at a national level have been very unequal (Riley 2001, 29; Zhao 1997, 117-127; Riley 2005). Although the risk of maternal death has fallen considerably in Western Europe and other advanced regions, it is estimated that over half a million women in developing countries die each year during pregnancy and childbirth and many who survive childbirth suffer from pregnancy-related injuries which have lifelong consequences (Watkins 2009). In contrast to maternal mortality rates of three per 100,000 live births in countries such as the Czech Republic, Denmark, Greece and Italy, the extent of premature death as a result of pregnancy and childbirth in sub-Saharan Africa is still substantial, with maternal mortality rates of 1,200 and 1,500 per 100,000 live births in Chad and Liberia respectively (*The Guardian* 2009). The ambitious millennium development goal of securing a 75 per cent reduction in maternal mortality between 1990 and 2015 is unlikely to be met (De Brouwere 2007, 542). Furthermore, maternal mortality, both historically and in a contemporary context, is directly associated with

an inflated risk of premature death amongst new-born babies and remains an important factor behind the deaths of 3.7 million infants in their first month of life. Although there have been some significant improvements in recent decades in infant mortality rates in Asia and Central America, a number of countries in the developing world (including Liberia) still suffer from death rates of over 235 per 1,000 live births, rates which were typical of some Western European states in the early-nineteenth century. By contrast, Denmark and Finland, for example, have been able to reduce their infant mortality rates to less than 3-4 per 1,000 live births. But even in the developed world health inequalities, whether defined by gender, occupation, social class, or place of residence still persist. Scotland, for example, continues to suffer from the lowest life expectancy at birth within the European Union (apart from Portugal); there is evidence of persistent health inequalities with the standardized mortality rate in the ten most deprived neighbourhoods a third higher than in the most prosperous areas of the country; and premature death is undoubtedly far more common than in England and Wales, with males from manual backgrounds in the age group 35 to 64 particularly disadvantaged (The Poverty Site). The Black Report of 1980 (published by the Department of Health and Social Security) had confirmed the extent to which overall improvements in health had been achieved in the 35 years following the introduction of the National Health Service, but both infant mortality and life expectancy were still correlated with social class, with poverty a major contributor to health inequalities. In Britain, as in many other European states, the problems created by persistent health inequalities remain considerable and the cost, in terms of premature death, is still substantial (Berridge and Blume 2003).

However, in order to assess the wider cultural, economic and social significance of premature death in the past, it is important to analyse, in the first instance, the process by which its scale and extent was gradually understood. This is neither the time nor the place to review the development of population science, but it is immediately clear that a full understanding of the significance of premature death was only achieved at a comparatively late date, primarily because of administrative and operational difficulties in compiling appropriate demographic data or as a result of the continued unwillingness of individual governments to provide a suitable policy framework. Although an initial attempt to construct basic life tables had been made in Ancient Rome (by Aemilius Macer), it was not until the seventeenth century that a growing interest in 'political arithmetic' led to the first substantive attempts to calculate life expectancy. William Graunt (1620-1674), using deaths from two separate time periods, created an important tool for life insurance and demography and provided a 'rough sense' of mortality trends in mid-seventeenth-century London; William Petty (1623-1687) established the life table principle based on estimated mortality rates for specific age groups; while Edmond Halley (1656-1742) utilized mortality data for Breslau (provided by Caspar Neumann) to

construct a life table which represented an important development for actuarial science (Graunt 1662; Greenwood 1948; Bantz 1987; Behar 1976; Buch 1977; Pearson 1978; Hacking 1985; Daston 1988; Clark 1999; Rusnock 2002). But the bills of mortality, whether from Breslau or London, were seldom a reliable source for calculating life expectancy (give the changing scale and frequency of urban age-specific in-, and out-migration), while Halley's life table was simply based on a classification of death by age and did not start at exact age 0 (Thatcher n.d.). Further advances in estimating longevity were made by mathematicians, political economists and scientists in France and Holland. Nicolaas Struyck (1687-1769) constructed the first scientific mortality table, which facilitated the tabulation of annuity values for every fifth year of life; William Kerseeboom (1691-1771) estimated the number of survivors from an initial population of 1,400 new-born infants up to the age of 95 years; and Antoine Deparcieux (1703-1768) used parish register material, the mortuary lists of ecclesiastics, and data on tontine membership to produce a reasonably accurate estimate of longevity (den Butler 2004; Kerseeboom 1748; Rohrbasser and Deparcieux 2004). In Germany, Johann Peter Süssmilch published a book on population and mortality tables in 1761, while Leonhard Euler wrote a number of articles on mortality and life insurance issues (Wilke 2004; Sibbett 2007; Euler 1760; Sandifer 2007). But the general focal point was the construction of reliable mortality tables which could be employed with the use of a suitable algorithm to calculate probable survivorship by age and innovative work in this field was driven primarily by the needs of a growing life insurance industry in many Western European states. Continuing deficiencies in the compilation of national population statistics, however, made it virtually impossible to construct a proper life table. Although the work of Struyck and Deparcieux helped to reveal the extent of excess male mortality, contemporary attempts to tabulate survivorship generally failed to reconstruct the mortality experience of different age groups (Demonferrand 1838; Séguy, Buchet and Bringé 2008).

Even in Britain knowledge of absolute population size and its past growth remained 'very inadequate' and it was not until the mid-nineteenth century that life tables were finally constructed which could serve as relatively reliable indicators of the extent and age distribution of premature death (Glass 1973, 15). In 1832, Thomas Rowe Edmonds claimed to have discovered a new law of mortality, although, in reality, he had merely rediscovered a relationship between ageing and mortality initially set out mathematically a decade earlier by Benjamin Gompertz (1779-1865) which provided a basis for estimating the age-specific rate of mortality by sex (Eyler 2002; Hocker 1965; Carey and Liedo 1995). Edmonds devoted considerable time to persuading members of the medical profession to use his 'discovery' to study case fatality and the health of larger communities. William Farr (1807-1883) developed this approach to generate some of the most sophisticated vital statistics of the nineteenth century, utilizing the rich data available at the General Register Office.

He used the 1841 census returns to construct two successive life tables (based on reported deaths in England and Wales for 1841 and 1838-1844 respectively), while his third life table was derived from census data for 1841 and 1851, together with mortality statistics for the years between 1838 and 1854 (Dupaquier 1984; Blyth 1890, 27; Bellhouse and Genest 2007).<sup>1</sup> As a result of Farr's important work, it became possible to compare life expectancy in both healthy and unhealthy areas (represented by Surrey and Liverpool respectively), by social class or defined population sub-group, and by population density with 'proximity' used as a proxy measure for relative overcrowding (Singer 2001).<sup>2</sup> To this extent, a relatively adequate basis for estimating both the extent and nature of premature death was finally established by the mid-nineteenth century, although it should be noted that Noel Humphreys was already arguing by the early-1880s that the construction of a new English life table was 'absolutely necessary' as it was widely recognized that the calculation of life tables at high ages was 'in general unsatisfactory' and that mean age at death was 'no real indication of the national mean duration of life' (Brownlee and Morison 1911; Humphreys 1883, 197).<sup>3</sup>

However, progress in constructing reliable life tables during the course of the nineteenth century was very uneven. Edward Wigglesworth had produced the first American life table in 1793, based on mortality statistics for Massachusetts, Maine and New Hampshire and had demonstrated that a high death rate amongst infants and children was directly associated with a low life expectancy, but there was nothing equivalent for the nation as a whole until the early twentieth century (Vonovski 1971; Haines 1980, 1998). In the case of Austria, there are no reliable reference life tables prior to 1869, while calculations up to 1912 suffered from data quality problems, particularly in respect to age heaping and the possible overstatement of age in census returns, and detailed mortality statistics were only available for the period from 1851-1870 onwards (Findl 1979; Ediev and Gisser 2007). Finally, in Germany the first three life tables were only constructed in the latter decades of the nineteenth century by Carl Becker (for 1871-1880) and Johannes Rahts (for 1881-1890 and 1891-1900 respectively), with the latter providing concrete evidence of the extent to which there had been a progressive decrease in the number of deaths prior to the age of 60 (Rosset 1964, 125). According to Ballod, however, the absence of reli-

---

<sup>1</sup> The short Surrey life table for 1841 incorporated the hypothesis developed by Abraham de Moivre (1667-1754), a key figure in the development of the theory of annuities, which posited that the number of living persons decreased in an arithmetical progression down to nothing at age 86 (Blyth 1890, 27; Bellhouse and Genest 2007).

<sup>2</sup> Farr's theory on the relationship between 'proximity' (overcrowding) and mean lifetime was developed in the Fifth Annual Report (Krause 2005).

<sup>3</sup> Dr. William Ogle had compiled a new life table for 1871-1881 using a similar method to Farr, but had been critical of the original methodology and evidence of 'some inconsistency in dealing with changing rates of infant mortality' (Hayward 1901).

able historical data, in particular mortality statistics covering the previous 100 years, precluded any analysis of the life experience of a complete generation and even where such data existed (as was the case in Sweden), other German statisticians, including von Mayr, simply rejected the evidence as 'a statistical fallacy' (Ballod 1899, 9; Rosset 1964, 125). At the same time Wilhelm Lexis was developing a more sophisticated model for calculating life expectancy and for assessing the extent of premature death: he suggested that life expectancy at birth was not an entirely satisfactory means of estimating mortality trends because it ignored the phenomenon of delayed ageing and under-reported the actual extension of longevity, whereas the modal length of life represented a better means of observing survival to old age. Everyone should live the same length of time (the normal length of life), but some were prevented by particular circumstances from achieving this objective. It was therefore desirable to distinguish between 'normal' deaths which occur at the normal age of death or are distributed in random fashion around that age from the premature deaths of both adults and children (Lexis 1878; Véron and Rohrbasser 2003). Indeed, by the end of the nineteenth century most European countries had sufficient data to monitor the extent to which premature death affected survivorship to the age of 60 and beyond (Table 2), but in other parts of the world (whether in Africa or Latin America) the compilation of mortality data was often still incomplete at the start of the twentieth century: in Uruguay, for example, reliable national records only became available during the 1940s (Birn 2008, 316). Moreover, even in Western Europe progress in calculating premature death by social class or occupation remained uneven. Whereas research on occupation-specific mortality was taken forward at a comparatively early date in Britain, with work by William Guy on the mean age of death of lawyers, clergymen and other elite groups whose details were recorded in the Annual Register and various county histories and a study by William Ogle on the mortality of medical practitioners, in Germany there were hardly any attempts to construct mortality charts (*Sterbetafeln*) for individual professions, apart from Karup-Gollmer's work published in 1888 and 1894 on clergymen and teachers, while within a European context Jacques Bertillon's paper from 1892 on occupation-specific mortality and morbidity was only able to list four principal tables in his review of research in this field (Guy 1857; Ogle 1886; Woods 1996; Ballod 1899, 11; Bertillon 1892).<sup>4</sup>

---

<sup>4</sup> The four principal tables had been compiled by Farr and Ogle (for England and Wales), by Kammer (for Switzerland), and by Bertillon himself for Paris. It was widely recognized that the frequency of occupational change made it difficult to construct life tables by occupation and research in this field was dependent on the construction of consistent and relatively accurate occupational titles (Booth 1886; Higgs 1990).

