

Medical officers of health and infant mortality: the
case of Kingston upon Thames in the late
nineteenth and early twentieth centuries

Christopher French and Juliet Warren

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 eightennineties 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: "(f)rom 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 "(d)ata 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 covering all towns and cities from at least the eighteen-seventies onwards.⁶ One of the pre-occupations of the Medical Officers of Health was infant mortality, and this paper considers how the Medical Officer of Health for Kingston - H.Beale Collins - reported on infant mortality during the late nineteenth century. Special attention is given to an important document (which is '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.⁷

Despite its development into a relative 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.⁸ By 1899 the rate had dropped to 139.9 with 137

infants dying before reaching their first birthday compared to 155 in 1895.⁹ Nonetheless, this rate was still worryingly high and of particular concern to the MOH was the fact that forty-four of these infants had died from infant diarrhoea during the months of August and September.¹⁰ To highlight this situation, Collins produced a table giving details of each of the forty-four 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 forty-four 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 street¹¹
- 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 the summer of 1899 were concentrated in just a few roads in two areas of Kingston - the Canbury area of the town north of the railway line which experienced twenty-two deaths, and an area south of the railway line concentrated between the London Road and the local cemetery which experienced fourteen deaths. Both areas 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 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."¹² 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."¹³

Characteristics of Infant Diarrhoea

The first characteristic of infant diarrhoea which can be considered from this 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 as such and recorded either as a diarrhoeal disease or a disease of the digestive organs.¹⁴ Of the forty-four recorded deaths, twenty-nine listed diarrhoea (often qualified by such terms as 'acute', 'infantile', and 'vomiting') as a diarrhoeal cause of death, whilst the remaining fifteen came into the second category, recording, for example, 'gastro-enteritis' and 'acute entero-colitis' as the cause of death. The justification for including deaths from enteritis was set out by the Medical Officer of Health 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....."¹⁵

However recorded, once contracted, infant diarrhoea was swift in its deadly impact. One infant survived for twenty-one days, but this was unusual since thirty-three of the infants who died from infant diarrhoea did so within a week of contracting the ailment. The remainder died within the second week.¹⁶

Table 1 Age Distribution of Infant Deaths From Diarrhoea in Kingston in August & September 1899

Age	Number	Age	Number
Less than 1 month	6	7 to 9 months	6
1 to 3 months	8	10 to 12 months	9
4 to 6 months	11	12 months +	4

Source: MOH Report for Kingston, 1899, Table attached to p.11.

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 - as shown in Table 1. The conditions which helped to bring about this high level of 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 document 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 nineteen days of the month to give a total of 4.09 inches of rain.¹⁷ 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 "(t)he streets were not dusty, the surfaces of yards and gardens were well washed, and the sewers were well flushed."¹⁸ In 1899, when these conditions did not apply, there were forty-four deaths in August and September from infant diarrhoea. Overall, in fact, 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."¹⁹ 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 dealing with 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 forty-four 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 forty fathers' occupations provided by the MOH, seventeen were labourers, costermongers, vendors or carmen; fifteen followed more skilled/semi-skilled occupations such as tailor, painter, plumber or gas fitter; whilst 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.²⁰ Sixteen of the other mothers also worked, mainly in occupations such as laundress, charwoman and lodging house keeper or simply as 'occasional workers'. This number of working mothers was of concern to Collins. Clearly not understanding the economic reality of many working class households, and from a highly partial point of view, 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."²¹ The occupational profile of the parents of these forty-four infants clearly confirms 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 forty-four 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 and 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.”

and

“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.”²²

Of the forty-four houses reported on in the 1899 Report, however, only three had a fully paved back yard and only twelve had concrete over the basement:

	<u>Yes</u>	<u>No</u>	<u>Unknown</u>	<u>Partly</u>
Concrete Over Basement	12	24	8	
Paved Back Yard	3	19	4	18

Finally, regarding general sanitary conditions there were - as has been indicated - a range of descriptions, including ‘good’ (seven), ‘fair’ (seventeen), and ‘indifferent’ (sixteen). Not a great deal can be read into these very broad descriptions of sanitary conditions, but the evidence reinforces the overall picture that at the individual level those infants most likely to suffer 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 "(t)he switch to a greater consumption of 'fresh' cows milk and condensed milk at the end of the nineteenth century meant a greater convenience for working women, but their offspring may have suffered."²³ Such concern was typical of many medical and child care writers at the end of the nineteenth century, summed up, dramatically and judgmentally, by Collins when he wrote "(m)others who shirk breast feeding, either for convenience or pecuniary benefit, are guilty of cruelty to their babies."²⁴ 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. Of the forty-four 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' (fourteen 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."²⁵

Nor was locally produced milk above suspicion. Three of the named suppliers in the eighteen-nineties 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."²⁶ 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 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."²⁷

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.²⁸

Conclusion

Kingston suffered from relatively high levels of infant mortality throughout the eighteen-nineties. Infant diarrhoea was a major cause of these high levels, and was particularly virulent during August and September of 1899 when forty-four infants succumbed to this ailment. In turn, the hot dry weather was 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 cannot be reduced to the judgmental conclusions on working mothers reached by nineteenth century commentators such as Medical Officers of Health. Nor can they 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 when combined - as in the main MOH document discussed here - such a combination proved deadly for many infants during the first year of their lives.

