HEALTH AND URBAN GROWTH IN ENGLAND IN THE ‘DARK AGE’ OF HISTORICAL DEMOGRAPHY C.1750-1850

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1. Introduction

The discipline which became demography was the brainchild of urban intellectuals such as Thomas Malthus and William Farr labouring to comprehend population problems during the ‘dark age’ of historical demography: the period of most dramatic urban growth when we also have so little reliable evidence concerning the changing health of urban populations. Demography was in part born out of a persistent preoccupation with trying to understand the threatening problem of urban health in this increasingly urban age. John Graunt in his *Natural and political observations and conclusions made upon the London Bills of mortality* (1662), held that human hosts gathered in large cities are, after armies on the move, probably the most unhealthy of collectivities. William Farr, in the 1840s, sought a mathematical formula to express his conviction that the more densely populated a city was, the more unhealthy it was.\(^1\) Exceptionally large capital cities like London and Amsterdam, which at their peak (c.1700 and c.1800, respectively) stood at 11-12% of their national totals, could only grow by mass in-migration and, in effect, acted as great demographic maws consuming an appreciable fraction of the natural increase in the nation's population (or, from another viewpoint, permitting a younger and more universal age at marriage régime to exist in the hinterland than would otherwise have been prudent- in the absence of the institutionalised option of migration to the metropolis).\(^2\)

It would seem from the pioneering observations of these founding fathers of demography, Graunt and Farr, therefore, that certain health and mortality consequences could be expected inevitably to occur as a result of the growth of towns into cities during the urbanisation of British society. This occurred at a quickening pace in the course of industrialisation in the second half of the 18th century and first half of the 19th century. However, frustratingly demographic historians have had at their disposal rather little direct

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demographic evidence on the populations of these growing towns with which to study this. We do, however, know that any such density law as Farr proposed was subsequently transformed, since by the end of the 19th century there had occurred an historic reversal of this venerable assumption of increasing urban size and insalubrity. Indeed, by the beginning of the 21st century some urban environments have become among the healthiest of habitats known to humans (while others, even in the same city, remain startlingly unhealthy).

Given this diversity today, were urban environments throughout the period 1650-1850 in fact necessarily uniformly unhealthy in the manner proposed by Graunt at the beginning of that period and confirmed by Farr at the end of it? Is it in fact correct that the relationship between urban growth and health during Britain’s ‘long eighteenth century’ straightforwardly illustrates the associations between deteriorating health and the size and density of towns to which they each drew attention?

Consideration of this question provides the opportunity to review empirical and theoretical work on the relationship between urban growth and health in the early modern and early nineteenth century periods. A careful review of the implications of this research shows that 'Farr's law' may well be a highly misleading over-simplification- lore, not law. While it may have had some descriptive accuracy in application to London in the late 17th century, which Graunt observed first-hand, and it may also have applied to the crowded industrial cities of the mid-19th century, which Farr observed and studied with unprecedented care, nevertheless it may not have held true for the urban growth that occurred during the intervening century and a half between the influential work of these two men. Instead a much more complex set of economic, socio-political and environmental factors, rather than autonomic 'laws' of density of habitation, may have been more truly determinative of the


4 In the W.H.O. Commission on the Social Determinants of Health’s main report, Closing the Gap in a Generation. Health Equity through Action on the Social Determinants of Health (Geneva: WHO 2008), it was noted that male life expectancy in the Lenzie North district of Glasgow in the UK in the year 2000 was one of the highest in the western world at 82 years; yet in nearby Calton, another district of Glasgow, male life expectancy was at a level below many less developed countries in the world in 2000, at just 54 years.
changing health and mortality consequences of urban growth during this period embracing the ‘dark age’ of urban historical demography.

2. An economic approach: a typology of early modern environments

Thanks to the penetrating interpretative synthesis of Jan de Vries, we have a well-documented economic typology of urbanisation in Europe during the early modern period from 1500 to 1800, providing the essential historical context from which to view the subsequent growth of industrial cities in England during the ‘dark age’.

De Vries points out that during the early modern period there was no straightforward relationship between increasing economic activity and intensifying urbanisation of the population. Increasing economic activity predominantly took the form of enhanced agricultural productivity (rising yields per acre and per worker on the land) and increasing cottage-based, non-mechanised rural proto-industry. Both of these flourished as a more efficient national or regional communications network was developed, serviced by the marketing and financial skills of the metropolitan mercantile intermediaries operating at the centre of the communication system which comprised the nascent market.

In terms of his helpful 'three-sector pre-industrial migration model', labour 'migrated' economically - not from farm to urban manufacturing sectors, but from farm to rural manufacturing sectors. The result was 'selective urban growth' only.

This selective urban growth resulted in capital cities and the largest metropolitan, regional trading centres growing disproportionately, as also did the density of the rural-dwelling population, primarily because of increasing numbers of cottage-based protoindustrial manufacturers. But most smaller and medium-sized towns failed to exhibit substantial growth above the trend of their national totals according to De Vries. In this sense De Vries has even talked of a paradoxical 'de-urbanisation' during the early modern period, despite gradual and

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sustained per capita economic growth occurring. While most parts of Europe (except Belgium and Italy) did register an approximate doubling of the urban proportions of their population totals from 1500 to 1750, this was usually due only to the disproportionate growth of the single city at the centre of each national or regional trading system. De Vries therefore considers the period after 1800 in Europe (after approximately 1750 in Britain because of its earlier industrialisation) to have witnessed a distinct form of 'new urbanisation' beyond the metropolitan, central city. This, of course, was specifically related to the growth of a host of provincial towns, some quite new, where entrepreneurs were deploying the novel mechanised techniques of industrial mass production to exploit certain locational and natural resource advantages - typically coal or iron or both - in the manufacture of various marketable commodities.

This distinction between different forms of urban and rural population growth during the period 1500-1800 is certainly a helpful perspective for those looking at the murky problem of the detailed history of mortality in relation to the health consequences of urbanisation during the industrialising era in Britain. As a result of the work of the Cambridge Group, it is considered that the overall trend in national aggregate mortality patterns is now well-established: $e_0$ rose steadily from 34.27 years to 41.25 across the period 1741-6 to 1811-16 and then levelled-off at 40-41 years for the next half-century until a trend of continuous improvement in the national figure at last resumed after 1870. This picture has been confirmed for health and morbidity by Floud et al's similarly work on trends in children's height attainments, which reports an almost identical pattern of rising heights among successive birth cohorts from the 1750s until the 1810s, but then a temporary deterioration until the birth cohort of the 1860s, when improvement was slowly resumed.

The most obvious way in which to explain these non-linear trends over time would be in terms of economic conditions and living standards. However, there is a strong consensus

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8 J. de Vries, *European urbanisation* (1984), Table 3.7.
among economic historians that overall trends in real wages (reflecting the population's purchasing power for food consumption) show an almost inverse pattern: rough stasis during the eighteenth century until a general all-round rise commenced from the 1810s onwards.\footnote{For all its increasing technology, the real wage side of the standard of living debate still substantially stands where M.W. Flinn's judicious summary left it in 1974: M.W. Flinn, 'Trends in real wages' EcHR XXVII (1974), 395-413. The most recent effective contribution was: C.H. Feinstein, ‘Pessimism perpetuated: Real wages and the standard of living in Britain during and after the Industrial Revolution’ \textit{JEcH} 58 (1998), 625-58.}

Nor can disaggregation of living standards provide an answer to this paradox? It seems clear that there were, indeed, marked and changing regional and sectoral patterns in real wages during this period. At the beginning of the 18th century London stood out as the only high wage region, with labourers' wages approximately twice the levels found elsewhere including for instance Lancashire- as yet still rural. By the beginning of the 19th century, however, Lancashire had almost caught-up the wage-levels prevailing in the capital, which had meanwhile remained roughly constant. It seems probable that this local increase in real wages also applied to other major industrialising regions, such as Staffordshire North and South, West Yorkshire, the North-East, Lanarkshire and South Wales.\footnote{Hunt EW and Botham FW (1987) ‘Wages in Britain during the industrial revolution’ EcHR 40, 380-99.}

Increases in real wages continued throughout the nineteenth century for these regions, now joined by London, too. However, the rural and village-dwelling handicraft workers, many of whom had experienced rising incomes during the 18th century, were large groups of workers whose numbers and real wages declined from the 1830s onwards as the factory system spread to successive branches of the textiles and other industries.\footnote{Spinners in the cotton industry and then handloom weavers were the first to experience this technological redundancy: Bythell D (1969) \textit{The Handloom Weavers}, Cambridge .}

Many agricultural labourers, still the largest occupational category in the workforce in 1851, were also increasingly experiencing economic difficulties throughout the course of the nineteenth century.\footnote{Snell KDM (1985) \textit{Annals of the Labouring Poor: Social Change and Agrarian England, 1660-1900}, Cambridge}

When this disaggregation is matched against what we know of disaggregated mortality and health patterns, this only further confirms the original paradox. As a result of the early labours of William Farr at the General Register Office in compiling comparative life-tables...
for rural Surrey, London and Liverpool—based on the 1841 census and death registration in the years centred on 1841—we know that industrial cities like Liverpool at the centre of the new high-wage regions which had emerged in the course of the previous century were at that time experiencing appalling levels of mortality. Their $e_0$ figure was probably under 30 years according to Farr's calculations (Liverpool's was calculated at 25.7 but there is good reason to suspect that because of relative under-registration of births that this figure should be slightly higher). Rural Surrey, however, despite the much lower wages of farm-workers and the shrinking number of small-scale rural manufacturers, was apparently continuing to experience the 18th-century trajectory of improvement, now recording an $e_0$ of 45 years (also probably subject to small amount of under-registration of births). A further complication in the picture is that London, the most extensive and intensely urban environment of all (and containing much industry of all sizes by 1841), recorded a figure of 37 years, only slightly below the national average. Floud's height evidence also shows greatest shortfalls in height attainments in the first half of the 19th century among children born in towns and cities, although here it is born and bred Londoners who come out most deficient of all. Furthermore, it appears from Floud's evidence that height attainments in industrialising counties were deteriorating from the mid-18th century onwards with a brief respite for the cohorts born between the 1780s and 1810s. Whereas the London and Home counties data shows improvement from a very low baseline of extreme height deficiency in the early 18th century from the 1740s until the 1810s when a downturn then ensued alongside that of the provincial cities. By contrast those born in rural counties exhibited a very gradual improvement in heights throughout the period studied by Floud et al. from the 1740s onwards.

The absence of relationship between real wages and mortality and health patterns is therefore only further confirmed by disaggregation. Indeed, disaggregated patterns confirm the likelihood that mortality and health were determined much more by the chief conceptual alternative, namely certain epidemiological and environmental factors related to urban and

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16 5th ARRG (PP 1843, XXI), pp.33-7.  
17 D.V. Glass, Numbering the people (1973)  
18 R. Floud et al Height, health and history (1990), Figures 5.4 and 5.5.
industrial growth, rather than by trends in incomes or real wages. However, it is also clear from the differences between London and elsewhere in the figures for heights and wages during the 18th century and for life expectancy c.1841 that the relationships involved between urbanisation and health are far from straightforward. The interpretative framework offered by Jan de Vries may be particularly helpful in its suggestion that those many towns involved in the 'new urbanisation' of industrial manufacturing during the late 18th and 19th centuries should be treated as a substantially distinct historical phenomenon, a new development with its own demographic and epidemiological rules. The causes of their health trajectories may have been quite distinct from those governing the course of events in London and also in a substantial number of older, established towns, such as Bath, Canterbury, Salisbury, Oxford, whose growth during the post-1750 period was of a different order – much more gradual and relatively sedate than that of the newer, predominantly industrial centres. It might be important, therefore, to consider that, in terms of health and mortality implications, there was not one 'urbanisation' during the ‘dark age’, c.1750-1850, but at least three quite distinct kinds of urban growth: that of London; that of older, provincial non-industrial towns; and that of newer provincial industrial towns and cities. Furthermore, the implications of these different kinds of urban growth for health are by no means simply reducible to differences in size or density. The three types represent, rather, differences in prior history as well as in rate of growth.

There are, then, various problems in dealing with the health consequences of economic and urban growth in the industrialising period. The fundamental problem is that of specifying in detail how, when and why during this long period urban places and their populations were changed from environments of health enhancement to those of health deterioration? When and how did a growing parish become so 'urban' or so industrial that its inhabitants' health began to suffer.

3. The early modern epidemiological regime

As has been noted, the right kind of evidence on changing mortality and health patterns in most places which became major centres of industry during the critical period of early urban growth from 1740 to 1840 simply does not exist in a useable form. It seems very likely that there will never be a high-quality demographic or epidemiological record available for most of these places during that period. In fast-growing towns the national census is unreliable before 1841 (when household schedules were first used) and given the extent of immigration and non-conformity in many of these towns, the parish registration of vital events by the Anglican Church is no substitute (civil registration was of course introduced in 1837 partly to remedy these defects). Nevertheless some admirable work has been done with the difficult material that is available for the period before the 1837. By comparing together the various findings which have emerged regarding mortality patterns in places experiencing different kinds of urban and demographic growth during the late 18th and early 19th centuries, it is possible to construct the outlines of an historical account of relevance to the interpretative economic framework derivable from De Vries.

Firstly there is the data that has been analysed and presented by the Cambridge Group from its 26 reconstituted parishes. Wrigley et al 1997 classified these parishes into four groups, which broadly correspond to De Vries’ three non-metropolitan categories: firstly a set of rural agricultural parishes; secondly, a set of rural manufacturing parishes; and thirdly a set of market towns and also a set of market towns which had a handicraft sector. To this we can add the detailed and locally contextualised mortality evidence that is available which relates to four further different kinds of place: the highly rural region of North Shropshire including the town of Oswestry; a study of two reconstituted proto-industrial textile parishes in West Yorkshire, Calverly and Sowerby; and two moderate-sized provincial industrial towns: Carlisle, which experienced substantial but not disproportionate population growth during this period, and the important town of Wigan, the only truly industrial provincial town for which relatively adequate data exists.