Table 2: The number of people surviving to the age of 60 years in European states at the turn of the twentieth century.

Country	Period	Number of survivors to 60 years per 100 infants	
		Males	Females
European Russia	1896-1897	28.4	30.7
Spain	1900	30.3	34.1
Bulgaria	1899-1902	36.6	36.1
Austria	1901-1905	36.4	39.8
Czechoslovakia	1899-1902	35.8	41.3
Italy	1899-1902	44.0	43.4
Germany	1891-1900	38.3	44.8
England	1891-1900	40.9	43.4
France	1898-1903	43.2	49.4
Belgium	1891-1900	43.5	50.3
Norway	1890-1900	49.8	55.6
Sweden	1891-1900	51.0	56.4
Denmark	1901-1905	54.7	60.2

Sources: Life tables of selected countries as reported in the Demographic Yearbook 1953, United Nations, pp.304-323; Edward Rosset, *Aging process of population*, Oxford, 1964, p. 124.

As far as age-specific mortality was concerned, however, the cumulative increase in demographic and statistical research in the course of the nineteenth century was considerable, particularly in relation to infant and child mortality which continued to account for a significant proportion of premature deaths. The compilation of national population statistics in Sweden from 1749 onwards provided data on age- and disease-specific mortality and gave rise to articles by Pehr Wargentin (1717-1783) and F. T. Berg (1806-1887) which reflected a growing concern over high rates of both infant and maternal mortality (Tedebrand 2000, 138-140). In Britain, the introduction of variolation (inoculation) against smallpox in the late-eighteenth century stimulated an increased interest in statistical data on mortality and morbidity which was followed in the 1830s by a number of statistical analyses of death and sickness in medical

journals (Glass 1973, 120-129).<sup>5</sup> Although it was acknowledged that there was a continuing under-registration of births until 1874, the introduction of civil registration in 1837 enabled statisticians to calculate age-specific mortality by sex and at different stages of infancy. It was increasingly recognized that the ‘morbid influences exert the greatest power in infancy and childhood’; that the infant death rate could be taken as ‘a good measure of the health of a district’; and that an analysis of child mortality had to be based on ‘an inquiry into historical changes’ (Curtis 1838, 12; Farr 1876; Brownlee 1916, 233; Newsholme 1923, 347). In Germany, an attempt was made in the 1780s to calculate the stillbirth-birth ratio and the increasing availability of data in the nineteenth century led to various explanations of high infant mortality rates, focusing on the causes of non-breastfeeding to the impact of price fluctuations (Nicolai 1788-1796 *Beilage* 1, 25; Müller 1890; Weisz 1880). A similar trend was evident in relation to data on maternal mortality, despite persistent definitional problems: the proportion of all deaths attributed to puerperal fever in Prussia had already been calculated for the period between 1824 and 1837, while British data at the end of the nineteenth century confirmed the persistence of high rates of death due to ‘injury at birth’ (Hoffmann 1839, 44; Duffield 1912). Although the reliability of much of the available data often remained problematical, the gradual extension of the state administrative apparatus throughout most of Western Europe in the course of the nineteenth century, in particular the foundation of central statistical offices, provided the basis for the collation and analysis of information on different aspects of mortality, and prompted a growing awareness of the scale of premature death, whether as a result of pregnancy and childbirth, during infancy and early childhood, or as a corollary of occupation and social class (Wernicke 1896).

### The Political Economy of Premature Death

The increased awareness of the scale of premature death in European countries was not simply a result of gradual, if selective, improvements in vital statistics and national population data. The initial interest in estimating life expectancy on the basis of mortality data was driven essentially by the actuarial needs of the early life insurance industry. Many of the pioneers of probability theory were instrumental in creating a theoretical framework for issuing annuities and their work was an essential precondition for the development of the insurance industry (Bellhouse and Genest 2007; Elderton and Ogborn 1943). In 1762, the Equitable was the first life assurance company to use premium rates calculated for long-term life policies and the growing number of mutual friendly societies

---

<sup>5</sup> For example, articles were published in the *British Medical Almanack* and the *London Medical Gazette*.

in Britain and elsewhere also depended on accurate statistics on sickness and mortality (Deuchar 1882; Alborn 1994; Renn 1998).<sup>6</sup> Indeed, in many cases the motive for undertaking an analysis of sickness and death rates was simply to make sure that the various forms of life assurance available to customers was ultimately covered by the receipt of sufficient premiums (Ratcliffe 1850). But the growing interest in estimating life expectancy, age-specific mortality, and the extent of premature death was also fuelled by wider state concerns. Mercantilist theory, in its various forms, placed considerable emphasis on the need to sustain a sufficient population size and this, in turn, led to proposals for individual states to take specific measures to safeguard their demographic potential and to prevent avoidable deaths at a time when there were real fears of the risk of depopulation (Overbeek 1974, 28-34; Hooock 1979). In general, mercantilists in the early eighteenth century saw significant advantages in a large and increasing population and John Rickman's case for introducing a census in 1801 was predicated on the belief that 'an industrious population is the first and most necessary requirement to the prosperity of nations' (Glass 1973, 106). Indeed, according to Buchan, the health of people in general was 'the proper object of attention of the magistrate', while 'merchant logick' was utilized within an accounting methodology to encourage an increased take up of smallpox inoculation in Britain and to justify the expenditure of smallpox vaccination in the Danish West Indies in order to protect the population of enslaved workers (Buchan 1769, xii; Rusnock 2002; Jensen 2009).

To some extent, the importance of maintaining a healthy population (and for limiting the extent of premature death) was undermined by increased rates of population growth from the mid-eighteenth century onwards and the initial dislocation caused by the onset of the industrial revolution. But although Malthus can justifiably be regarded as the founder of the economists' theory of population, his theory was not universally accepted by contemporaries, such as Nassau Senior, who continued to maintain that food supply had always increased at a faster rate than population (Glass 1959, 6-7). In any case, statisticians continued to develop a methodology for calculating the economic value of the population in terms of longevity and occupational role. According to William Farr, adult sickness reduced 'the efficient population of the empire', whereas ill health amongst children was unimportant because it in no way contributed to 'the nation's actual strength'. He accepted, however, that the economic value of the population had yet to be determined, particularly in terms of the relative contribution of individual occupations, but excess male mortality (even below the age of five) at a county level represented 'a waste of life' (Farr 1837, 568-69; Humphreys 1885, 59; Wall 1974). Such a negative view of the potential economic value of children was not exceptional, as other

---

<sup>6</sup> For a detailed review of the development of actuarial accounting, see (Haberman and Sibbett 1995; Pearson 1997).

contemporaries, such as Theodor Wittstein, adopted a similar life-cycle approach in calculating human capital value (Wittstein 1867).<sup>7</sup> Within a wider context, the development of human capital theory in the course of the nineteenth century reinforced the belief that each individual had a specific and calculable value which could only be utilized optimally if appropriate measures were taken by the state and other relevant agencies to limit infectious disease and other causes of premature death (Engel 1883; Vögele and Woelk 2002, 124). Indeed, such a line of reasoning ultimately provided a justification for the adoption of ‘productive policies’, whether in relation to child care or social insurance (Goldscheid 1911; Halling, Schäfer and Vögele 2005, 388). Although the dominant scientific approach, whether in Britain, Germany or elsewhere, was to equate the value of the individual with a measurable labour market contribution which thereby restricted the focus of policy-makers to those citizens who were economically productive, the ramifications of human capital theory were nevertheless considerable. The monetary cost of any failure to prevent the outbreak of epidemics and the loss of human capital as a result of premature death could be estimated with some accuracy and the case for extending public health measures was considerably strengthened.<sup>8</sup>

Although social Darwinism and theories of racial hygiene prompted a more selective and discriminatory appraisal of the economic value of individuals and specific population sub-groups, particularly in the early decades of the twentieth century, the medicalization of the life course did not prevent further developments in human capital theory and the scientification of longevity. This approach continued to be based on neoclassical economic theory which used the discounted present value of a worker’s future earnings as a proxy for estimating the cost of premature death. Irving Fisher made one of the earliest estimates of the impact of mortality and morbidity on American national output in 1908; Dublin and Lotka, in an important contribution published in 1936, attempted to calculate the years of life forfeited as a result of individual causes; and other contributions during the 1940s focused on the potential years of life lost, as represented by individuals dying from specific causes, including tuberculosis, and the need to develop an appropriate methodology for estimating ‘life years lost’ and ‘working years lost’ as a result of premature or avoidable death (Dimand 2005, 393; Dublin and Lotka 1936, 121-137; Dempsey 1947, 157; Robinson 1948, 60; Dickinson and Welker 1948). This gave rise to the Haenszel’s construction of standardized rates of lost years of life up to the age of 75 which provided a means of assessing the relative contribution of specific

---

<sup>7</sup> According to Wittstein, the value of a human life, both at birth and in old age was 0 (Vögele and Woelk 2002, 126).

<sup>8</sup> Max von Pettenkofer, in particular, highlighted the economic cost of epidemics: the total cost of the cholera outbreak in Hamburg in 1892 was estimated at 430 million Mark (Gottstein 1929; Vögele and Woelk 2002, 128).

causes of death to reduced life expectancy and produced a noticeable change in their ranking as measured by the actual number of lost years of life (Haenszel 1950). Human capital theory underpinned much of this research, given the recognition that premature death, particularly amongst adults, led to a loss of wages and reduced national output potential. By estimating the potential years of life lost through premature death, statisticians were able to construct an index which isolated the major causes of reduced longevity (whether infant mortality, accidents or violence) and assigned them an economic value in terms of future lost earnings (Heien and Pittman 1989; Mullahy and Sindelar 1989; Perloff et al. 1984).

Increasingly, estimates of the years of life lost, by age-group and cause of death, have been used to inform health policy and to assess the potential economic returns to public health intervention, predicated on the assumption that a high proportion of premature deaths are entirely 'preventable' (Romedor and McWhinnie 1977; Arcà, Orio, Forastiere, Tasco and Perucci 1988).<sup>9</sup> Although there is persistent controversy over the appropriate definition of an upper end point in calculating the years of potential life lost (YPLL), measures of premature mortality are now widely used for establishing public health priorities and the impact of policy initiatives on population sub-groups defined by age, ethnicity, gender and occupation. In terms of specific causes of premature death, the 'cost of illness method' also provides a means of estimating their 'economic burden', whether in relation to the cost of stroke, AIDS, alcohol abuse or the incidence of diabetes (Chan and Hayes 1998; Henriksson and Jönsson 1998; Harkness 1989; Rice et al. 1985).<sup>10</sup> From a policy perspective, national and regional governments are increasingly able to establish the predominant causes of premature death, whether cardiovascular diseases, cancer, infant mortality, accidents, HIV/AIDS, homicide, diabetes, or drug and alcohol abuse, to assess the economic costs of reduced (productive) longevity by cause-of-death, and to allocate health policy expenditure in a manner which will further improve life expectancy and enhance the implicit value of human capital (Humblett, Lagasse and Levêque 2000; Johansen, Smith, Juel and Rosdahl 2005; Pham et al. 2009). Human capital theory has been used to estimate the value of lives lost due to road accidents in Australia (A\$246.1 million dollars), while premature death before the age of 70 in the District of Columbia was attributed to three predominant factors – unhealthy behavior, limited access to preventive services, and adverse environmental conditions (Giles and Cowan 1999; Government of the District of Columbia 2006). Moreover, a similar approach has been applied in order to assess the years of potential productivity lost as a result of disability (rather than death), given that the long-term medical

---

<sup>9</sup> Premature mortality before age 65 was lower in Italy than in America because of a marked difference in mortality from both injuries and heart disease.