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*, vol 9 (1994), pp.185-212; N.Williams and C.Galley, "Urban-rural differentials in infant mortality in Victorian England", *Population Studies*, vol 49 (1995), pp.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.Vogele, *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), pp.120-47; P.A.Watterson, "Infant mortality by father's occupation from the 1911 census of England and Wales", *Demography*, vol 25 (1988), pp.289-306; P.J.Atkins, "White poison? The social consequences of milk consumption, 1850-1930", *Social History of Medicine*, vol 5 (1992), pp.207-27; R. Milward and F. Bell, "Infant mortality in Victorian Britain: the mother as medium", *Economic History Review*, vol 54 (2001), pp.699-733; and N.Morgan, "Infant mortality, flies and horses in later-nineteenth-century towns: a case study of Preston", *Continuity and Change*, vol 17 (2002), pp.97-132.

³ Williams and Galley, “Urban-rural differentials”, pp.416-7.

⁴ Milward and Bell, “Infant mortality in Victorian Britain”, p.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), p.109; and A.Reid, “Infant feeding and post-neonatal mortality in Derbyshire, England, in the early twentieth century”, *Population Studies*, vol 56 (2002), especially pp.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*, vol 5 (1992), pp.71-94; and C.French, “‘Death in Kingston upon Thames’: analysis of the Bonner Hill Cemetery burial records, 1855-1911’, *Archives*, vol 28 (2003), pp.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* (2 vols, London, 1973), vol 2, pp.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), pp.128-42.

⁷ As well as this paper looking at infant mortality in detail in one year - 1899 - two other micro-studies of infant mortality in Kingston in the late nineteenth and early twentieth centuries are being undertaken covering (1) the Canbury area of Kingston; (2) Asylum Road - both notorious as slum areas.

⁸ North Kingston Local History Room, (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1895, p.16.

⁹ The 1899 figures are from the table attached to the front of the Annual Report of the Medical Officer of Health for 1899 in N.K.L.H.R., (S1 (614) KIN).

¹⁰ 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. 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.

¹¹ 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.

¹² N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1893, p.4.

¹³ N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1893, p.12.

¹⁴ 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*, vol 7 (1994), p.486. See also N.Williams, "The reporting and classification of causes of death in mid-nineteenth century England", *Historical Methods*, vol 29 (1996), p.65.

¹⁵ H.Meredith Richards, "The factors which determine the local incidence of fatal infantile diarrhoea", *Journal of Hygiene*, vol 3 (1903), p.328.

¹⁶ 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.

¹⁷ N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1905, p.18.

¹⁸ N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1904, p.16.

¹⁹ N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1904, p.14.

²⁰ The parents of one child could not be traced, so no occupation and very few other details are provided in this case.

²¹ N.K.L.H.R., (S1 (614) KIN). Annual Report of the Medical Officer of Health for 1904, p.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*, vol 12 (1978), pp.248-67.

²² N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1893, p.5.

²³ Atkins, "White poison?", p.221.

²⁴ N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1902, p.11.

²⁵ N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1898, p.6.

²⁶ N.K.L.H.R., (KB5/6/1), Sanitary and Drainage Committee Minute Book, 1889-1897, p.27.

²⁷ N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1897, p.15.

²⁸ N.K.L.H.R., (S1 (614) KIN), Annual Report of the Medical Officer of Health for 1899, p.11. For a comprehensive study of the impact of milk on ill-health between 1850 and 1930 see Atkins, "White poison?", pp. 207-27.

Infant Mortality in the 20th Century, Dramatic but Uneven Progress" Myron E. Wegman School of Public Health, University of Michigan: *J. Nutr.* 131: 401S-408S, 2001. Measles mortality graphs are enlightening [more below] and contradict the claims of Government health officials that vaccines have saved millions of lives. It is an unscientific claim which the data show is untrue. A dramatic fall in the numbers of reported measles cases would be expected. Doctors substantially overdiagnose measles cases especially when they believe it is a possible diagnosis. Doctors were told the vaccine prevented children getting measles when introduced in the late 1960s so after that time a substantial reduction in diagnoses would be expected. Medical Officer of Health, Medical Health Officer or District Medical Officer, is a title and commonly used for the senior government official of a health department or agency, usually at a municipal, county/district, state/province, or regional level. The post is held by a physician who serves to advise and lead a team of public health professionals such as environmental health officers and public health nurses on matters of public health importance. "Infant Mortality in Kingston upon Thames in 1899" (PDF). [permanent dead link]. English, Mary P. (1990). In the early 20th century, cesarean sections became more common and occasionally saved women who would have died of obstructed labor. Above, a baby born via modern-day C-section. Photo by Martin Valigursky/iStockphoto/Thinkstock. She works in a mental health agency for HIV-positive people. When she was seven months pregnant, her diaphragm, the band of muscle that separates the chest from the abdomen, split, and a piece of stomach pushed up through it and necrotized. She went into labor, gave birth to her daughter, and had emergency surgery followed by massive doses of antibiotics. Improved maternal survival eventually did turn into one of the great public health and medical achievements of the 20th century—it just took an unconscionably long time. Professional secrecy of doctors became an issue of considerable medico-legal and political debate in the late nineteenth and early twentieth centuries in both Germany and England, although the legal preconditions for this debate were quite different in the two countries. While in Germany medical confidentiality was a legal obligation and granted in court, no such statutory recognition of doctors' professional secrecy existed in England. This paper is a comparative analysis of medical secrecy in three key areas--divorce trials, venereal disease and abortion--in both countries. Y THE LATE nineteenth century, epidemics of cholera, ty-phus, yellow fever, and plague were claiming many fewer lives in the modernizing states of Europe and North America. Governments had successfully asserted their rights to quarantine infected populations when these episodic horrors appeared, and improved standards of military hygiene had also blunted the diseases' spread (Kunitz 1983, 1986). Case fatality rates from surgery declined precipitously in the last decades of the nineteenth century, and surgical patients began to outnumber medical patients in some hospitals (Vogel 1980). Although antiseptic practices came to be accepted in U.S. hospitals, the ideas on which they were based were not always greeted so warmly.