

Chapter 2

Infant feeding and infant mortality in the United Kingdom in the late nineteenth and early twentieth centuries

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Abstract

This chapter addresses the rise and decline of infant mortality in the late nineteenth and early twentieth centuries. A subset of deaths related to infant feeding is analysed, particularly where the proximate cause was said to be diarrhoea. A number of key points about the relationship between feeding and mortality are examined, with particular reference to evidence contained in annual reports of Medical Officers of Health. There has been some controversy as to whether diarrhoea in particular can be said to be the result more of social than environmental factors and the paper reflects on this.

Introduction: All Food History Passes Through the Bowels

The topic of infant mortality has great significance for demographers, for whom the fertility and mortality transitions are key thresholds, not just in the late nineteenth and early twentieth centuries but right up to the present day in the Global South. Thus, the Millennium Development Goal #4 was set to reduce the under-five mortality rate by two thirds between 1990 and 2015. In the event this did not happen but it did drop by more than half, from 90 to 43 deaths per 1,000 live births, which was a considerable achievement.

The rapid fall in infant mortality 100 years earlier, at the turn of the twentieth century, was a similarly iconic phenomenon in western European demographic history. It was symbolic of the emerging shape of modern societies and the relationship between their growing populations and the structure of economic development. A falling infant mortality rate is integral to the ‘demographic transition’ and, also, according to Omran, it can be linked to what he called the ‘epidemiological transition’ in which public health measures such as improved sanitation and food quality were central to reducing the impact of disease.¹

While acknowledging this big picture, for present purposes this chapter is written as a contribution to food history, not demography, so it will not deal with infant mortality as a whole. Instead we will look at the subset of deaths that was food-related, specifically for the United Kingdom (UK) in the late nineteenth and early twentieth centuries. Even more

¹ Omran 1971.

particularly, we will look at diseases of the organs that process food: the stomach and the bowels. The argument will be that a substantial proportion of the appalling total of infant deaths can be traced to diarrhoea and its relationship to feeding practices and to food hygiene.

The chapter is divided as follows. First, a source will be introduced that has great potential for the study of the intersection of infant feeding and health/ill-health. Second, a number of major issues from this source will be selected for interrogation, such as the suggestion that feeding with contaminated cow's milk was responsible for many infant deaths. Then, finally, it will be proposed that more research is required on mortality amongst those infants who, for whatever reason, were not breast-fed. It is this group that was at highest risk in the period under review.

Source Materials

It is no surprise that infant mortality for breast-fed infants was lower than for those artificially fed because we know that mother's milk conveys certain immunities to disease. But it is the detail that is lacking for the period under review. So far in the literature on infant death in the UK the following sources have been used in attempts to provide empirical depth: (a) manuals on child care, including advice on infant feeding; (b) official mortality and morbidity data, interpreted as indicators of causality; and (c) the published and unpublished notes on infant mortality and infant feeding by the midwife, health visitor, mother and child clinic, and Medical Officer of Health (MOH).²

In this paper we will draw mainly upon the annual reports of MOsH. I am not the first to have done this; Valerie Fildes also used them extensively. She collected data on 648,102 instances of infant feeding for the period 1900 to 1919. My database is for the longer period of 1902 to 1938 and it contains information on about 3,039,963 observations.³ The term 'observation' here is somewhat vague but is usually a datum collected in order to calculate the proportion of infants of a certain age (though this not always recorded precisely) who were fed by a particular means.⁴ The information was gathered by health visitors and clinics, with some additional clerical effort during intensive survey years.

² Reid 2002.

³ For more on the MOH reports see Atkins 2003.

⁴ This means that the same child may have been included more than once, though her feeding regime will likely have changed if she lived to her first birthday.

The data published in the MOH reports are vast in scope but they are not without question marks hanging over them. Whether or not they were collected in the first place seems to have depended upon the enthusiasm of the individuals in post and the resources available to them. Both seem to have varied through time and from one local authority to another. In addition, there are many technical issues that can be raised about the data quality. For instance, in no sense were the surveys planned to be statistically representative and the interpretive points raised below are therefore indicative rather than definitive. Second, in the minds of most of the MOsH, infant feeding was medicalised as a key factor in morbidity and mortality. They therefore tended to prioritise the mothers and babies thought to be most at risk and, as a result, the data in their structure are unlikely to approximate the population mean.

A third technical issue is what was meant by breast-feeding in the published MOH data. The term ‘ever-breast-fed’ is used by the World Health Organization for their present-day breast-feeding databank, but this is a disappointingly vague and minimalist definition. We know that weeks/months of breast-feeding are required to confer the key immunities (such as IgA) that protect against challenges like diarrhoea and it is therefore better if we know the length of breast-feeding and mean age of weaning. Only then we can judge securely if there is any difference between breast and bottle in terms of mortality outcomes. Fortunately, many of the UK MOH reports enable us to build a picture of the proportion of mothers breast-feeding at each month during the first year and how this changed in the first half of the twentieth century.

The Intellectual Context

In 1906 George Newman published his influential book *Infant Mortality: a Social Problem* and then in 2006 Eilidh Garrett and her colleagues prepared a centenary celebratory volume entitled *Infant Mortality: a Continuing Social Problem*.⁵ Newman and others set the agenda for research on infant mortality in the twentieth century and their emphasis upon the ‘social’ broke with several decades where the emphasis had been placed on environmental conditions.⁶ This shift in the centre of gravity of the debate is still evident in the literature today.

Immediately after Newman’s book, the Notification of Births Act (1907) was passed and this was a key threshold because there was now a fuller record of the number and the

⁵ Newman 1906; Garrett et al. 2006.

⁶ Woods 2006.

whereabouts of newborns. Although it was permissive legislation,⁷ the Act was quickly adopted in the larger cities and now their authorities had better information to plan an early home visit to the mother and her new infant. Gradually an official discourse evolved on infant mortality which included substantial national-level reports in 1910 and 1913 by Arthur Newsholme as Medical Officer of the Local Government Board.⁸ Local authorities came to accept that controlling infant mortality was one of their core public health responsibilities and the decade either side of the First World War experienced much activity in terms of data collection and a range of interventions. Outreach to mothers grew particularly in popularity: there was the better organization of health visiting and the provision of Infant Welfare or Mother and Child clinics, and one of the most forceful messages conveyed was the encouragement of breast-feeding.⁹

Intensive survey work on infant feeding was impossible though on a continuing basis for most local authorities on financial grounds, and there was only occasionally encouragement for a widespread effort from central government: 1913, 1920 and 1925 were the most prominent years in which the Local Government Board and its successor, the Ministry of Health, urged action. They issued instructions on compiling MOH reports and updated this guidance several times, though after 1925 the intellectual energy moved elsewhere to other important public health challenges.

The MOH Data: What Do They Show Us?

The MOH reports for the late nineteenth and early twentieth centuries contained a wealth of information about infant feeding and infant mortality. But we are *not* dealing in this chapter with infant mortality as a whole, which is a much larger and more complex topic. In this section we will look at *diarrhoea deaths only* and identify six cardinal issues, which can provide us with the foundation of an analysis.

Table 2.1 The Feeding of Infants in Three Example Localities

Feeding method	Croydon, 1900-20 at 6 months		Brighton, 1903-07		Lambeth, 1908-10	
	Diarrhoea deaths	Survivors	Diarrhoea deaths	Survivors	Diarrhoea deaths	Survivors

⁷ It was compulsory from 1913.

⁸ British Parliamentary Papers 1910 (Cd. 5263) xxxix.973-1128, *Supplement to the Annual Report of the Medical Officer of Health to the Local Government Board on Infant and Child Mortality; Second Report on Infant and Child Mortality*, BPP 1913 (Cd. 6909) xxxii.1.

⁹ Dwork 1987.

Breast	21.0	69.9	6.5	62.6	14.2	87.5
Breast + bottle	10.5	14.2	2.7	2.9	14.9	5.3
Breast + food	3.9	5.1	3.3	10.8	3.0	4.3
Breast + food + bottle	8.5	2.9	-	-	2.7	0.0
Cow's milk	25.4	2.6	35.3	8.4	48.6	1.9
Condensed milk	18.3	2.6	32.6	4.2	11.2	0.0
Ordinary diet	12.3	2.8	1.1	1.6	5.4	0.0
Other	-	-	18.5	9.4	0.0	1.0
Total	99.9	100.1	100.0	99.9	100.0	100.0

Source: MOH Annual Reports

1. Infantile Diarrhoea and Artificial Feeding

To begin with, a crucial point is that healthy babies seem to have had a different diet from those that died in their first year. Table 1 makes this point clearly. Note that a majority of the survivors were breast-fed. This method was not absent amongst those that died but in all three case studies it was a lesser proportion than those fed on cow's milk (on its own or in combination) or condensed milk.

The terms 'mixed food' and 'artificial food' occur frequently in the MOH reports. 'Mixed' feeding was breast milk and any other category, whereas 'artificial' food was for the fully weaned child. Table 1 shows some of the possibilities but there were many combinations and identifying the health consequences of each separately is problematic.

There is not much evidence from the MOH reports that farinaceous foods, either on their own or in combination with breast milk, were responsible for the high deal toll among artificially fed infants as was sometimes claimed. Instead, cow's milk, fresh or condensed, seems to have been the main culprit, as we will see below.

An obvious question is why babies were taken from the breast. One answer is that the proportion of women in a locality's workforce affected breast-feeding habits there. Where the local industrial structure presented good employment opportunities for women, the time (usually recorded as the month of age) of weaning to solid foods was earlier, for instance in the cotton spinning and weaving towns of Lancashire. This was no doubt because the long hours of work made it impossible to nurse the baby sufficiently frequently for the flow of breast milk to be maintained. Table 2 indicates that the drying up of breast milk was the commonest reason for weaning alongside the mother being unwell, and not necessarily that working women were deliberately abandoning breast-feeding out of choice. The anxiety caused to women at having

to wholly or partially wean their babies early was hinted at by one worker in the field: ‘During the thirteen years spent by me in child welfare work, I have encountered no problem so easy to solve in theory, but so difficult to solve in practice’.¹⁰

Table 2.2. Reasons for Weaning in Three Urban Settings

Reasons for weaning	Blackburn 1911-12	Birmingham 1905	Finsbury 1908-9
Milk went	146	300	114
Mother’s health	33	58	72
Mother working	21	22	18
Baby unwell	11	0	0
Child would not take breast	1	0	0
Other	4	4	0
Total	216	384	204

Source: MOH Annual Reports

2. Why the Absence or Reduction of Breast-Feeding?

Non-breast-feeding areas have been identified in Germany, Austria, Northern Italy, the Czech Republic, Sweden, Finland, Iceland and Russia.¹¹ But in the UK no such area existed. Valerie Fildes did claim that Scotland and the North East of England had higher rates of breast feeding than the rest of the country and if that is true it will have probably been due these areas having had lower proportions of those women who were the most likely to turn to the alternatives to breast milk. My MOH database gives no support, however, for there having been significant regional differences in infant feeding beyond those caused by poverty and by high female workforce participation.

Ann Roberts and Rima Apple stated that breast-feeding fell in the late nineteenth century in the UK and the USA respectively.¹² The implication is that infants would have been at greater risk of malnutrition and ill-health. But can these claims be justified? Breast-feeding was cheap and therefore the main option for working class women not in paid employment. For them it also provided a means of contraception. It is certainly true that middle class women

¹⁰ Macpherson 1928.

¹¹ Fildes 1992, 54.

¹² Roberts 1973; Apple 1987.

were more likely to have been able to afford alternatives such as cow’s milk and patent foods, but condensed milk was also an affordable option for all but the ultra-poor.¹³

The Roberts/Apple thesis has support less in a total absence of breast-feeding than in the earlier time of weaning evidenced in many MOH reports.¹⁴ The figures for breast-feeding in the first month in the aggregated MOH database do indeed shows a slow decline of about 15 per cent from just before the First World War to just before the Second. Unfortunately, little MOH data is available after 1945 but sample surveys indicate a continued decline in the second half of the twentieth century. In 1995 it seems that breast-feeding was as much as 40 per cent lower in weeks 16 and 24 than it had been in the 1920s, indicating both earlier weaning and a lower propensity to breast-feed from the outset.¹⁵

3. *The Rise of Commercial Infant Feeding*

Although the MOH source material has scant support for a hypothesis that patent farinaceous foods were responsible for inflated infant mortality, it does, however, time and again implicate the dairy economy and its increasing role in infant feeding. Here we mean the supply side but Ann Roberts has shown that a description of changing demand can also be written.¹⁶

The rise of the retailing of ‘fresh’ milk paralleled what seems to have been a first phase of the use of substitutes for breast-feeding, in the late nineteenth century. