

RESEARCH IN PROGRESS

MEDICAL OFFICERS OF HEALTH AND INFANT MORTALITY: THE CASE OF KINGSTON-UPON-THAMES IN THE LATE NINETEENTH AND EARLY TWENTIETH CENTURIES

Dr. Christopher French and Juliet Warren

Centre for Local History Studies
Kingston University

Introduction

Recent research has greatly increased our understanding of the geography, the extent and the causes of infant mortality in England and Wales since 1850. This research has focused in particular on the timing of the beginning of the decline in infant mortality, on urban/rural differentials, and on the complex of causes of infant mortality. As a result the traditional picture, that not only did the level of infant mortality fail to fall in the last decades of the nineteenth century but it actually increased during the late eighteen-nineties before beginning its long run decline in the first decade of the twentieth century, has been significantly qualified. For many geographical areas, the beginning of the decline is now located in the later decades of the nineteenth century, the increase in the 1890s was a short term interruption to a longer run trend caused by adverse climatic conditions, whilst national levels of infant mortality were disproportionately influenced by the levels of infant mortality in London and the 'great cities'.¹

The causes of high levels of infant mortality—and the reasons for any subsequent decline—have also been subjected to close scrutiny and debate, with various authors arguing that high levels of infant mortality were the result of geographical, environmental, housing, family, dietary or medical factors.²

Much of this research is based on aggregate data covering registration sub-districts, districts, counties and divisions or individual towns/groups of towns. However, it is becoming increasingly recognised that to test these research findings, it is now necessary to go beyond the aggregate studies on which they are largely based and to analyse individual localities and communities in depth to see to what extent they suffered from infant mortality and why. Indeed, as Williams and Galley have argued:

from the broad spectrum of factors affecting the life chances of infants, many cannot be quantified, and there is often an unwillingness to move beyond the security of hard statistics, graphs, and tables in search of qualitative, often patchy, and invariably local material.³

This can only be done, however, if suitable local evidence is available to provide the necessary details for micro-level studies and to overcome the problem that 'data limitations usually prevent such analyses from focusing on individuals.'⁴ Local authority burial records are one such source, especially when the information they contain can be enriched with further information from other sources via record linkage.⁵ A second place to look is in the Medical Officer of Health (MOH) *Reports*, which cover all towns and cities from at least the eighteen-seventies onwards.⁶

Both of these sources—the municipal burial records and MOH *Reports*—have been extensively researched as part of the Kingston Local History Project.⁷ One of the areas being investigated as part of the project concerns the extent and causes of infant mortality in the Kingston area between 1855 and 1911.⁸ The aim of this ongoing local research is to help test conclusions reached by studies based on the established aggregate national sources, and to highlight local variations in the incidence and causes of infant mortality. To underpin the research, a database has been created containing all 29,551 entries in the municipal cemetery burial registers at Bonner Hill between 1855 (the year the cemetery opened) and 1911. Information provided for each burial includes name, age, date of death, date of burial and, after 1872, address. This burial database has also been linked to the Kingston census returns for 1861 to 1891.⁹ The burial database and the linked data are now being used to analyse the changing profile of mortality in general and infant mortality in particular in the Kingston area over time and to draw out some of the geographical, environmental and personal circumstances which may have influenced that profile. For example, research results already reported show that over the study period all age groups between 5 and 49 experienced a relative decline in level of burials, whereas the reverse was the case for those aged 50 or more. This profile would seem to indicate that Kingston experienced a number of improvements in housing, public health and diet which not only reduced the threat of death among the 5–49 year-olds, but also ensured that more Kingstonians survived into old age.