We should start, however, with London, the lynchpin of the early modern economic system, according to De Vries and also central to early modern epidemiology. Here there have been a number of important studies. Firstly, careful use of the Bills of Mortality by
Laxton and Williams has led to the conclusion that during the first half of the 18th century, when national life expectancy was at its lowest for the whole period covered by Wrigley and Schofield, 1541-1871, the London populace was probably experiencing extraordinarily high infant mortality rates (IMR) of as much as 350-400 per thousand births, which thereafter improved significantly over the ensuing 100 years.\(^\text{20}\) This has been broadly confirmed by John Landers' detailed work on the London Quaker community’s vital registers. Through combined analysis of the age-incidence of deaths over the first months of life along with the seasonality of mortality Landers has shown that London's especially high infant mortality, pre-1750, was principally caused, firstly, by high rates of infectious disease striking down weanlings aged 6-24 months and, secondly, by a summer peak of diarrhoeal water- and foodborne diseases among neonates, suggesting unusually extensive practice of artificial feeding from a relatively early age among London mothers.\(^\text{21}\) He notes that as well as depriving infants of any immunity against infections, artificial feeding exposed infants to repeated bouts of diarrhoea which exacerbated their vulnerability to attack from infectious disease. Landers is therefore prepared to speculate that a change of infant feeding practices in the metropolis may have been an important reason for the relative improvement in metropolitan IMR 1750-1850.\(^\text{22}\) That this is a distinct possibility has recently been confirmed by Lewis’s research on the adoption of breastfeeding among the social elite at this time.\(^\text{23}\) Furthermore, Gill Newton in a meticulous and resourceful comparative study of the inner and outer parishes of Cheapside and Clerkenwell, which ingeniously demonstrates that there had already been one significant change in breast-feeding practices among wealthy Londoners during the late 17th century.


\(^{21}\) J. Landers, 'Age patterns of mortality in London during the 'long 18th century' SHM (1990), 27-60.

\(^{22}\) J. Landers, 'Age patterns of mortality in London during the 'long 18th century' SHM (1990), p.51. Interestingly, this would gain support from the evidence presented by Valerie Fildes on new medical advice promoting breastfeeding from the mid-18th century, such as William Cadogan's dispelling of the prejudice against giving colostrum: V. Fildes, Breasts, bottles and babies (1988).

century, when they ceased to send their infants out to wet-nurse and instead had them nursed or artificially fed within the family home.24

A second reason put forward by Landers for the metropolitan populace's improving health during the second half of the 18th century is probably even more significant, however, and is related to an important general model of infectious disease incidence, derived from the work of W.H. McNeill among others.25 Smallpox has been used by Landers as a marker for infectious disease in general because it was one of the few causes of death accurately identified by contemporaries. Through a highly effective and detailed consideration of the changing incidence of smallpox in the Quaker community, Landers shows that smallpox was a major component of the especially high metropolitan mortality 1700-1749, both at 6-24 months and at all ages up to age 30. Indeed, having once survived the ravages of infectious diseases, life expectancy at age 30 was little worse in the capital than elsewhere. The subsequent fall in London mortality, 1750-99, was almost entirely due to decline in smallpox at ages 6 months-10 years. Furthermore, in both periods virtually all those dying of smallpox above the age of 10 were non-immune adult immigrants (non-London born).26

In order to begin to make sense of these findings for London- it is probable that an extremely important factor was the changing ratio of town-born residents to rural-born immigrants. The century after 1650 not only saw London's rise to pre-eminence as the mercantile capital of a global Empire but also- as the plague outbreak attests- as an international disease entrepot, too. Meanwhile its demographic growth meant that it rose to an historic peak as a proportion of the nation's total. This implied, as Tony Wrigley long ago pointed-out, an historical maximum in the inward flow of non-metropolitan born in-migrants from the provinces and therefore probably a maximum proportion of non-immune young adults and their children living and dying in the capital during this most lethal century of

26 J. Landers, 'Age patterns of mortality in Lodon during the 'long 18th century' SHM (1990), pp.53-4.
proliferating infectious diseases. Through the increasing volume of flows back and forth to their communities of origin, using the improving network of turnpike roads which this era witnessed, it may be that this increasing weight and proportion (within the national population total) of migrants to and from the national capital eventually succeeded in so geographically-spreading the full range of endemic diseases which were in permanent residence in the capital (due to its sufficiently-large population to sustain the existence of infectious disease on an endemic basis) that the effective endemic reservoir came to incorporate the entire national population. In the terminology of the McNeill/Landers model: a weakly-bounded metropolitan epidemiological régime was, by virtue of the increasing velocity of movement of people and goods around the national market with its communications centred on London, fast-becoming a national epidemiological régime during the century after 1650.

As a result of this economic-growth-driven process there was an initial metropolitan upsurge and a subsequent attenuation (though marked by continuing mini-epidemics during the first half of the 18th century) in the severity of infectious diseases as they became endemic on a national scale. The latter phase would have been especially noticeable as an improvement in the London population's death-rates from infectious diseases. This is because the large proportion of the capital's population formed from immigrants who had previously been unexposed to the capital's endemic diseases were now drawn from a hinterland where those diseases were also becoming established endemics of childhood. Therefore the continuing flow of immigrants from the provinces would no longer bring to London an especially vulnerable non-immune group.

In attempting to put the London findings in context and to corroborate his overall interpretation, Landers turned to the contemporaneous findings for the second of the four places mentioned above. R.E. Jones's work on the printed records of 60 or so parish registers from North Shropshire provides the most detailed mortality comparison available for an entire rural district for the 17th and 18th centuries. This shows before 1710 very low rates of infant mortality at 6-12 months in rural Shropshire parishes, a pattern conspicuously not shared by

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27 E.A. Wrigley (1967), 'A simple model of London's importance'.
the only town in this region, Oswestry.28 Before 1710 infant mortality in the rural parishes was
dominated primarily by neonatal winter respiratory disease. But thereafter a new pattern is
visible in the rural parish registers, which became more similar to Oswestry. The principal
new influence was a rising incidence of weanling infectious diseases at 6-12 months, most
probably smallpox and measles.29 Not until the late 18th century was there a subsequent
waning of the impact of these novel infectious diseases, with the result that the winter
respiratory disease pattern re-emerged as the principal influence. In a still-rural North
Shropshire, this then remained the dominant pattern throughout the 19th century, a period
during which, by contrast, summer diarrhoea was increasingly the main infant killer
elsewhere in most of the new urban districts.30 Thus, the view of a metropolitan-based
reservoir of endemic infectious diseases spreading out through the nation's increasingly well-
travelled communications network over the course of the century after 1650 seems to be
borne-out by this evidence from North Shropshire, which also exhibits the predicted
immunologically-derived attenuation in the impact of these diseases by the end of the 18th
century, once they had become endemic on a nationwide basis.

Evidence from the Cambridge Group’s sample of 26 reconstituted parishes also
broadly confirms the McNeill/Landers model. Apart from 3 parishes suffering from the
notorious insalubrity of the fenland marshes (Great Oakley, Willingham and March), it was
the four market towns of Alcester, Banbury, Gainsborough and Lowestoft, those most well-
connected to the metropolis, which had by far the highest mortality rates in the late 17th and
early 18th centuries; but they also experienced among the most substantial improvement
during the second half of the 18th and early 19th centuries. Those many parishes in the samples
remaining agricultural and rural throughout tended to exhibit among the lowest mortality in
the earlier period and to retain this into the 19th century. It was the 3 parishes which acquired
domestic proto-industry and would be characterised as ‘rural-manufacturing’ in De Vries

28 R.E. Jones, 'Further evidence on the decline in infant mortality' Popn Studies (1980), pp.244-5.
typology- Shepshed, Gedling and Birstall- whose populations had moderately low mortality in the late 17th and early 18th centuries but which, had experienced the most severe deterioration in their health by the mid-19th centuries, swapping their relative position with the 4 market towns.\(^{31}\) The reconstitution study of the framework knitting village of Shepshed in Leicestershire has also been at the centre of a detailed and contextualised local study of the parish by David Levine.\(^{32}\) This confirms that it was reduced wages and serious unemployment due to the increasing competition of mechanised production plants elsewhere, which was the principal reason for the high and rising infant and child mortality suffered in Shepshed during the 19th century. Finally, the independent reconstitution studies completed by Hudson and King of the two West Riding parishes of Calverly and Sowerby, have also confirmed a similar Pattern of increased mortality by the first half of the 19th century, compared to a century pervisouly, the first of the 18th century.\(^{33}\)

4. Light in the dark: evidence on changing health in urban manufacturing towns in England c.1750-1850

Although there is no comparable detailed mortality evidence available yet for any of the largest English provincial cities during the period 1740-1840, there is the Heysham data for Carlisle, which can be used to generate age-specific mortality trends for a town which retained its rank position as 45th largest town in England throughout the period 1801-51.\(^{34}\) There is also newly available research on the parish registers of the town of Wigan.

Armstrong's presentation of the Carlisle data shows a marked improvement in mortality during the late 18th century which was attributed at the time to a dramatic fall in smallpox, partly due to vaccination. But this was followed, according to Armstrong, by a significant deterioration in mortality during the period 1815-50, especially among young

\(^{34}\) This data has been analysed and presented in: W.A. Armstrong, 'The trend of mortality in Carlisle between the 1780s and 1840s: a demographic contribution to the standard of living debate' \textit{Ec.H.R.} XXXV,1 (1981), 94-114.
children and those aged over 15. Armstrong attributed this partly to overcrowding and unplanned, insanitary overbuilding in Carlisle (which tripled in population from the 1780s to 1840s) and partly to the income loss and unemployment suffered by handloom weavers as power looms arrived in Carlisle from 1811 onwards. Shepshed's mortality pattern across this period is quite similar to Carlisle's. However, it was not insanitary overbuilding and crowding that was the cause of deterioration in Shepshed’s case but its populace did suffer the unemployment and poverty caused by technological redundancy because factories being established elsewhere were taking Shepshed's work away. Having been a thriving centre of rural industry during the 18th century, this now came to an end.

To this, we can now add the newly available detailed evidence for the town of Wigan. Crompton was able to compare the post-1837 civil registration data for Wigan with an analysis of the data recorded in the parish registers of All Saints, the central parish which served the Anglican population of the Borough of Wigan, comprising approximately 50,000 records of baptisms, burials and marriages record during the period c.1800-36. Wigan was a paradigm industrial town which tripled in size from 10,000 in 1801 to over 30,000 inhabitants by 1851. Unlike many other industrialising towns, there was very little nonconformity in Wigan, whose protestant community was polarised and organised – by their social elite- into zealous Anglican conformity, by the historic presence of the largest Catholic minority in any Lancashire town- and therefore in any town in the country (26.5% of the Wigan population of 4,500 in 1767 were Catholic, compared to 21% in Preston and Warrington, and just 5% in Liverpool). A Tory Masonic elite of cotton magnates and landed coal-owners, led by Lord Lindsey- after whom one of Wigan’s ten Orange Lodges was named- ensured that the dependent workforce was unusually assiduous in their loyalty to the Anglican church. These were the unique sociological conditions which conspired to produce exceptionally well-maintained and comprehensive parish registers at All Saints, despite the

35 D.G. Crompton, “Industrialisation, population change and patterns of disease and mortality in Wigan 1800 – 1850.” (U of Manchester unpublished PhD dissertation 2011), Table 4.1., and pp.262-3, which shows that while the central ‘Borough’ tripled in size, the ‘Parish of Wigan’, which included several outlying townships and churches, also grew substantially but at a slightly slower pace, from 34,500 in 1801 to 77,500 in 1851.

36 Crompton, Table 1.1 (3), p.87; and Fig.2.1, p.130.
town’s rapid industrialising growth.\textsuperscript{37} The pre-1837 parish registers consequently offer a relatively complete record of the demography of the Anglican majority in this working-class town, including considerable, valuable detail on age and cause of death.\textsuperscript{38} Crompton is able to show that in Wigan, as also in Carlisle, the health of the population appeared to improve, overall, during the period 1790-1825, in association with a marked reduction in both the Infant Mortality Rate and deaths at age 1-5, the latter strongly associated with reduced smallpox mortality.\textsuperscript{39} But thereafter health of the town deteriorated significantly down to 1850. In addition to recurrent smallpox epidemics, analysis of patterns of cause and age in infants and children indicates the Wigan population was particularly afflicted by typhus and scarlet fever.\textsuperscript{40} Most significantly a rise in diarrhoeal and post-weaning hygiene deaths was particularly marked, driving a 50% rise in IMR between 1819-24 and 1843-8, from approximately 120 to 180/000.\textsuperscript{41}

Thus, the detailed evidence for these four kinds of place during the period 1750-1850 is extremely interesting in relation to the non-linear national aggregate health and mortality patterns discussed above and also the De Vries approach. The evidence indicates that trends over time for London and for the most rural parts of the country were both primarily reflections of structural changes in the nation's overall epidemiological regime in relation to infectious diseases. There is certainly no reason to believe that these changes did not also affect rural-industrial and urban-industrial communities, too, as they were also, of course part of the changing national epidemiological regime which saw infectious diseases alter their character from an irregular epidemic to an endemic child-focused pattern. However, the evidence available suggests that in these proto-industrial and fully industrialising communities trends in health and mortality across this period were even more strongly influenced by a second set of more purely economic forces, more directly related to the processes of burgeoning industrial growth. Those proto-industrial villages of cottage

\textsuperscript{37} Crompton, ch.1 Part 3, pp. 98-9.
\textsuperscript{38} Crompton, Ch.3, Part 1.
\textsuperscript{39} Crompton, Fig.5.2.
\textsuperscript{40} Crompton, pp.294-301.
\textsuperscript{41} Crompton, Chs.4 and 5, pp. ; and Figure 4.1.
manufacture such as Shepshed, which never subsequently developed into centres of mechanised industry, experienced initial prosperity but subsequent socio-economic dislocation with apparent severe health implications as a result of the technological redundancy which arrived for most of them at some point during the first six or seven decades of the 19th century. Yet paradoxically, the examples of Carlisle and Wigan also indicate that negative health consequences, apparently unrelated to inadequacy or insecurity of incomes, also may have ensued at precisely the same time for the populaces in those industrial communities which continued to expand into towns and cities at the expense of a place like Shepshed. Armstrong's analysis suggests that as a result of the extremely fast urbanisation which accompanied industrial growth- even in a town of only moderate expansion and only partially-industrial like Carlisle- a distinct category of hygiene and sanitation diseases erupted in the first half of the 19th century as a result of the unregulated, overcrowded conditions of habitation in these growing industrial centres.

5. English demography in the ‘dark age’ 1750-1850: the double jeopardy of two epidemiological regimes

The new Wigan evidence, therefore, provides further detailed confirmation of the Carlisle data, showing that during the ‘dark age’ of historical demography, it seems most likely that, under the cover of this darkness, Britain’s demography was undergoing a seismic regime change. An early modern epidemiological regime, which had entered a phase of endemic maturity during the 18th century, resulting in reduction overall in the nation’s mortality levels as the principal killers became childhood infections, was now having superimposed on top of it a newly lethal industrial, urban regime. The former had been dominant for the three centuries before 1800 in the economic landscape analysed by De Vries, where the evolving patterns of disease incidence may be best understood as products of the changing migration-mediated relationship between the commercial entrepot of the Great Wen and its rural and rural-manufacturing economic partners. The principal dynamic in this system was the manner in which the wealth-accumulating capital city was ever increasingly in
communication with a gradually more densely-networked economic and migratory hinterland; and so drawing these peripheries into its own epidemiological orbit and forming a single national-scale endemic disease environment. However, from the beginning of the second quarter of the 19th century a quite different set of economic forces began to manifest their epidemiological influence, both in those places where population was growing most rapidly, the new multiple urban foci of provincial industrialisation mostly located in the north and the midlands, but also in those previously prosperous nodes of rural proto-industry, much of which were scattered around the south and the midlands, which now found themselves left behind by steam-driven mechanisation in the growing factory towns of the coalfields of the north and the midlands.

Having decreased in the 18th century, mortality now increased again in places like Shepshed and Gedling, due to the poverty of redundancy coinciding with a change of ideology in government enforcing the harsh new welfare policy of less eligibility and the workhouse test for the unemployed. Of more demographic significance, mortality also surged in the new, growing centres of mechanised manufacturing taking Gedling and Shepshed’s places, because the same ideology of laissez-faire that preached abandonment of the tenets of the old Poor Law, eschewed also the planning of towns, that had come to characterise the previous era of the ‘urban renaissance’, c.1660-1770. Thus, sudden influxes of workers seeking the new factory employment in places like Wigan or Carlisle resulted in sharp deterioration in the living conditions of proletarian families, as landlords simply maximised their rents by crowding them into the cheapest, least desirable accommodation available. The classic diseases of hygiene and overcrowding all increased dramatically: diarrhoea, typhus, cholera, typhoid, respiratory diseases and tuberculosis. They competed with, overtook and exacerbated the set of endemic childhood infectious diseases bequeathed by the longer-established early modern regime, which also continued to take their toll, such as

smallpox, scarlet fever, diphtheria, measles and whooping cough. This most unfortunate first
generation of urban proletarian populations was thus engulfed in an epidemiological double
jeopardy, subject to the depredations of two distinctively-caused epidemiological regimes at
once. When we exit the ‘dark age’ in the 1840s, and return into the light of fully available
historical demographic data, the Registrar-General’s civil registration system shows all the
country’s larger industrial cities subject to the same desperate conditions, whose emergence
and timing we can document most fully in the case of Wigan’s Anglican populace.

Thus, if we refer back to Jan de Vries typology of three different kinds of early
modern economic sector, the metropolis, the agricultural rural, and the rural manufacturing,
augmented by the new fourth category, which emerges in England 1750-1850, of the urban
manufacturing sector, we can see that the first half of the 19th century may well have been the
period of maximum high mortality, especially infant and childhood mortality, for two of these
four categories of place. The populations in places of declining rural-industry and in places of
burgeoning urban manufacturing each probably suffered a reversal of trend after 1800,
relative to the improvements in health all across the nation that characterised the latter half of
the 18th century. Each of these two kinds of place now endured much enhanced levels of
mortality, stemming from their opposed fortunes in the same historical process of steam-
powered mechanisation of industrial processes. Meanwhile, however, those communities
which remained agricultural and rural and also those many small and medium-sized, long-
established market, spa, administrative and cathedral towns throughout the southern half of
England, provided they did not acquire any significant industrial manufacturing, continued to
experience throughout this period the trajectory of gradually declining mortality that had been
in train since the mid-18th century. Their low population density, if rural, or absence of rapid
growth if no-manufacturing towns, meant that they were largely unaffected by the new
epidemiological regime of overcrowding and sanitation which was sweeping through all those
places where mechanised industry was expanding.

London itself, the fourth of these four ‘augmented’ De Vries categories, was
inevitably a more complex mix. Certainly it was not untouched by industrialisation,
overcrowding and poverty, yet it was so large, so prosperous and such an enormous market
for professional and commercial services, that the health experience of its population was not
dominated by the consequences for the proletarian class of unplanned industrial expansion
and immigration as in most northern and midland cities. While certain extensive parts of
London undoubtedly suffered grievously, notably the unfashionable and crowded districts of
the East End and Southwark and other pockets, such as Notting Dale in Kensington,
the unusually large proportion of middle-class and lower-middle class suburbs, able to
purchase a sufficiently more salubrious domestic environment away from the docks and
sweated workshops, raised the average health experience of London as a whole so that it was
not so far below the national average throughout the nineteenth century.

Thus, the recent historical demographic evidence that has become available during the
last two decades perhaps enables us to shine just enough light into the previous dark age of
England’s urban demography, c.1750-1850, to formulate an empirically-based interpretation
of what was happening during this period of crucial change, in those urban places which were
rapidly superseding the rural as the typical environment of the English population. Historical
demography has established an impressive framework with which to interpret mortality
change during the early modern period 1500-1800, where the McNeill-Landers
epidemiological model can be synthesised with the De Vries economic typology to provide a
convincing general account. This paper has argued that the urban epidemiology of the
nineteenth-century then becomes even more complicated. Added to the patterns of endemic

45 On Notting Dale, see the excellent chapter by A. Mooney and A. Tanner, ‘Infant Mortality,
a spatial problem: Notting Dale Special Area in George Newman’s London’, ch.9 in E.
46 For instance it has been shown that by 1921 42.5% of Londoners lived in the most
salubrious ‘white collar’ local environments in London and none lived in the most unhealthy
‘staple industry’ environments (the balance in London all lived in ‘light industry’
environments). Whereas throughout the 5 major regions of the Midlands and the North
(comprising 5 of the 11 ‘Census Divisions’ into which England and Wales was divided in
1921, London being one of these 11), 30-40% lived in ‘staple industry’ environments and
typically only 5-10% in ‘white collar’ environments: Garrett et al, Changing Family Size in
England and Wales 1891—1911: Place, Class and Demography (Cambridge: Cambridge
University Press, 2001), Table 6.2.1. For explanation of definitions of the ‘environments’ see
ibid., pp.96-9. On the lower middle class in Victorian London, see Crossick, G., (ed), The
lower middle class in Britain 1870-1914 (1977); Crossick, G., An artisan elite in Victorian
childhood diseases prevalent by the late 18th century and continuing throughout much of the nineteenth-century, this period witnessed the rise of a new economic-demographic sector of the population and its associated environment, that of the urban industrial manufacturing provincial town and city. As more evidence becomes available this seems to continue to confirm that the negative impact on the health of the populations migrating to and living in these new environments first became strongly manifest quite precisely at the beginning of the second quarter of the nineteenth-century, with both overall and infant and child mortality trends in these growing towns undergoing an inflection at exactly that point. A trend of previous improvement was now replaced with one of deterioration lasting for at least two further decades, associated both with a stalling of the prior long-term improvements seen in infectious diseases such as smallpox, and a massive increase in a range of hygiene, sanitation, overcrowding and poverty diseases.

That we know this happened in towns as diverse in their history and size as Carlisle, Glasgow and now Wigan indicates that Graunt’s proposition and Farr’s subsequent attempt to define it mathematically as a law, do not provide the most helpful way to approach the demography of urban health in England across the two centuries that encompass the period between the work of these two men from the 1660s to the 1870s. Changes in urban health during this period were not primarily a function of size and density of urban agglomerations, though this was certainly a predisposing condition. They were more precisely the outcome of a complex amalgam of two superimposed economic-epidemiological regimes. The first was of long standing and subject to a pattern of evolution from epidemic to endemic incidence, determined by the interaction between the biology of infectious diseases and changing patterns of communication generated by the commercial expansion of the economy. The second was of more recent provenance and was due principally to a new policy, relative to the 18th-century fashion for urban planning and renaissance, of laissez-faire, unplanned urban expansion, permitting the market forces of supply and demand to determine how many workers and their families were crowded into the cheapest accommodation that could be provided for them in the new centres of mechanised mass production growing in those parts of the country accessible to the new energy source from Britain’s coalfields.