<sup>10</sup> For a review of the cost of illness approach, see Hodgson and Meiners 1982.

and social implications of injuries can often be significant, while concern over the quality of life in old age has encouraged some demographers to develop a new measure – active life expectancy – which distinguishes between disability-free and chronic disability years of life remaining, and attempts have also been made to assess the economic costs generated by workplace stress (Linn and Sheps 1993; Crimmins, Saito and Ingegneri 1997; Béjean and Sultan-Taïb 2005). At one level, the reliance on YPLL estimates is now a precondition for structuring public health policies designed to address premature death, sickness and disability, while the underlying methodology has become increasingly refined and sophisticated, but it must not be forgotten that the antecedents of scientific and medical interest in the extent and causes of truncated survivorship and reduced longevity can be found in the late-eighteenth and nineteenth centuries.

### Private Perceptions of Premature Death

The paper, so far, has been concerned with charting the process by which a scientific understanding of the extent of premature death was established from the mid-seventeenth century onwards and examining the key factors which underpinned the growing concern over the scale of curtailed longevity. It has focused on the contribution of actuaries, political economists and statisticians in constructing knowledge about the probable scale of premature death, its significance for the development of the nascent life insurance industry, and its importance for the state and the formulation of public health policy. But it is also essential to analyse private perceptions of premature death and to ascertain how the experience of truncated survivorship was actually experienced and understood by individuals, families, occupational groups or by members of specific social classes. To what extent was the English aristocracy in the sixteenth century aware of the risk of premature death, whether as a result of infant, child or maternal mortality, or as a consequence of judicial execution and the hazards of military engagement? Were the wives of peers during the first three-quarters of the eighteenth century conscious of the fact that they exposed themselves to a significantly higher risk of maternal mortality than other social groups because of the employment of specialist male doctors (Woods 2007, 495)? In 1866 almost 5,000 British sailors died at sea (approximately 2.4 per cent of the total employed in the merchant marine), of whom are known to have drowned, but was the real risk associated with such an occupation fully recognized by contemporaries (MAL 1869)? How did people respond to the reality of premature death during a period when statistical knowledge of its relative incidence, by age-group, occupation or social class, still remained fragmentary and incomplete? And what, if any, steps were taken to minimize or to exclude any avoidable risk of premature death?

Any analysis of these issues is invariably complicated by the selective survival of correspondence and diary evidence from the early-modern period and the general absence of material relating to the peasants and unskilled labourers of the eighteenth and nineteenth centuries. The execution of Ann Boleyn (Henry VIII's second wife) did not deter other women from accepting the hand of the King, although this led directly to a further case of premature death. If elite life expectancy in England and Wales remained unchanged between the sixteenth and eighteenth centuries, as demonstrated by Dr. Guy in the 1850s, at a level now known to have been below the national average, there is little to suggest that this was recognized as a serious problem by contemporaries because its significance in relation to normal life expectancy was not noted and the rich clearly continued to encounter serious survival hazards, at least until after 1800 (Brownlee 1916, 235-6; Riley 2001, 144).

Table 3: A list of the 'most celebrated individuals who have attained what, according to the average duration of life, may be termed old age'

Name	Age at Death		Name	Age at Death
Newton	85		Sophocles	90
Anacreon	85		Sir C Wren	91
Mirabeau	86		Hobbes	91
Halley	86		William Hutton	92
Dr Young	86		Adam Fergusson	93
C. Hutton	86		Sir Hans Sloane	93
Cassini	87		Simonides	98
Lady R Russell	87		Zeno	98
Rowland Hill	89		Herodian	100
Mrs Hannah More	89		Fontenelle	100
Elizabeth Baxter	89		Gorgias	107
Lord Stowell	90		Hippocrates	109

Source: John Harrison Curtis, *Simplicity of Living. Observations on the Preservation of Health in Infancy, Youth, Manhood, and Age with the best means of improving the moral and physical condition of man, prolonging life, and promoting human happiness* (London, 1838), p.,160.

At the same time, examples of 'remarkable longevity', as a benchmark for individual expectations of a long life, were increasingly highlighted by the publishers of popular health guides in the late-eighteenth and early-nineteenth

century. Henry Jenkins, whose diet was apparently 'coarse and sour' who died on the 8th of December 1670, was reputed to have been 169 years of age and when he could no longer work as a fisherman he went begging at different localities in Yorkshire, whereas Thomas Carn, according to the parish register of St. Leonard, Shoreditch, was 207 years of age when he finally passed away on 28th January 1588 (Curtis 1838, 155-59). Even members of the aristocracy were listed as surviving to a considerable old age: for example, Sir Christopher Wren died at the age of 91 and Sir Hans Sloane at the age of 93 (Table 3). According to the Medical Adviser, a number of 'aged persons' had died during the 1820s, including T. Gilbert who died in 1822 at the age of 120, together with Nancy Lawrence ('a black') and Soloman Nibet who reached the ages of 140 and 143 respectively at the time of their deaths in 1824 and 1820 (Burnet, Maginn and Dewhurst 1836, 154-5). Clearly, many of the older examples (whether from ancient Greece or Rome) cannot be verified by modern means and the oldest known person in history was almost certainly Jeanne Calment (1875-1997), whose death at the age of 122 years and 164 days effectively defines the human lifespan. More recent research has confirmed that life expectancy has risen in a linear fashion from 1840 onwards, with a noticeable increase in the number of centenarians, but it is difficult to believe that many contemporaries would have been aware of this trend or would have been prepared to place any degree of credibility in some of the examples of long life published by different authors (Oeppen and Vaupel 2002).<sup>11</sup> Longevity myths can be regarded as cultural narratives which reflect a belief in exceptional or improbable longevity, but the contrast between the estimated life expectancy at birth in pre-industrial Europe (20-30 years) and the exceptional (and unrealistic) life-spans which were cited in contemporary literature seems to suggest a need to raise individual aspirations by adopting behavioural norms which would at least help to reduce the excessive extent of premature death.

Certainly, in Germany there was a gradual increase between 1740 and 1800 in the proportion of new titles published in medicine (including popular moral writings), some of which reflected the principles later propounded by Hufeland (1766-1836) on the 'art of prolonging life' which was first published in 1796 and subsequently translated into a number of other languages (North 2008, Table 1.2, 9; Hufeland 1796; Wiedemann 1995). In some cases, religious or state authorities played an active role in disseminating popular books: the Bishop of Würzburg and Bamberg distributed 2,500 copies of the *Mildheimer Noth- und Hilfsbüchlein* by R. Z. Becker in 1789, while Schley's *Volksfreund* was provided as a schoolbook in Nürnberg (Lammert 1869, 81). But it was in Britain that manuals on health and longevity became particularly popular dur-

---

<sup>11</sup> The Kannisto-Thatcher database on Old Age Mortality at the Max Planck Institute for Demographic Research was originally established in order to estimate death rates at the highest ages (above age 80).

ing the second half of the eighteenth century, reflecting the accelerated commercialization of society, a widening concern with the possibility of securing life extension, and a public discourse about the aging body (Porter 1989; Yallop 2000). Lay health manuals enjoyed large sales, whether in London or provincial towns and cities such as Bristol; William Buchan's book on domestic medicine, which reflected an innate optimism about the possible improvement of the people's health through 'the progress of knowledge' and was intended as a substitute for deficient medical care, went through numerous editions after its publication in 1769; John Wesley, the evangelist and leader of Methodism, published advice for preserving health and treating disease, emphasizing the benefits of cold bathing and cleanliness; and the Scottish doctor, John Armstrong, published a didactic poem in blank verse on the art of preserving health in 1744 with specific sections on diet and exercise (Fissell 1991, 37; Lawrence 1975; Dunn 2000; Maddox 2007; Armstrong 1744).<sup>12</sup>

A number of points need to be made in this context. First, although it is difficult to evaluate the overall impact of contemporary health manuals, they often contained useful advice on the benefits of avoiding health-threatening hazards such as 'noxious vapours' or the 'extremity of cold and heat'. Some late-nineteenth century observers attributed the improvement in mortality rates in different parts of Germany to the 'art of prolonging life', while the advice contained in a medical treatise on Liverpool published in 1784 was acknowledged almost 100 years later as a work which 'contains many sanitary hints which might be useful, even at the present day (Buchan 1769, 680-82; Biedermann 1880, 340-41; Moss 1784; Picton 1873, 576). There was a general recognition of the importance of maintaining a 'reasonable lifestyle' to limit the negative impact of passions as 'we are directly responsible for most illnesses ourselves': individuals could prevent or mitigate the impact of epidemics through observing dietary rules and by proper 'expirations and transpirations', while environmental improvements (including the drainage of swamps and standing waters) would help to restore the natural order and protect the population as a whole from the ravages of disease (Hufeland 1796, 364; Lindemann 1996, 264-271; Riley 1987, 145). Secondly, the approach taken by social and medical reformers, such as Thomas Beddoes, was specifically aimed at addressing the health problems of the 'middling and affluent classes', in the belief that affluence and luxury inevitably produced an effete and unhealthy population (Beddoes 1802). To this extent, it reflected an awareness of the health problems of privileged social groups which had suffered from below average

---

<sup>12</sup> It should be noted, however, that Buchan's book was also written for commercial gain. A considerable number of successful health manuals were translated into other languages and marketed throughout Europe. For example, an English version of the 13th edition of the handbook on herbal remedies written by Sebastian Kneipp, the parish priest of Worishofen in Bavaria, was published in 1891 (Kneipp 1891).

life expectancy prior to the late eighteenth century, in part perhaps as a result of life-style choices. Thirdly, with the further growth of a consumer society in many regions of Europe in the course of the nineteenth century and significant improvements in literacy rates (particularly amongst women) a rising demand for health manuals was met by an expansion in supply, with publications focusing on a range of approaches to the achievement of a long life, including homeopathic remedies and contemporary developments in medical science, and on specific socio-economic groups (Cornaro 1821; Combe 1836; Curtis 1838, 138). By the late-nineteenth and early-twentieth century even working-class families often owned manuals which covered a wide range of diseases and their remedies, as well as providing advice on cooking and household management. For example, *Consult Me (The Book That Every Family Needs)* included extensive advice on medical issues, including the prevention of infection, together with information on 'botanical remedies' (*Consult Me*, 1899). The modern preoccupation with measures which apparently can safeguard against premature death and delay the aging process, whether a long-term daily consumption of less than 20 grams of red wine or the anti-aging pill RESVLIFE which claims to increase the consumer's 'healthy lifespan', can therefore be viewed as a natural extension of concerns which were articulated increasingly from the mid-eighteenth century onwards (Campbell 2009). But whereas members of the nascent middle class during the Age of the Enlightenment were consulting health manuals at a time when premature death was only too common, contemporary concerns are predicated on a belief that 'natural death' itself represents a human holocaust and the use of nanomedicine, genomics and proteomics, together with dechronification (the removal of accumulated metabolic toxins) are seen as a means of extending further the human life span and removing the threat of truncated longevity (Freitas 2009; Fogel 2004, postscript: how long can we live?).