Infant burials, on the other hand, showed a relative increase in the last four decades of the nineteenth century. In the 1860s infants under the age of one made up 17.4 per cent of total burials, increasing to 20.8 per cent in the 1870s, 23.5 per cent in the 1880s and 23.9 per cent in the 1890s before declining to 19.9 per cent in the 1900s. Over three-quarters of these infant deaths occurred during the first six months after birth and were particularly high during the hot summer months of August and September. Additionally, throughout the whole study period, infant mortality was concentrated not only in specific geographical areas of the town—in particular the two areas highlighted in

Figure 1—but also in households of low socio-economic status. For example, the research has shown that of 287 infants who died before reaching the age of five and who could also be identified in the Kingston census returns, 89 per cent had fathers whose occupation placed them in social classes III, IV and V. In the 1891 census, however, only 72 per cent of all male heads of household followed occupations associated with these three classes.¹⁰

The next stage in the research is to illuminate this general picture of infant mortality in Kingston between 1850 and 1911 with a number of micro-studies which are now seen as necessary in sharpening our understanding of local populations and local communities.¹¹ To take the research further, therefore, as well as this paper detailing the 44 diarrhoea deaths recorded in August and September 1899, two other micro-studies of infant mortality in Kingston in the late nineteenth and early twentieth centuries are being undertaken. These studies, building on the illustrative material presented here, will provide two wider ranging analyses of infant mortality in the Canbury area of Kingston and in Asylum Road—both notorious as slum areas. They will concentrate research on, for example, specific areas, streets, houses, socio-economic groups and even families over discrete periods of time.

In-depth studies such as these need to draw on the second important source noted above and that is the Medical Officer of Health (MOH) *Reports*. One of the preoccupations of the MOHs was infant mortality, and this paper considers how the MOH for Kingston, H. Beale Collins, reported on infant mortality during the late-nineteenth century.¹² Special attention is given in this paper to an important document (which is, quoting Williams and Galley again, 'qualitative', 'patchy' and 'local') produced for the 1899 *Report* which highlights the many factors influencing infant mortality in one particular community at a particular point of time.¹³

Despite its development into a relatively prosperous suburban town in the late nineteenth century, Kingston still suffered from high levels of infant mortality, particularly in the eighteen-nineties. The MOH continually referred to this state of affairs, even comparing Kingston's infant mortality rate in 1895 of 162.4 per 1,000 registered births with that of some of the worst inner-London slums.¹⁴ By 1899 the rate had dropped to 139.9 with 137 infants dying before reaching their first birthday compared to 155 in 1895.¹⁵ Nonetheless, the 1899 rate was still worryingly high and of particular concern to the MOH was the fact that 55 of the infants had died from infant diarrhoea, 44 during the months of August and September alone.¹⁶ To highlight this situation, Beale Collins produced a table giving details of each of the 44 'summer' diarrhoea deaths recorded. Names of the infants who died are not given, but these can often be ascertained by cross-checking details which are given with those in the municipal burial registers which do provide names. Analysis of the material provided on these 44 individuals helps to shed light on the location and possible causes of infant mortality which are more difficult to identify from the aggregate data normally used in studies of infant mortality.

The following information was provided by the MOH on each infant death:

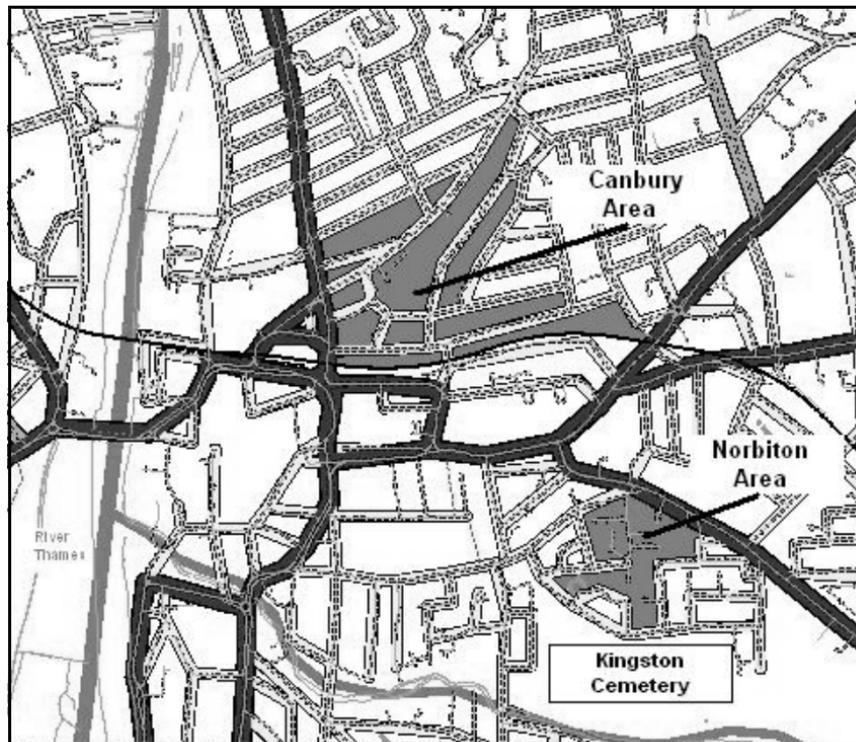
- a) District
- b) Road or street¹⁷
- c) Occupation of parents
- d) Disease as stated to Registrar
- e) Age
- f) Duration of illness
- g) Other cases of diarrhoea
- h) Other cases of illness
- i) Characteristics of street
- j) Style of house
- k) Concrete over basement
- l) Pavement in yard
- m) Sanitary conditions
- n) Dust collection
- o) Soil
- p) Feeding
- q) Milk supply
- r) Arrangements for storage of milk etc
- s) Occupation of house, tenement, lodger etc

a) and b) provide details on the geographical location of infant diarrhoea; d) e) and f) detail certain characteristics of the ailment; whilst a number of inter-linked factors influencing the incidence of infant diarrhoea such as personal and family circumstances, housing and sanitary conditions, and dietary factors can be analysed from the rest of the information provided.

Geographical location

Infant deaths from diarrhoea in August and September 1899 were concentrated in just a few roads in two areas of Kingston. Out of 44 such deaths, the Canbury area of the town north of the railway line experienced 22, and an area south of the railway line concentrated between the London Road and the local cemetery experienced 14 deaths. The eight remaining deaths occurred in other parts of the town. The two main areas—highlighted in Figure 1—contained some of Kingston's worst slum roads, including Canbury Park Road (six deaths), Vincent Road (three deaths), Cross Road (three deaths), Asylum Road (two deaths), and Hudson Road (two deaths). The Canbury district was adjacent to the course of the old Latchmere Brook which, as a source of drinking water for the area, the MOH continually referred to as a major health hazard. For example, in his very first *Report* for 1893, he stated that '...we find

Figure 1 Areas of high infant mortality in Kingston-upon-Thames in the 1890s.



Source: Ordnance Survey Map of Kingston upon Thames 1914.

in the Canbury district the remains of a stream called the Latchmere Brook... Here again there are more wells for supplying drinking water. In this latter district there has been a number of cases of Diphtheria.¹⁸ The same *Report*, when discussing infant deaths from summer diarrhoea, emphasised that these 'deaths mostly occurred during the hot weather in the same neighbourhood as the Diphtheria cases, viz., near the Hogg's Mill Stream and the old Latchmere Brook.'¹⁹

When considering the geographical concentration of infant mortality, it is also necessary to try to determine the number of infants who were 'at risk' in the areas/roads highlighted. Although the main intention of this paper is to consider the *level* and *location* of infant mortality in the summer of 1899, future research will also try to estimate the *rate* of infant mortality. This will be done by using the Kingston baptism registers to estimate the size of the at risk infant population by geographical location and by social class of parents; and by tracing infants through the baptism registers into the burial registers. The MOH, himself, recognised the importance of accounting for the number of infants at risk. All of

the roads mentioned in this paper were picked out by the MOH as being particularly prone to high levels of infant mortality, *but* he also maintained that 'I only cite the roads where the figures were high for the numbers living in the roads.'²⁰ Such a statement, however, deserves further consideration since preliminary research indicates that the number of baptisms per house in 1898 and 1899 was indeed higher in the 'slum' roads than in the more salubrious areas of Kingston. In other words, higher fertility in the roads being analysed here meant that there were higher *numbers* of children at risk of death. In the 1890s 243 children from Canbury Park Road were baptised and 27 (11 per cent) of these children were found in the burial records as having died before reaching their first birthday. The situation in Asylum Road was even worse since of the 71 children baptised between 1893 and 1901, 22 (31 per cent) could also be located in the burial records less than a year after their birth. For the much more salubrious Kingston Hill, however, the figures were 58 baptisms and 3 (5 per cent) infant burials. Further research along the lines discussed here will help to clarify not only the relative levels of infant mortality in specified areas of Kingston but also the rates of infant mortality in these areas.