### Human agency and the response to premature death

The increasing popularity of health manuals designed to prevent premature death and to ensure a long and healthy life raises a number of important questions relating to the changing reaction to truncated longevity, the way in which the unexpected and premature death of family members, friends, and prominent members of society was interpreted and commemorated, and the role of human agency in responding to the hazards and risks which contributed to a restricted life expectancy. To what extent was premature death viewed as inevitable before the development of modern medicine ultimately suppressed the long legacy of dangerous and ineffectual medical practices (Wootton 2006)? Was death, irrespective of age, simply seen as part of life (Neimeyer, Wittkowski and Moser 2004; Tomer 2000)? How was premature death commemorated, in terms of religious interpretation and its symbolic significance? At what point in

time did human agency seek to limit the risks which contributed to curtailed longevity, whether through a change in behavioural life styles, collective action, pressure on public health policy, or popular health campaigns?

Figure 1



Death of the First Born, by Erastus Salisbury Field, 1875

Figure 2



For Such is the Kingdom, by Frank Bramley, 1891

Certainly in the Victorian period, if not earlier, there was an overriding concern with premature death, particularly in relation to the death of infants and young children, which found a direct expression in the funeral trade and cemetery symbolism. The death of a child was clearly seen as the ‘most distressing and incapacitating of all’ and far harder to accept than the loss of an elderly parent, while contemporary diary evidence often reflected the traumatic consequences for the bereaved parents (Jalland 1996, 111).<sup>13</sup> A child’s premature death was sometimes interpreted as a supreme test of Christian faith, accompanied by rituals of sorrow which were reflected in condolence letters, mourning dress and the visual representation of loss (as was evident in *Death of the First Born* by the American folk artist Erastus Salisbury Field, painted in 1875: Figure 1) (Black and Lipman 1987, 184).<sup>14</sup> According to Houlbooke (1998, 234-37), the death of a partner may have left the deepest imprint in letters and diaries in early modern England, but the loss of a child was also especially hard to bear. Indeed, there is evidence of significant social and psychological investment in children in the medieval period, which suggests that the sudden loss of an infant or child has always been the occasion for grief and sorrow, although perhaps expressed in different ways, with contemporary literature and painting often reflecting the emotional significance of such an event (Orme 2001; Woods 2006; Pigler 1957). Whether in Europe or North America, the grief of parents confronted with the premature death of a child was unmistakable, at least as it was portrayed by artists such as the father of Harry Horsley who made a cast of his son after his death from scarlet fever in 1854 or Christen Dalsgaard in a painting from 1857 of the arrival of the village carpenter with a coffin for the dead child (Figure 2) (Kent 1987, 87).<sup>15</sup>

The fact that Dalsgaard’s painting reflects the response of a peasant family to the sudden loss of a child is particularly instructive, as much of the evidence (whether in a written or visual form) for assessing the reaction of bereaved parents and other family members is highly class-specific and arguably unrepresentative. It portrays the formal response to bereavement by elite groups, including the Victorian middle class, or by diarists who had strong religious beliefs and a close family involvement in the practice of Christianity (Jalland 1996, 142). By contrast, the attitude of the peasantry and working class to the premature death of infants and children was often portrayed as having been more ambivalent. According to Buchan, ‘in place of wishing their children to live, so far does poverty get the better of natural affection, that they are often

---

<sup>13</sup> See, also Gilpin 1812 (5th edition): his talented son had lived until his final year at Oxford.

<sup>14</sup> Erastus Salisbury Field (1805-1900) was an itinerant New England artist (Black 1963; 1966).

<sup>15</sup> The Danish painter, Christen Dalsgaard (1824-1907) often portrayed dramatic moments in people’s lives, including bereavement following the death of a family member (Søeborg 1902).

very happy when they die' and high rates of infant mortality which were attributed to parental neglect as a result of poverty more than justified the payment of a 'small premium' for each child who was alive at the year's end (Buchan 1769, 10). Although the incidence of infanticide remained relatively stable in Bavaria in the early nineteenth century, child neglect often led to premature death: many children were cared for by their mother rather than being entrusted to a qualified doctor and traditional cures often aggravated the initial condition and led to premature death (HSTAM Ministerium des Inneren 1819; Regierungs-Akten 1837). Even at the end of the nineteenth century a very high proportion of infants and children died without any formal medical attention (*ohne vorgesuchten Hilfe*). It was widely recognized in medical circles, from a relatively early date, that high infant mortality rates were caused by unsatisfactory infant feeding practices, in particular the failure by mothers to breastfeed their children. Because of traditional prejudice, many families were 'capitally mistaken in their management of children', while the 'giving of artificial food too early' was a common 'error' although 'injudicious' exposure to cold was also an important cause of infant mortality (Cadogan 1748; Rendle-Short 1960; Curtis 1838, 12, 19). Buchan (1769, 1, 4) was unwilling to impose 'upon every mother to suckle her own child', but he did accept that insufficient care was given to teaching 'the proper management of children to those whom Nature has designed for mothers'. Even amongst women from the more privileged classes of society breastfeeding was viewed as 'dishonourable', despite the fact that a recourse to wet-nursing often had tragic consequences, and the continued failure to adopt best practice was attributed to prejudice or the prioritization of comfort although it was clearly not a matter of indifference for the state that new-born infants were not fed correctly (Wendelstadt 1797; Lesky 1976, Part 2, Section 2, 112-3; Müller 1891, 15; Sussman 1982, 7, 19-20).

Ostensibly, the evidence compiled by individual authors of health manuals and the official reports of early-nineteenth century medical officers suggests a willful lack of concern for infant and child welfare, particularly on the part of lower class families. It would seem to confirm the parental indifference hypothesis initially proposed by Phillippe Ariès and others, which posited that high infant mortality rates and the premature death of infants and young children were inevitably associated with a limited emotional investment (Ariès 1972; Stone 1977, 51-2). Failure to breast feed infants or a deliberate choice to rely on a wet nurse simply meant that 'these mothers did not care, and that this is why their children vanished in the ghastly slaughter of the innocents that was traditional child-rearing' (Shorter 1980, 61). But the apparent indifference to premature death needs to be placed within a wider context, where infant rearing practices were influenced directly by a range of factors, including the critical role of a mother within the family economy, the extent of female labour force participation, the impact of a low nutritional status on the ability to suckle the new-born, as well as dominant cultural and sexual norms, with early weaning

often an unavoidable consequence of a resumption of sexual relations and the concept of a further child (Flandrin 1979, 208). The visual portrayal of parental grief in peasant or working-class families on the premature death of a child in the nineteenth century was ultimately no different to the way in which bereavement was recorded or commemorated by elite groups. It seems reasonable to conclude, therefore, that most parents, irrespective of their socio-economic background, would have been anxious and distressed at the illness and premature death of one of their children (Pollok 1996, 124-39). Indeed, in the United States there is evidence that poorer families who could not afford to commission a 'death portrait' of a deceased child, paid for local artists to make 'shingle portraits' using charcoal on pieces of wood, although the increasing popularity of photography after the Civil War led to deceased children being included in family pictures which were intended to reflect the extent of parental and sibling love and affection (Figure 3) (Olivares 2008). The parish registers of Neuss and Behlendorf in the period 1620 to 1760 consistently registered the premature deaths of children in an affectionate manner ('*Söhnlein*', '*Töchterlein*'), which further reinforces the argument that their loss was deeply felt, just as today (Hartwig 1937).

Figure 3



Victorian post-mortem photographs (assembled by Annie Davies, Spring Symposium, April 2008)

Equally, there is every indication that premature death, at whatever age, was generally an occasion of grief. The diaries of Liverpool merchants in the nineteenth century often betrayed an overriding fear of ill-health and disease and frequently recorded the passing of friends and associates, but particular attention was paid to unexpected or premature deaths. In November 1868, for example, the ship owner Peter McQuie was clearly upset over the death at 6.15 a.m. of Josephine Maudesley, who died suddenly at the age of seven, as ‘on the previous morning she was playing in the garden’, while the cotton-broker George Holt recorded the death in January 1851 of William Lapsell, of Woolton, whose loss of his only daughter and child some years ago ‘threw a gloom’ over his views and prospects of life (MAL, DX/641/6/2, 07.11.1868; LRO, 920 DUR 1/2, 06.01.1851). Although many merchants increasingly survived into old age, there were notable exceptions. Samuel Smart died in 1854 at the age of 32; Thomas Littledale, a highly successful merchant and Commodore of the Mersey Yacht Club, died in 1861 at the age of 42 (leaving behind a widow, three daughters and two sons); the merchant Alexander Balfour was buried in 1885 leaving ‘a young family’; and the merchant and ship broker John Taylor Cook died aged 50 ‘by his own act’, having hanged himself in his bedchamber at his lodgings after suffering from deteriorating health for some time (MAL, DX/641/6/, 1868; Hoult 1913, 31; LRO, 920 DUR 1/2, 01.12.1851; Mercantile Liverpool Project database, obituaries). But illness and premature death were not seen as inevitable and considerable time and resources were spent on seeking out advice and assistance from well-established medical practitioners, even if the efficacy of their recommended treatments, from a contemporary perspective, must remain questionable. Similarly, as far as peasant families were concerned, it is often necessary to look beyond the formal reports of medical officers, with their criticism of popular fatalism and prejudice, whether in relation to small-pox inoculation or infant rearing practices, and the persistent belief that mothers and babies were damaged by ‘bad’ fairies (Sköld 1996, 290-91; Tucker 2003).<sup>16</sup> Indeed, the belief in traditional preventive measures and the willingness of the rural population to resort to remedies provided by quacks and charlatans can also be interpreted as evidence of a strategy designed to limit the depredations of disease and to circumscribe the risk of premature death.

What is certainly clear by the Victorian period is the widespread utilization of cemetery symbolism to commemorate the premature death of family members. For example, the graves of children were adorned with butterflies as symbols of resurrection or with lambs as a representation of Christ; empty furniture or a baby’s chair symbolized the unfulfilled lives of children whose age at

---

<sup>16</sup> On the basis of the police administrative reports for the Isar Kreis in Bavaria for 1830-33, the ‘common people’ sought advice from quacks with the same intensity as they would consult an oracle (StAOB Regierungs-Akten 1124/157093 1830-33, Teil IV).

death was registered in a differentiated manner (the grave of a teenager would be furnished with a partial boom, while that of a child who had died under the age of 12 would merit just a bud) (Rochester's History). Although the imposing cemeteries of the Victorian era were initially designed to serve the needs of elite groups, they were increasingly used by lower-middle class families and the symbolism of premature death gradually permeated society as a whole (Curl 1972; Rutherford 2008; Trend-Hill n.d.). In general, the art of the Victorian period reflected a preoccupation with death, with bereavement and loss often portrayed in a sentimental and dramatic manner in etchings, lithographs, paintings, portraits and photographs. But the premature death of an infant or young child was often commemorated with a particular poignancy. As Frank Bramley's painting reveals (*For Such is the Kingdom*, 1891), it was customary for the body to be placed in a small white coffin which would be preceded by a procession of children dressed in white, while four young maidens, attired in a similar manner, served as pall bearers (Figure 4) (<http://oakgrovecemetery>).<sup>17</sup>

Figure 4



The Village Carpenter comes with a Coffin for the Dead Child, by Christen Dalsgaard, 1857

---

<sup>17</sup> Frank Bramley (1857-1915) was a highly regarded British post-impressionist painter.

## The Cultural, Economic and Social Significance of Premature Death

The formal representation of premature death in cemetery symbolism highlights both its private significance and its public commemoration. The death of a child, the loss of a wife in childbirth, the suicide of an acquaintance, or the sudden death of a business partner were all events which had not only a direct personal impact, but often wider ramifications. First, the restricted durability of marriage as a result of high rates of maternal mortality led to the disruption of the family production unit and, in many cases, re-marriage, with 'large social implications' (Wernicke 1896; Bolovan and Bolovan 2003, 238).<sup>18</sup> Irrespective of changing attitudes to the mourning of the dead, rapid remarriages remained customary in many rural areas of Europe (with widowers receiving special religious dispensation), but the consequences in terms of family dynamics, inheritance rights and the treatment of step-children were frequently significant, with close kinfolk often expected to intervene to protect 'orphans' from ill-treatment by a stepmother (Flandrin 1979, 115-16). Secondly, the premature death of a husband, as the primary breadwinner, had an immediate and negative impact on surviving family members: remarriage was generally far less common amongst widows and even in a contemporary context it can result in structural poverty and depleted family resources, with an increased risk of morbidity and a diminished labour capacity (Ainsworth and Semali 2000; Carter et al. 2007; Metropolitan Life Insurance Company 2006). Thirdly, the loss of a young infant, in many cases, was followed by another pregnancy and further pressure on the wife in terms of her net nutritional status, overall health and survival chances. Fourthly, the continued viability of business partnerships was compromised not only by the vicissitudes of trade and poor decision-making, but also by the risk of premature death. In mid-nineteenth century Liverpool, for example, 60 per cent of the partnerships recorded in 1851 had disappeared from the trade directories by 1862 while 75 per cent of those registered in 1872 were not heard of again and their collapse in some cases was caused by the unexpected death of one of the partners (Cock, Davies and Mäenpää 2010). By contrast, improvements in life expectancy, whether in infancy or at older ages, also had significant implications for family life and society as a whole: the fall in infant mortality rates in the course of the nineteenth century, at least within a European context, was a factor which affected the onset and timing of the fertility transition, while improvements in life expectancy for people in the later stages of the life course (above the age of 70) between 1880 and 1910 involved both changes in family arrangements and a greater degree of state welfare intervention (Högman 1999, 126-36).

---

<sup>18</sup> The average length of marriage had only risen from 19 to 22 years between the late-eighteenth century and 1881-1895.

But the increasing awareness of the actual scale of premature death, particularly in relation to the loss of infants and young children, high rates of maternal mortality, and the mortality risks of specific occupations, also impelled individual states from the late-eighteenth century onwards to develop strategies to control or to minimize health hazards. The claim by some eighteenth-century writers that it was the duty of the state to limit infection and to control the spread of disease ultimately gave rise to 'strong government-led investment' in the public health infrastructure, particularly from the mid-nineteenth century onwards, as a means of curtailing the unnecessary loss of life which resulted from premature death (Szreter 2005). The cumulative increase in the scientific understanding of the extent of premature death and the factors which led to reduced longevity by age group, occupation and trade, or social class, reinforced the need to preventive measures. According to William Farr, external agents had 'as great an influence on the frequency of sickness as on its fatality', and the obvious, unavoidable corollary was that 'man has as much power to prevent as to cure disease' (Farr 1837, 601). While health manuals sensibly offered dietary advice as a means of preventing premature death, the evidence assembled through the construction of life tables and age- and occupation-specific mortality rates provided a convincing case for the formulation and implementation of public health strategies, irrespective of the contemporary state of knowledge concerning disease causation. If the regent was responsible for taking whatever measures were necessary to secure an increase in total population, as Süssmilch had argued, specific attention would need to be devoted, by definition, to restricting the extent of premature deaths, particularly where these represented a measurable loss in human capital. Once the actual loss in the present discounted value of potential earnings due to preventable illness and premature death was known, as Irving Fisher demonstrated in the case of the United States, the case for introducing compulsory health insurance could be sustained (even if it still remains to be implemented) (Fisher 1917). By the mid-eighteenth century most Western states had been made aware of the persistence of high levels of maternal mortality and the negative consequences of premature death both for individual families and for society as a whole. In Bavaria, for example, it was recognized that the frequency of maternal and infant deaths made it necessary for the state to establish many midwifery schools, even at great cost (Strixner 1768, 2). Although the effectiveness of the policy response by individual states varied considerably, subsequent improvements in maternal mortality rates were generally a result of improved midwifery practice and obstetric care, together with better access to professional services and attempts to improve the social and medical environment of prospective parents and their children (Loudon 1992; Högberg 2004; De Brou-

were, 2007; Birn 2008, 337).<sup>19</sup> Improved knowledge of the scale of premature death was therefore often a precondition for official intervention.

## Postscript

Today, it is widely recognized that a great deal of premature death is preventable. Diarrheal disease accounts, on average, for over 2.9 million deaths each year, largely amongst infants and young children in the Third World, while in the United States motor vehicle accidents (together with other transport accidents) accounted for 65 per cent of potentially productive years of life lost in the mid-1980s: the highest risk of premature death is still to be found in the age group 25-44 where young males in particular are victims of accidents and homicides (Riley 2001, 228; Perloff et al. 1984, 174, 178). If the standardized death rate of Costa Rica (a poor country which has nevertheless achieved a relatively high life expectancy) was replicated at a global level, 24.7 million premature deaths could have been avoided (Nakajima 1995, 18-19, 101-04; Riley 2001, 227). If the economic dislocation which accompanied the collapse of communism after 1989 was followed by a significant fall in life expectancy, particularly for adult males, by 2000 the spread of AIDS had accounted for approximately 19 million premature deaths and a noticeable increase in age-specific morbidity rates, particularly in sub-Saharan Africa (Bobadilla and Costello 2006). Even in a context where the probable extent of premature death is fully known and there is general agreement on the leading causes of truncated longevity, the life expectancy of a significant proportion of the world's population remains severely restricted. Despite an increasingly sophisticated methodology for calculating the economic costs of specific causes of mortality and morbidity, and a widespread recognition of the familial and social consequences of premature death, the response of individual governments and supranational agencies is still inadequate. Such a perspective is important in terms of evaluating the way in which states reacted to the unfolding evidence of the scale of premature death in the past and the appropriateness of public health initiatives, whether in relation to the introduction of quarantine (*cordons sanitaires*), an extension of community-based midwifery services, or large-scale improvements to the urban sanitary infrastructure. But there is an underlying continuity and similarity to the overall approach to the problems caused by premature death, whether in the late-eighteenth century or in a contemporary context: it is dependent on accumulated scientific evidence; it recognizes the importance of human agency together with the need to educate the people; and it prioritizes preventive policies which are inevitably mediated by economic,

---

<sup>19</sup> In many parts of Europe existing regulations relating to the role of midwives were extended in the course of the eighteenth century (Marland, 1993, 195-200).

class-specific and ideological considerations (Lesky 1976, 320; Perloff et al. 1984, 180).<sup>20</sup>

## References

- Ainsworth, M. and I. Semali. 2000. The Impact of Adult Deaths on Children's Health in North-Western Tanzania. *Policy Research Working Paper* (World Bank Washington) 2266.
- Alborn, Timothy Lee, 1994. A calculating profession: Victorian actuaries and the statisticians. *Science in Context* 7: 433-468.
- Anderson, Michael. 1980. *Approaches to the History of the Western Family 1500-1914* (Studies in Economic and Social History). London and Basingstoke: Mac-Millan.
- Antonovsky, Aaron. 1967. Social class, life expectancy and overall mortality. *Milbank Memorial Fund Quarterly* 45, 2 Part 1: 31-73.
- Arcà, M., F. Di Orio, F. Forastiere, C. Tasco and C. A. Perucci. 1988. Years of potential life loss (YPLL) before age 65 in Italy. *American Journal of Public Health* 78, 9: 1202-1205.
- Ariès, Phillipe. 1972. *Centuries of Childhood*. London: Cape.
- Armstrong, John (Anon). 1744. *The Art of Preserving Health. A Poem*. London: Millar.
- Ballod, Carl. 1899. *Die mittlere Lebensdauer in Stadt und Land* (Staats- und sozialwissenschaftliche Forschungen). Leipzig: Duncker & Humblot.
- Bantz, James E. 1987. Sir William Petty: Modern epidemiologist (1623-1687). *Journal of Community Health* 12, 2-3: 185-197.
- Beddoes, Thomas. 1802. *Hygēia, or Essays Moral and Medical on the causes affecting the personal state of the middling and affluent classes*. Bristol: Mills.
- Behar, L. 1976. Des Tables de mortalité aux XVIIe et XVIIIe siècles; Histoire-signification. *Annales de Démographie Historique*: 173-200.
- Béjean, Sophie and Hélène Sultan-Taïb. 2005. Modeling the economic burden of diseases imputable to stress at work. *European Journal of Health Economics* 1: 16-23.
- Bellhouse, David R. and Christian Genest. 2007. Maty's Biography of Abraham de Moivre, Translated, Annotated and Augmented. *Statistical Science* 22, 1: 109-136.
- Berridge, Virginia and Stuart Blume (eds.) 2003. *Poor Health: Social Inequality before and after the Black Report*. London: Frank Cass.
- Bertillon, Jacques, 1892. Morbidity and Mortality according to occupation. *Journal of the Royal Statistical Society* 55: 559-600.
- Biedermann, K. 1880. *Deutschlands politische, materielle und soziale Zustände im 18. Jahrhundert*. Leipzig: Weber.

---

<sup>20</sup> It is now accepted that time devoted to education is negatively related to the probability of premature death and that increased rates of female secondary school enrolment contribute to lower levels of infant mortality (Huang, Fulginiti and Peterson, 2003; Kingdom 1997, 5).

- Birn, Anne-Emanuelle. 2008. Doctors on Record: Uruguay's Infant Mortality Stagnation and Its Remedies, 1895-1945. *Bulletin of the History of Medicine* 82: 311-354.
- Black, Mary C. 1963. Erastus Salisbury Field. *Art in America* 51, 1: 82-83.
- Black, Mary C. 1966. Erastus Salisbury Field. *Art in America* 54, 1: 49-56.
- Black, Mary and Jean Lipman. 1987. *American Folk Painting*. New York: Potter.
- Blyth, A. Wynter. 1890. *A Manual of Public Health*. London and New York: Mac-Millan.
- Bobadilla, José and Christine A. Costello. 2006. *Premature Death in the New Independent States: Overview* (Commission on Behavioral and Social Sciences and Education). New York: The National Academies Press.
- Bolovan, Sorina Paula and Ioan Bolovan. 2003. *Transylvania in the Modern Era. Demographic Aspects*. Cluj: Romanian Cultural Institute.
- Booth, C. 1886. Occupation of the people of the United Kingdom, 1801-1881. *Journal of the Royal Statistical Society* 49: 314-444.
- Brown, Mark. 2009. A life in armour: how Henry VIII grew from L to XXXL. *The Guardian*, April 1.
- Brownlee, John. 1916. The History of the Birth and Death Rates in England and Wales as a whole, from 1570 to the Present Time. *Public Health* 29, 10: 228-238.
- Brownlee, John and R. M. Morison. 1911. Note on the Calculation of the Probabilities of Life at High Ages. *Journal of the Royal Statistical Society* 74: 201-205.
- Buchan, William. 1769. *Domestic Medicine*. Edinburgh: Balfour, Auld and Smellie.
- Buck, Peter. 1977. Seventeenth-Century Political Arithmetic: Civil Strife and Vital Statistics. *Iris* 68: 67-84.
- Burnet, Alex, Mr. Maginn and Henry W. Dewhurst (eds.). 1836. *The New Medical Adviser and Family Physician; containing every information necessary to the treatment and cure of all diseases incidental to the human body throughout every period of life forming a complete Guide to the preservation of Health and the attainment of Longevity*. London: Geo Virtue.
- Campbell, Denis. 2009. Wine may help men outlive teetotalers. *The Guardian*, April 30.
- Carey, James R. and Pablo Liedo. 1995. Sex-specific life table ageing rates in large medfly cohorts. *Experimental Gerontology* 30, 3-4: 313-325.
- Carr-Saunders, A. M. 1964. *World Population - Past Growth and Present Trends*. London: Cass.
- Carter, Michael R., Julian May, Jorge Agüero and Sonya Ravindranath. 2007. The Economic Impact of Premature Adult Mortality: Panel Data Evidence from KwaZulu-Natal, South Africa, paper submitted to a Special Edition of AIDS, 20/04/07, 1-20.
- Chan, Ben and Bill Hayes. 1998. Cost of stroke in Ontario, 1994/95. *Canadian Medical Association Journal*, 159, September supplement: S1-S8.
- Clark, Geoffrey. 1999. *Betting on Lives: The Culture of Life Insurance in England, 1695-1775*. Manchester and New York: Manchester University Press.
- Cock, Randolph, John Davies and Sari Mäenpää. 2010. The Mercantile Liverpool Project Database: Sources and Findings. In *Networks of Power and Influence: business, culture and identity in Liverpool's Merchant Community, c.1800-1914*, ed. Robert Lee (forthcoming).

- Consult Me*. 1899. *Consult Me, Prefaced and Improved with Numerous Additions* (by the author of 'Enquire Within'). London: Ornamental.
- Combe, Andrew. 1836. *The Principle of Physiology Applied to the Preservation of Health and to the Improvement of Physiological and Mental Education* (4th edition). Edinburgh: MacLachlan and Stuart.
- Cornaro, Luigi. 1821. *A Sure Method of Attaining Long and Healthy Life with the Means of correcting a Bad Constitution*. Cheltenham: Foulis.
- Crimmins, Eileen M., Yasuhiko Saito and Dominique Ingegneri. 1997. Trends in Disability-Free Life Expectancy in the United States, 1970-90. *Population and Development Review* 23: 555-572.
- Curl, James Stevens. 1972. *The Victorian Celebration of Death*. Newton Abbott: David and Charles.
- Curtis, John Harrison. 1838. *Simplicity of Living. Observations on the Preservation of Health in Infancy, Youth, and Age*. London: Henry Renshaw.
- Daston, Lorraine. 1988. *Classical probability in the enlightenment*. Princeton: Princeton University Press.
- De Brouwere, Vincent. 2007. The Comparative Study of Maternal Mortality over Time: The Role of the Professionalisation of Childbirth. *Social History of Medicine* 20, 3: 541-562.
- Den Butler, Frank A. G. 2004. Statistics and the Origin of the Royal Netherlands Economic Association. *De Economist* 153, 3:439-446.
- Cadogan, William. 1748. *An essay upon Nursing and the management of children*. London: Horsfield.
- Demonferrand, J. F. 1838. *Essai sur les lois de la mortalité en France*. Paris: Polytechnique.
- Dempsey, Mary. 1947. Decline in Tuberculosis: The Death Rate Fails to Tell the Entire Story. *American Review of Tuberculosis* 86, 2: 157.
- Deuchar, J. J. 1882. A sketch of the history of the science of life contingencies with special reference to the origin and construction of mortality tables. *Transactions of the Insurance and Actuarial Society of Glasgow, 1st ser.* 3: 33-71.
- Dickinson, Frank G. and Everett L. Welker. 1948. What is the Leading Cause of Death? Two New Measures. *Journal of the American Medical Association* 64.
- Dimand, Robert W. 2005. Comments on William D. Nordhaus's 'Irving Fisher and the Contribution of Improved Longevity to Living Standard. *American Journal of Economics and Sociology* 64, 1: 393-397.
- Dublin, Louis I. and Alfred J. Lotka. 1936. *Length of Life*. New York: Ronald Press.
- Dudfield, Reginald. 1912. Still-births in relation to Infantile Mortality. *Journal of the Royal Statistical Society* 76, 1: 1-87.
- Dunn, Peter M. 2000. Perinatal lessons from the past. Dr William Buchan (1729-1803) and his Domestic Medicine. *Archives of Disease in Childhood – Fetal and Neonatal Edition* 83: F71-F73.
- Dupaquier, M. 1984. William Farr, demographer. *Population* 39, 2: 339-355.
- Ediev, Dalkhat and Richard Gisser. 2007. Reconstruction of historical series of life tables and of age-sex structure for the Austrian population in the 19th and the first half of the 20th century. *Vienna Yearbook of Population Research*: 327-355.

- Elderton, William P. and M. E. Ogborn. 1943. The Mortality of Adult Males since the Middle of the Eighteenth Century as shown by the Experience of Life Assurance Companies. *Journal of the Royal Statistical Society* 106: 1-20.
- Engel, Ernst. *Der Werth des Menschen, I Theil: Der Kostenwerth des Menschen*. Berlin: Simion.
- Euler, Leonhard. 1760. Recherches generals sur la mortalité et la multiplication du genre human. *Mémoires de l'académie des sciences de Berlin* 16: 144-164.
- Eyler, John M. 2002. Constructing vital statistics: Thomas Rowe Edmonds and William Farr, 1835-1845. *Sozial und Präventivmedizin/Social and Preventive Medicine* 47, 1: 6-13.
- Farr, William. 1837. Vital Statistics: or, the Statistics of Health, Sickness, Disease, and Death. In *A statistical account of the British Empire*, ed. J. R. McCulloch, 567-601. London: Knight.
- Farr, William. 1865. On infant mortality and on alleged inaccuracies of the census. *Journal of the Royal Statistical Society of London* 28: 125-149.
- Findl, P. 1979. Mortalität und Lebenserwartung in den österreichischen Alpenländern im Zeitalter der Hochindustrialisierung (1868 bis 1912). In *Geschichte und Ergebnisse der zentralen amtlichen Statistik in Österreich 1829-1979*, ed. Österreichisches Statistisches Zentralamt, 425-452. Vienna: Statistisches Zentralamt.
- Fisher, Irving. 1917. The Need for Health Insurance. *American Labor Legislation Review* 7, 1: 9-23.
- Flandrin, Jean-Louis. 1979. *Families in Former Times - Kinship, Household and Sexuality*. Cambridge: Cambridge University Press.
- Fissell, Mary Elizabeth. 1991. *Patients, power, and the poor in eighteenth-century Bristol*. Cambridge: Cambridge University Press.
- Fogel, Robert William. 2004. *The Escape from Hunger and Premature Death, 1700-2100* (Cambridge Studies in Population, Economic and Society in Past Time 38) Cambridge: Cambridge University Press.
- Freitas, Robert A. 2009. The longevity meme. Activism and education to defeat aging., <http://www.longevitymeme.org/articles> (accessed 07.04.2009).
- Giles, Margaret J. and Edith Cowan. 1999. Human Capital Theory An Australian Road Crash Costing Review. University of Western Australia, School of Finance and Business Economics, working paper series, 99.8.
- Gilpin, Joshua. 1812. *A Monument of Parental Affection to a Dear and Only Son*. (5th edition) London: Houlston and Hatchard.
- Glass, D. V. (ed.). 1959. *Introduction to Malthus*. London: Frank Cass.
- Glass, D. V. 1973. Numbering the people. In *The eighteenth-century population controversy and the development of census and vital statistics in Britain*. Farnborough: Saxon House.
- Goldscheid, Rudolf. 1911. *Höherentwicklung und Menschenökonomie. Grundlegung der Sozialbiologie*. Leipzig: Klinkhardt.
- Gottstein, Adolf. 1929. *Die Lehre von den Epidemien*. Berlin: Springer.
- Government of the District of Columbia. 2006. Department of Health, Vital Statistics – Leading Causes of Premature Death, 1999-2003.
- Graunt, William. 1662. *Natural and Political Observations upon the Bills of Mortality*. London: Martin, Allestry and Dicas.

- Greenwood, Major. 1948. *Medical Statistics from Graunt to Farr*. Cambridge: Cambridge University Press.
- Guy, William A. 1857. On the Duration of Life among Lawyers: with additional observations on the Relative Longevity of the Members of the Three Learned Professions. *Journal of the Statistical Society of London* 20: 65-71.
- Haberman, Steven and Trevor Sibbett (eds.). 1995. *The History of Actuarial Science* (10 volumes). London: Pickering & Chatto.
- Hacking, Ian. 1985. *The Emergence of Probability*. Cambridge: Cambridge University Press.
- Haenszel, William. 1950. A Standardized Rate for Mortality Defined in Units of Lost Years of Life. *American Journal of Public Health* 40, 1: 17-26.
- Haines, Michael R. 1980. The American life table of 1830-1860: an evaluation. *Journal of Interdisciplinary History* 11, 1: 73-91.
- Haines, Michael R. 1998. Estimated Life Tables for the United States, 1850-1900. *Historical Methods* 31, 4: 149-169.
- Halling, Thorsten, Julia Schäfer and Jörg Vögele. 2005. Volk, Volkskörper, Volkswirtschaft – Bevölkerungsfragen in Forschung und Lehre von Nationalökonomie und Medizin. In *Das Konstrukt "Bevölkerung" vor, im und nach dem "Dritten Reich"*, ed. Rainer Mackensen and Jürgen Reulecke, 388-428. Wiesbaden: Verlag für Sozialwissenschaften.
- Harkness, Jon. 1989. The Economic Cost of AIDS in Canada. *Canadian Public Policy/Analyse de Politique* 15, 4: 405-412.
- Hartwig, J. 1937. Die natürliche Bevölkerungsbewegung in den Lübeckischen Kirchspielen Neuss und Behlendorf. *Archiv für Bevölkerungswissenschaft und Bevölkerungspolitik* 7: 234-237.
- Hayward, T. E. 1901. A Series of Life Tables for England and Wales for each successive Decennium from 1841-50 to 1881-90, calculated by an Abbreviated Method. *Journal of the Royal Statistical Society* 64: 636-641.
- Heien, D. M. and D. J. Pittman. 1989. The economic costs of alcohol abuse: An assessment of current methods and estimates. *Journal of Studies on Alcohol* 50, 6: 567-579.
- Henriksson, G. F. and B. Jönsson. Diabetes: the cost of illness in Sweden. *Journal of Internal Medicine* 244, 6: 461-468.
- Higgs, E. 1990. Structuring the past. The occupational and household classification of the nineteenth-century census data. In *History and Computing* 3, ed. E. Mawdsley et al., 67-73. Manchester: Manchester University Press.
- Hocker, P. F. 1965. Benjamin Gompertz. *Journal of the Institute of Actuaries* 91: 203-212.
- Hodgson, T. A., and M. R. Meiners. 1982. Cost-of-illness methodology: A guide to current practices and procedures. *Milbank Memorial Fund Quarterly* 60: 429-462.
- Hoffmann, J. G. 1839. *Die Bevölkerung des Preussischen Staats nach dem Ergebnisse der zu Ende des Jahres 1837 amtlich aufgenommenen Nachrichten*. Berlin: Nicolai.
- Högberg, Ulf. 2004. The Decline in Maternal Mortality in Sweden: The Role of Community Midwifery. *American Journal of Public Health* 94, 8: 1312-1320.
- Hollingsworth, Thomas H. 1977. Mortality in the British Peerage Families since 1600. *Population* (numéro special): 323-351.

- Hoock, J. 1979. Sciences camérales et statistique démographique en Allemagne au XVIIe et XVIIIe siècle. *Annales de Démographie Historique*: 145-155.
- Houlbrooke, Ralph. 1998. *Death, Religion, and the Family in England, 1480-1750*. Oxford: Clarendon.
- Hoult, James. 1913. *West Derby, Old Swan and Wavertree Historical and Topographical*. Liverpool: Tinling.
- Houston, Rab H. 1992. Mortality in early modern Scotland: the life expectancy of advocates. *Continuity and Change* 7, 1: 47-70.
- Houston, Rab H. and W. A. Prest. 1995. 'To Die in the Term'. The Mortality of English Barristers. *Journal of Interdisciplinary History* 26, 2: 233-249.
- HSTAM (Hauptstaatsarchiv München), Ministerium des Inneren (MI), 15048, Sanitätswesen, 07.09.1819, Die Anzeigen der Gerichts-Ärzte des Isar-Kreises über Bevölkerung und Metereologie des Jahres 1817-18 betreffend.
- HSTAM (Hauptstaatsarchiv München), Regierungs-Akten (RA), 1055/15118, Berchtesgaden, Masern- und Grippe Ausbruch, 09.04.1837; Report of the Gerichtsarzt Dr Griel, 23.03.1837. <<http://oakgrovecemetery.wordpress.com/2009/01/28/death-of-young-child/>>.
- Huang, Rui, Lilyan E. Fulginiti and E. Wesley Peterson. 2005. Investing in Hope: AIDS, Life expectancy, and human capital accumulation. In *Proceedings of the 25th International Conference of Agricultural Economists*, 16-22 August 2003, ed. David Colman: 218-233. Malden: Blackwell.
- Hufeland, Christoph Wilhelm. 1796. *Die Kunst das menschliche Leben zu verlängern*. Leipzig: Reclam.
- Humblet, P. C., R. Lagasse and A. Levêque. 2000. Trends in Belgian premature avoidable deaths over a 20 year period. *Journal of Epidemiological Community Health* 54, 9: 687-691.
- Humphreys, Noel. 1883. The Recent Decline in the English Death-Rate, and its Effect upon the Duration of Life. *Journal of the Statistical Society of London* 46, 2: 189-224.
- Humphreys, Noel (ed.). 1885. *Vital Statistics: A Memorial Volume of Selections From The Reports And Writings of William Farr*. London: Sanitary Institute.
- Jalland, Pat. 1996. *Death in the Victorian Family*. Oxford: Clarendon Press.
- Jensen, Niklas Thode. 2009. Safeguarding Slaves: Smallpox, Vaccination, and Governmental Health Policies among the Enslaved Population in the Danish West Indies, 1803-1848. *Bulletin of the History of Medicine* 83, 1: 95-124.
- Johansen, J. D., E. Smith, K. Juel and N. Rosdahl. 2000. The AIDS epidemic in the city of Copenhagen, Denmark: Potential years of life lost and the impact on life expectancy. *Scandinavian Journal of Public Health* 33, 3: 222-227.
- Johansson, Sheila Ryan. 1991. Welfare, mortality and gender over three centuries. *Continuity and Change* 6, 2: 135-178.
- Kent, Neil. 1987. *Nordisk konst från classicism till expressionism*. Eskiltuna.
- Kersseboom, Willem. 1748. *Essays on the Political Arithmetic contained in Three Treatises*. The Hague: van den Bergh.
- Kingdom, Geeta Gandhi. 2002. Education of women and socio-economic development. In *Reason and Revelation: Studies in the Babi and Baha'i Religions* 13. Los Angeles: Kalimat Press.
- Kneipp, Sebastian. 1891. *My Water Cure*. London: Blackwood.

- Krause, Richard M. 2005. Preventive and Social Medicine: A Victorian Legacy. *Indian Journal of Community Medicine* 30, 4: 104-108.
- Lammert, Gottfried 1869. *Volksmedizin und medizinischer Aberglaube in Bayern*. Würzburg: Julien.
- Lawrence, C. J. 1975. William Buchan: Medicine Laid Open. *Medical History* 19, 1: 20-35.
- Lesky, Erna. 1976. *A System of Complete Medical Police. Selections from Johann Peter Frank* (Part 2, Section 2). Baltimore: Johns Hopkins University Press.
- Lexis, Wilhelm. 1878. Sur la durée normale de la vie humaine et sur la théorie de la stabilité des rapports statistiques. *Annales de démographie internationale* 2: 447-462.
- Lindemann, Mary. 1996. *Health and Healing in Eighteenth-Century Germany*. Baltimore and London: Johns Hopkins.
- Linn Shai and Sam Sheps. 1993. Disability and the Years of Potential Productivity Lost: Modifying the Years of Potential Life Lost and the Investment-Production-Consumer Model by Disability Level. *Epidemiology* 4, 5: 449-454.
- Loudon, Irvine. 1992. *Death in Childbirth: An International Study of Maternal Care and Maternal Mortality, 1800-1950*. Oxford: Clarendon Press.
- Loudon, Irvine. 2000. Maternal mortality in the past and its relevance to developing countries today. *American Journal of Clinical Nutrition* 72, 1: 241-246.
- LRO (Liverpool Record Office). 920 DUR 1/2, Family Diary maintained by George Holt, 01.12.1851.
- Maddox, Randy L. 2007. John Wesley on Holistic Health and Healing. *Methodist History* 46, 1: 4-33.
- MAL (Maritime Archives and Library, Merseyside Maritime Museum), DX/641/6/1, McQuie Family Journal 1846-1868.
- MAL (Maritime Archives and Library, Merseyside Maritime Museum). D/SO/2/1/1, Report of the Liverpool Seamen's Orphan Institution for the year ending 31st December 1869.
- Marland, Hilary. 1993. The 'burgerlijkje' midwife: the *stadsvroedvrouw* of eighteenth-century Holland. In *The Art of Midwifery. Early Modern Midwives in Europe*, ed. Hilary Marland: 192-213. London and New York: Routledge.
- Mercantile Liverpool Project database, obituaries.
- Metropolitan Life Insurance Company (MetLife). 2006. Financial Impact of Premature Death. The Value of Adequate Life Insurance Coverage When Tragedy Strikes. New York: MetLife.
- Moss, William. 1784. *A Familiar Medical Survey of Liverpool*. Liverpool: Hodgson and Lowndes.
- Mullahy, J. and J. Sindelar. 1989. Life-cycle effects of alcoholism on education, earnings, and occupation. *Inquiry* 26: 272-282.
- Müller, Friedrich W. 1891. *Ueber die Ursachen des Nichtstillens auf der schwäbisch-bayrischen Hochebene nebst geschichtlichen Notizen über das Nichtstillen überhaupt*. Munich: Ernst.
- Neimeyer, R. A., J. Wittkowski and R. P. Moser. 2004. Psychological research in death attitudes: An overview and evaluation. *Death Studies* 28: 309-340.
- Newsholme, Arthur. 1923. *The Elements of Vital Statistics in their Bearing on Social and Public Health Problems*. (new edition) London: Allen and Unwin.