Characteristics of infant diarrhoea

The first characteristic of infant diarrhoea which can be considered from Beale Collins' 1899 document is how the disease was reported to the Registrar. Disease reporting was a particularly haphazard affair in the nineteenth century, but since diarrhoea was a symptom and not a disease it was easily recognisable and cause of death was recorded either as a diarrhoeal disease or as a disease of the digestive organs.²¹ Of the 44 recorded diarrhoea deaths, 29 listed diarrhoea (often qualified by such terms as 'acute', 'infantile', and 'vomiting') as the primary cause of death, whilst in the remaining 15 cases it was given in a secondary category, while 'gastro-enteritis' or 'acute entero-colitis' was recorded as the main cause of death. The justification for including deaths from enteritis was set out by the MOH for Croydon when he claimed that although

the term 'enteritis' probably includes a certain number of deaths that differ in their antecedents from the acute form of diarrhoea which is variously known as 'summer diarrhoea,' 'zymotic enteritis,' or 'epidemic diarrhoea.' Yet there can be no doubt that the majority of cases of 'enteritis' differ neither in causation nor in symptoms from the other group. Both 'diarrhoea' and 'enteritis' are summer diseases.....²²

However recorded, once contracted, infant diarrhoea was swift in its deadly impact. One infant survived for 21 days, but this was unusual since 33 of the infants who died from infant diarrhoea did so within a week of contracting the ailment. The remainder died within the second week.²³

The third characteristic of infant diarrhoea which can be assessed concerns the age at which the infants died. In fact, the distribution of mortality is fairly even across the age range, with 11 infants dying in the first three months of their lives, another 11 dying in months four, five and six, 8 infants dying in months

seven, eight and nine, 10 infants in months 10, 11 and 12, and, finally, four children died after 12 months of their short lives. The relative importance of diarrhoea as a cause of infant mortality may well have varied between these different age ranges and further research into the material produced by the MOH on causes of death among the infant population, in the 1890s in particular, will aim to explore this possibility in more detail. Nonetheless, the conditions which helped to bring about this high level of diarrhoea-induced infant mortality in the summer of 1899 were a mixture of interlinked environmental, housing, personal, and dietary factors. Although each factor may have had its greatest impact on infant mortality at different times in these infants' brief life-cycles, when they coincided their overall impact was lethal, especially during a hot, dry summer.

The MOH did not deal with climatic conditions in the 1899 *Report* being discussed here, but he did provide comparative information on the weather in subsequent reports. In fact, August 1899 was the driest August for the period 1899 to 1913 with only 0.74 inches of rain and only six days in the month experiencing rain. In 1903, in contrast, rain fell on 19 days of the month to give a total of 4.09 inches of rain.²⁴ These climatic conditions help to explain why there was only one death from infant diarrhoea in August 1903 since, as the MOH reported, in conditions where rainfall is plentiful and evenly distributed throughout the month 'the streets were not dusty, the surfaces of yards and gardens were well washed, and the sewers were well flushed.'²⁵ In 1899, when these conditions did not apply, there were 44 deaths in August and September from infant diarrhoea. Overall, in fact, Beale Collins argued that infant diarrhoea 'depends largely upon climatic conditions but its malignity is greater under conditions which I venture to suggest can be ameliorated without great trouble or expense.'²⁶ These conditions need to be examined.

Influences on infant diarrhoea in Kingston in 1899

The factors which influenced the high level of mortality from summer diarrhoea outlined above will be considered under three broad headings: personal circumstances; housing and sanitary conditions; and dietary factors. Personal circumstances (including income, affordable rent and food, and time to provide adequate child care support) largely derived from the occupation followed by one or both parents. The parents of the 44 infants who died in August/September 1899 on the whole followed unskilled occupations of low status and low income or skilled/semi-skilled manual occupations. Of the 40 fathers' occupations provided by the MOH, 17 were labourers, costermongers, vendors or carmen; 15 followed more skilled/semi-skilled occupations such as tailor, painter, plumber or gas fitter; while the remaining eight had slightly higher status occupations including commercial traveller, commission agent or antique dealer. In the three cases where the father was absent, the mothers worked as a laundress, a general servant and a housemaid. Sixteen of the other mothers also worked, mainly in occupations such as laundress, charwoman and lodging house keeper or simply as 'occasional workers'. The parents of one child could not be traced, so no occupation and very few other details are

provided in this case. The high number of working mothers was of concern to Beale Collins. Clearly not understanding the economic reality of many working class households he argued that children could be far better looked after 'if the mother was not anxious to go out and earn money, or amuse herself.'²⁷ The occupational profile of the parents of these 44 infants clearly confirms earlier research findings (see above) that not only was infant diarrhoea geographically concentrated in Kingston in the summer of 1899, it was also concentrated among the lower social groups following low status occupations.

Systematic analysis of the housing and environmental conditions in which these 44 infants lived is more problematic given the rather subjective classifications used by the MOH when describing characteristics of the streets and general sanitary conditions, including 'fair', 'indifferent' and 'good'. Although infant deaths from diarrhoea occurred within a range of street, housing and sanitary conditions—as described by the MOH—a general picture does emerge, however, of small cottages in predominantly working class areas/streets, suffering from indifferent sanitary conditions. Only one of the streets—Cavendish Street—is characterised as 'middle class', with typical descriptions of the rest being 'bad' (Asylum Road), 'poor class' (Canbury Villas), 'varies' (e.g. Hudson Road and Kings Road), or 'working class' (e.g. Elm Road and Canbury Park Road). Styles of house were largely given as 'cottage' with qualifications including 'small', 'semi-detached', 'very old', 'not clean', 'badly built', 'small and old' and 'old-fashioned'. Only two of the cottages were characterised as 'good' and 'small but good condition'.

H. Beale Collins was also a keen advocate of concreting over basements and the paving of back yards of all working class housing. In his very first *Report* he set out his creed as follows:

In all new houses concrete over the basement is obligatory, and rightly so, when it is considered that the heat of the house (more especially in cold, wet, or frosty weather, when the ground is sealed), tends to draw the air that is always present in the interstices of the soil, into the house, unless it is covered over with impermeable material.

....

The paving of back yards in all houses of this class is most necessary for the health and well being of the occupiers, and every effort is being made to get the improvements carried out.²⁸

Out of the 44 houses in which infants considered in the 1899 *Report* lived, however, only three had a fully paved back yard and only 12 had concrete over the basement. Of the other houses, 24 did not have concrete over the basement and 19 did not have a paved back yard; 18 had a partly paved back yard, whilst the situation with the remaining houses is not given. Research currently underway into the housing stock available to the working classes—especially in the Canbury and Norbiton areas—in the late nineteenth and early twentieth centuries will not only allow the relationship between housing conditions and

infant mortality to be explored in more detail, but also indicate how successful Beale Collins was in putting his housing principles into practice.²⁹

Finally, regarding general sanitary conditions there were—as has been indicated—a range of descriptions, including ‘good’ (7), ‘fair’ (17), and ‘indifferent’ (16). Not a great deal can be read into these very broad descriptions, but the evidence reinforces the overall picture that at the individual level those infants who suffered death from summer diarrhoea, had parents in low status occupations, lived in a predominantly working class street, consisting of small cottages and enduring indifferent sanitary conditions.