- Nakajima, Hiroshi. 1995. *The World Health Report 1995: Bridging the Gaps*. Geneva: WHO.
- Nicolai, Christoph Friedrich. 1788-1796. *Beschreibungen einer Reise durch Deutschland und die Schweiz*. Leipzig: Leonhardt.
- North, Michael. 2008. 'Material Delight and the Joy of Living'. *Cultural Consumption in the Age of Enlightenment in Germany*. Aldershot: Ashgate.
- Oeppen, Jim and James Vaupel. 2002. Enhanced: Broken Limits to Life Expectancy. *Science* 280 (10 May): 1029-1031.
- Ogle, William. 1886. Statistics of Mortality in the Medical Profession. *Medico-Chirurgical Transactions*, 69: 217-237.
- Olivares, Natalie 2008: Victorian photos mix family life with death. <<http://media.www.theanger.org/media/storage/paper1010/news/2008/04/18/Premiere>>.
- Orme, Nicholas. 2001. *Medieval Children*. New Haven: Yale University Press.
- Overbeek, J. 1974. *History of population theories*. Rotterdam: Rotterdam University Press.
- Pearson, Karl. 1978. *The history of statistics in the 17th and 18th centuries*. London: Griffin.
- Pearson, Robin. 1997. Towards an Historical Model of Services Innovation: The Case of the Insurance Industry, 1700-1914. *Economic History Review* 50, 2: 235-256.
- Perloff, Janet D., Susan A. LeBailly, Philip R. Kletke, Peter P. Budetti and John P. Connelly. 1984. Premature Death in the United States: Years of Life Lost and Health Priorities. *Journal of Public Health Policy* 5, 2: 167-184.
- Pham, T.-M., Y. Fujino, R. Ide, N. Tokui, T. Mizoue, I. Ogimoto, S. Matasuda and T. Yoshimura. 2009. Years of life lost due to cancer in a cohort study in Japan. *European Journal of Public Health* 19, 2: 189-192.
- Picton, J. A., 1873. *Memorials of Liverpool Historical and Topographical including a History of the Dock Estate* (vol. II – Topographical). London: Longmans, Green and Company.
- Pigler, Andor. 1957. Portraying the dead: painting – graphic art. *Acta Historiae Artium Academiae Scientiarum Hungaricae* 4: 1-74.
- Pollock, Linda. 1983. *Forgotten Children. Parent-child relations from 1500 to 1900*. Cambridge: Cambridge University Press.
- Porter, Roy. 1989. 'A little learning': knowledge of health in the 18th century. *GUT An International Journal of Gastroenterology and Hepatology* 30: 75-80.
- Ratcliffe, Henry. 1850. *Observations on the rate of mortality and sickness existing amongst friendly societies particularized for various trades, occupations and localities with a series of tables shewing the value of annuities, sick gifts, assurance for death and contributions to be paid equivalent thereto*. Manchester: Falkner.
- Rendle-Short, John. 1960. Infant management in the 18th century with special reference to the work of William Cadogan. *Bulletin of the History of Medicine* 34: 97-122.
- Renn, Derek F. 1998. *Life, death and money: actuaries and the creation of financial security*. Oxford: Clarendon Press.
- Rice, D. P., S. Kelman, L. S. Miller and S. Dunmeyer. *The Economic Cost of Alcohol and Drug Abuse and Mental Illness*. Rockville: Public Health Service.

- Riley, James C. 1987. *The Eighteenth-Century Campaign to Avoid Disease*. Basingstoke: MacMillan.
- Riley, James C. 2001. *Life Expectancy - A Global History*. Cambridge: Cambridge University Press.
- Riley, James C. 2005. Estimates of Regional and Global Life Expectancy, 1800-2000. *Population and Development Review* 31, 3: 537-543.
- Riley, James C. n.d. Introduction to the 'Bibliography'. Human Life-Table Database, <http://www.lifetable.de/introR.htm>.
- Robinson, Lukin H. 1948. Mortality Trends and Public Health in Canada. *Canadian Journal of Public Health* 39, 2: 60.
- Rochester's History, An Illustrated Timeline, Glossary of Victorian Cemetery Symbolism. [http://www.vintageviews.org/vv-tl/pages/Cem\\_Symbolism.htm](http://www.vintageviews.org/vv-tl/pages/Cem_Symbolism.htm).
- Rohrbasser, Jean-Marc and Christine Th  re. 2004. Antoine Deparcieux (1703-1768) and demographic data collection. *The History of the Family*, 9.1: 115-122.
- Romeder, J. M. and J. R. McWhinnie. 1977. Potential Years of Life Lost Between Ages 1 and 70: An Indicator of Premature Mortality for Health Planning. *International Journal of Epidemiology* 6: 143-151.
- Rosset, Edward. 1964. *Aging process of population*. Oxford: Pergamon.
- Rusnock, Andrea A. 2002. *Vital Accounts. Quantifying Health and Population in Eighteenth-century England and France*. Cambridge: Cambridge University Press.
- Rusnock, Andrea A. 2002. 'The Merchant's Logick': Numerical Debates over Smallpox Inoculation in Eighteenth-Century England. In *The Road to Medical Statistics*, ed. E. Magnello and A. Hardy, 37-54. Amsterdam: Rodopi.
- Rutherford, Sarah. 2008. *The Victorian Cemetery*. Oxford: Shire.
- Sandifer, Edward. 2007. *The Early Mathematics of Leonhard Euler*. Washington: Mathematical Association.
- S  guy, Isabelle, Luc Buchet and Arnaud Bring  . 2008. Model Life Tables for pre-Industrial Population: First Application in Palaeodemography. In *Recent Advances in Palaeodemography Data, Techniques, Patterns*, ed. Jean-Pierre Bocquet-Appel, 83-117. Dordrecht: Springer.
- Shorter, Edward. 1976. *The Making of the Modern Family*. London: Collins.
- Sibbett, Trevor. 2007. European sources for research on actuarial history. Seminar in Exploring Actual History, 14.06.2007: <[www.actuaries.org.uk/data/assets/pdf\\_file/0004/1981](http://www.actuaries.org.uk/data/assets/pdf_file/0004/1981)>.
- Singer, R. B. 2001. The first mortality follow-up study: the 1841 Report of William Farr (physician) on the mortality of lunatics. *Journal of Insurance Medicine* 33, 4: 298-309.
- Sk  ld, Peter. 1996. *Two Faces of Smallpox. A Disease and its Prevention in Eighteenth- and Nineteenth-Century Sweden* (Report no. 12 from the Demographic Data Base). Ume  : Ume   University.
- S  eborg, Knud. 1902. *Christen Dalsgaard og hans kunst*. Copenhagen: Bladfond.
- StAObB (Staatsarchiv f  r Oberbayern), Regierungs-Akten 1124/157093, Dreij  hriger Verwaltungs-Bericht der kgl. Polizey-Beh  rden im Isar Kreis (1830-33), Teil IV.
- Stone, Lawrence. 1977. *The Family, Sex and Marriage in England 1500-1800*. New York: Harper and Row.

- Strixner, Johann M. 1768. *Von dem Zustand der Geburtshülfe: Kurze Anrede bey Eröffnung der gnädigst neu errichteten Hebammenschule*. Munich.
- Sussman, George D. 1982. *Selling Mothers' Milk. The Wet-Nursing Business in France 1715-1914*. Urbana, Chicago and London: University of Illinois Press.
- Szreter, Simon. 2005. *Health and Wealth: Studies in History and Policy* (Rochester Studies in Medical History). Rochester: University of Rochester Press.
- Tedebrand, Lars-Göran. 2000. Historische Demographie in Schweden. In *Landesgeschichte und Historische Demographie* (Geschichtliche Landeskunde, Veröffentlichungen des Instituts für Geschichtliche Landeskunde an der Universität Mainz, Band 50), ed. Michael Matheus and Walter G. Rödel, 135-152. Stuttgart: Franz Steiner.
- Thatcher, A. Roger. n.d. A Note on Some Historical Data on Old Age Mortality: <http://www.demogr.mpg.de/Papers/Books/Monography2/a%20note>, htm.
- The Guardian*. 2009. World Factfiles, April 20-22.
- The Poverty Site, Scotland, premature death: <<http://www.poverty.org.uk/s60/index/shtml>>.
- Tomer, A. (ed.). 2000. *Death attitudes and the older adult*. Philadelphia: Brunner-Routledge.
- Trend-Hill, Jeane M. n.d. *The Lost Language*. Lulu Studio Photo Book.
- Tucker, Holly. 2003. *Pregnant Fictions: Childbirth and the Fairy Tale in Early-Modern France*. Detroit: Wayne State University Press.
- Véron, Jacques and Jean-Marc Rohrbasser. 2003. Wilhelm Lexis: la durée normale de la vie comme expression d'une 'nature des choses'. *Population* 58, 3: 343-364.
- Vögele, Jörg and Wolfgang Woelk. 2002. Der "Wert des Menschen" in den Bevölkerungswissenschaften vom ausgehenden 19. Jahrhundert bis zum Ende der Weimarer Republik. In *Bevölkerungslehre und Bevölkerungspolitik vor 1933*, ed. Rainer Mackensen, 121-134. Opladen: Leske and Budrich.
- Vonovskis, Maris A. 1971. The 1798 life table of Edward Wigglesworth. *Journal of Economic History* 31, 3: 570-590.
- Wall, Richard. 1974. *Mortality in mid 19th century Britain*. Farnborough: Gregg.
- Watkins, Kevin. 2009. Save the mothers. *The Guardian*, April 07.
- Weisz, Bela. 1880. *Der Einfluß der theueren und billigen Zeiten auf die Sterblichkeit*. Jena: Fischer.
- Wendelstadt, Georg F. C. 1797. *Ueber die Pflicht gesunder Mütter ihre Kinder selbst zu stillen*. Frankfurt and Leipzig: Akademische Schriften.
- Wernicke, Johannes. 1896. *Das Verhältnis zwischen Geborenen und Gestorbenen in historischer Entwicklung* (Conrad's Sammlung national-ökonomischer und statistischer Abhandlungen). Leipzig: Fischer.
- Wiedemann, H.-R. 1995. Christoph Wilhelm Hufeland 1762-1836. *European Journal of Pediatrics* 154, 12: 943.
- Wilke, Jürgen. 2004. From parish register to the 'historical table': The Prussian population statistics in the 17th and 18th centuries. *The History of the Family* 9, 1: 63-79.
- Wittstein, Theodor. 1867. *Mathematische Statistik und deren Anwendung auf Nationalökonomie und Versicherungs-Wissenschaft*. Hannover: Hahn.
- Woods, Robert. 1996. Physician heal thyself: the health and mortality of Victorian doctors. *Social History of Medicine* 9, 1: 1-30.

- Woods, Robert. 2006. *Children Remembered. Responses to Untimely Death in the Past*. Liverpool: Liverpool University Press.
- Woods, Robert. 2007. Medical and Demographic History: Inseparable? *Social History of Medicine* 20, 3: 483-503.
- Woods, Robert I. and Naomi Williams. 1995. Must the gap widen before it can be narrowed? Long-term trends in social class mortality differentials. *Continuity and Change* 10, 1: 105-137.
- Wootton, David. 2006. *Bad Medicine: Doctors Doing Harm Since Hippocrates*. Oxford: Oxford University Press.
- Wrigley, E. A. 1968. Mortality in Pre-Industrial England: The Example of Colyton, Devon over Three Centuries. *Daedalus* 97, 2: 546-580.
- Wrigley, E. A. 2004. British population during the 'long' eighteenth century. In *The Cambridge Economic History of Modern Britain, Business and Economics*, ed. Roderick A. Floud and Paul A. Johnson, 57-95. Cambridge: Cambridge University Press.
- Wrigley, E. A. and R. Schofield. 1981. *The Population History of England, 1541-1871*. Cambridge: Cambridge University Press.
- Yallop, Hellen. 2000. Between choice and destiny. Discourses about the aging body in eighteenth-century England, paper presented to the conference on the (Re) construction of the aging body. Western medical culture and gender, 1600-2000.
- Zhao, Zhongwei. 1997. Long-Term Mortality Patterns in Chinese History: Evidence from a Recorded Clan Population. *Population Studies* 51: 117-127.