The factor that caused the Kingston MOH the most concern when he considered the question of infant mortality, was the lack of breast feeding on the part of many mothers and the quality of artificial foods and cow’s milk used as alternatives. More recently Atkins has argued that ‘the switch to a greater consumption of “fresh” cow’s milk and condensed milk at the end of the nineteenth century meant a greater convenience for working women, but their offspring may have suffered.’³⁰ Such concern was typical of many medical and child care writers at the end of the nineteenth century, summed up, dramatically by Beale Collins when he wrote ‘mothers who shirk breast feeding, either for convenience or pecuniary benefit, are guilty of cruelty to their babies.’³¹ In his survey of infant mortality in the summer of 1899, therefore, the MOH included details on infant feeding, milk supply and arrangements for keeping milk.³² Of the 44 infants who died of infant diarrhoea, only two had been entirely breast fed; eight had experienced ‘breast and artificial’ or ‘breast partly’ feeding; while the remainder (where known) were subjected to artificial food only, sometimes with the food names such as ‘Allenbury’, ‘Mellin’s’ and ‘Ridge’s’ food given. Milk supply was often ‘condensed’ or ‘Nestles’ (14 cases) or provided by a number of named Kingston suppliers. Unfortunately, not all of the suppliers’ milk was produced locally since, as the MOH reported:

The milk supply of this town is largely from Hants and Dorset, and in neither of these counties is the sanitary administration very highly regarded. Even those cow-keepers who have their own cows purchase ‘railway milk’ in addition, only purveying the milk of their own cows to particular customers who, of course, are not found amongst the poor, who purchase small quantities at a time.³³

Nor was locally produced milk above suspicion. Three of the named suppliers in the 1890s were ‘Tilley’, ‘Morley’ and ‘Castledine’ who can be traced in the census returns for 1891 as running their milk supply businesses from three of the worst roads in Kingston—Washington Road, Acre Road and Canbury Park Road. Between December 1895 and December 1897, for example, the Borough Sanitary and Drainage Committee frequently resolved that ‘notice be served upon Mr. Tilley for the immediate compliance with the cowshed regulations in regard to his cowsheds in Washington Road, and that in default proceedings

be instituted against him.³⁴ Although Tilley had finally complied with this notice by April 1898, the general state of Kingston's dairies and cowsheds was still a cause of major concern. According to Beale Collins, although these were inspected regularly, he regretted that '...little has been done to bring them up to modern standards. With such a delicate article of consumption such as milk, dairymen ought to endeavour to do something more than comply with the very moderate requirements of the law.'³⁵ In addition, of course, the proximity of animals such as cows to living quarters was an additional health hazard especially during hot weather when, as Morgan has shown in the case of horses in Preston, animals—and animal excreta—attract flies and flies spread disease.³⁶

Even if milk reached a house in good condition, it could swiftly deteriorate—especially in hot summer weather. Cool, dry larders were needed in which to keep the milk, but of the houses experiencing an infant death in the summer of 1899, only ten were recorded as having a larder, and only eight of these were described as suitable for the storage of milk.³⁷

Conclusion

Kingston suffered from relatively high levels of infant mortality throughout the 1890s and infant diarrhoea was a major cause of these high levels, accounting for the following numbers of infant deaths: 28 in 1893; 8 in 1894; 20 in 1895; 18 in 1896; 28 in 1897; 32 in 1898 and a peak of 55 in 1899.³⁸ Infant diarrhoea was particularly virulent during August and September of the peak year when 44 infants succumbed to this ailment. In turn, the hot dry weather appears to have been the catalyst for the high incidence of infant death from summer diarrhoea during these two months. The influences which ensured that the potential threat of hot, dry weather was turned into a very real threat were numerous and they cannot be measured by precise statistical models, except at the aggregate level. But systematic analysis of infant mortality at the micro level—as discussed, for example, in the MOH Reports—indicates that levels of infant mortality were conditioned by a mixture of inter-linked environmental, housing, family, dietary and child-care factors. Individually such factors could have an adverse impact on infant survival rates, but in combination they proved particularly deadly for many infants during the first year of their lives.

NOTES

1. See, for example, N. Williams and G. Mooney, 'Infant mortality in an "Age of Great Cities": London and the English provincial cities compared, c. 1840–1910', *Continuity and Change*, 9 (1994), 185–212; N. Williams and C. Galley, 'Urban-rural differentials in infant mortality in Victorian England', *Population Studies*, 49 (1995), 401–20; R. Woods and N. Shelton, *An Atlas of Victorian Mortality* (Liverpool, 1997), chapter 5. For comprehensive bibliographies covering infant mortality in the late nineteenth and early twentieth centuries see those in J. Vogeles, *Urban Mortality Change in England and Germany, 1870–1913* (Liverpool, 1998); and R. Woods, *The Demography of Victorian England and Wales* (Cambridge, 2000).
2. For example in B. Thompson, 'Infant mortality in nineteenth-century Bradford', in R. Woods and J. Woodward (eds), *Urban Disease and Mortality in Nineteenth-Century England* (London, 1984), 120–47; P.A. Watterson, 'Infant mortality by father's occupation from the 1911 census of England

- and Wales', *Demography*, 25 (1988), 289–306; P.J. Atkins, 'White poison? The social consequences of milk consumption, 1850–1930', *Social History of Medicine*, 5 (1992), 207–27; R. Millward and F. Bell, 'Infant mortality in Victorian Britain: the mother as medium', *Economic History Review*, 54 (2001), 699–733; and N. Morgan, 'Infant mortality, flies and horses in later-nineteenth-century towns: a case study of Preston', *Continuity and Change*, 17 (2002), 97–132.
3. Williams and Galley, 'Urban-rural differentials', 416–7.
 4. Millward and Bell, 'Infant mortality in Victorian Britain', 700. The Civil Registers containing details of all individual deaths in the country would provide such local material, but since these are not available for historical research the historian needs to look elsewhere for suitable sources. On the need for studies of infant mortality to move from the aggregate to the individual level see also P. Laxton and N. Williams, 'Urbanization and infant mortality in England: a long term perspective and review', in M.C. Nelson and J. Rogers (eds), *Urbanisation and the Epidemiologic Transition* (Uppsala, 1989), 109; and A.Reid, 'Infant feeding and post-neonatal mortality in Derbyshire, England, in the early twentieth century', *Population Studies*, 56 (2002), especially 151–2.
 5. For studies making use of local authority burial registers and record linkage see N. Williams, 'Death in its season: class, environment and the mortality of infants in nineteenth-century Sheffield', *Social History of Medicine*, 5 (1992), 71–94; and C. French, 'Death in Kingston upon Thames: analysis of the Bonner Hill Cemetery burial records, 1855–1911', *Archives*, 28 (2003), 36–47.
 6. For the growing contribution made by Medical Officers of Health to general improvements in public health after 1850 see A. Wohl, 'Unfit for human habitation', in H.J. Dyos and M. Wolff (eds), *The Victorian City: Images and Realities, Vol II* (London, 1973), 603–24; and A. Hardy, 'Public health and the expert: the London Medical Officers of Health, 1856–1900', in R. MacLeod, *Government and Expertise; Specialists, Administrators and Professionals, 1860–1919* (Cambridge, 1988), 128–42.
 7. For details on the work of the Kingston Local History Project see P. Tilley and C. French, "'From local history towards total history': recreating local communities in the 19th century', *Family and Community History*, 4 (2001), 139–49; and P. Tilley, 'Creating life histories and family trees from nineteenth-century census records, parish registers and other sources', *Local Population Studies*, 68 (2002), 63–81.
 8. See French, 'Death in Kingston upon Thames', especially 39–46.
 9. For details of the method of record linkage used by the Kingston project see P. Tilley and C. French, 'Record linkage for nineteenth-century census returns. Automatic or computer aided?', *History and Computing*, 9 (1997), 122–33; and Tilley, 'Creating life histories', 70–77.
 10. All of the research findings reported here are discussed further in French, 'Death in Kingston upon Thames', 36–47.
 11. See, for example, M. Drake, 'Infant mortality: some family and community approaches', *Family and Community History*, 6 (2003), 107–12 and the symposium on infant mortality in the same volume.
 12. But see C. Galley in this volume for a discussion of the sometimes patchy treatment of infant mortality as a subject in the Medical Officers of Health Reports.
 13. Table attached to page 11 of the *Annual Report of the Medical Officer of Health for 1899*, the North Kingston Local History Room, (S1 (614) KIN) (hereafter *Annual Report MOH*). It is the details from this table which are analysed in the text of this paper. Henry Beale Collins (MRCS Eng. and LSA, 1873, Kings College) was a retired surgeon from the Royal Navy and formerly an Assistant Instructor in Naval Hygiene at Gosport in Hampshire. In 1891 he was Resident Medical Officer at St. George's Hanover Square Provident Dispensary, and Public Vaccinator for the Mayfair District. He published articles in the British Medical Journal on such subjects as influenza, rashes and eruptions in relation to the spread of infectious diseases, and the prevention of diphtheria. I am grateful to Pamela Reading, a research student attached to the Centre for Local History Studies at Kingston University, for providing me with this information from *Black's Medical Directory* for 1891.
 14. *Annual Report MOH 1895*, 16.
 15. The 1899 figures are from the table attached to the front of the *Annual Report MOH 1899*.

16. Throughout this paper, all of the deaths discussed will be covered by the term 'infant mortality' although 4 of them occurred after the child had passed his/her first birthday. These are included since they were detailed in the 1899 MOH document being analysed in this paper, and to exclude them would reduce an already rather small number of cases. In addition, the date attached to each of the MOH's Reports refers to the year covered although the actual report appeared in the early months of the following year.
17. Although only the initial of each road is given, because the general area is also given in some detail, it is not too difficult to identify each road by name. Roads can also be identified by linking material in this document (e.g. age at death and father's occupation) with the local authority burial registers to identify individual infants and their place of abode.
18. *Annual Report MOH 1893*, 4.
19. *Annual Report MOH 1893*, 12.
20. *Annual Report MOH 1895*, 16.
21. This distinction is discussed in A. Hardy, "'Death is the cure of all diseases": using the General Register Office Cause of Death statistics for 1837-1920', *Social History of Medicine*, 7 (1994), 486. See also N. Williams, 'The reporting and classification of causes of death in mid-nineteenth century England', *Historical Methods*, 29 (1996), 65.
22. H. Meredith Richards, 'The factors which determine the local incidence of fatal infantile diarrhoea', *Journal of Hygiene*, 3 (1903), 328.
23. These figures assume that those 10 infants who are recorded as having died within 'a few days' did in fact die within a week of the symptoms appearing. The duration of the illness is not given in 2 out of the 44 cases.
24. *Annual Report MOH 1905*, 18.
25. *Annual Report MOH 1904*, 16.
26. *Annual Report MOH 1904*, 14.
27. *Annual Report MOH 1904*, 16. This view was typical of many Medical Officers of Health at this time as shown in C. Dyehouse, 'Working-class mothers and infant mortality in England, 1895-1914', *Journal of Social History*, 12 (1978), 248-67.
28. *Annual Report MOH 1893*, 5.
29. For some of the details of this research see C. French, 'Infant mortality in Asylum Road, Kingston upon Thames, 1872-1911: an exercise in micro-history', *Family and Community History* (forthcoming).
30. Atkins, 'White poison?', 221.
31. *Annual Report MOH 1902*, 11.
32. An additional aspect of infant feeding, especially for older infants and one highlighted by Millward and Bell (but not dealt with in this paper) is that 'claims on household food were higher in direct proportion to family size. This may have been especially important in months seven to 12 as the child was weaned on to solid foods...'. See Millward and Bell, 'Infant mortality in Victorian Britain', 710.
33. *Annual Report MOH 1898*, 6.
34. *Sanitary and Drainage Committee Minute Book, 1889-1897*, N.K.L.H.R., (KB5/6/1), 27.
35. *Annual Report MOH 1897*, 15.
36. Morgan, 'Infant mortality, flies and horses', 97-132.
37. *Annual Report MOH 1899*, 11. For a comprehensive study of the impact of milk on ill-health between 1850 and 1930 see Atkins, 'White poison?', 207-27.
38. These figures are all taken from the *MOH Reports* for the relevant years.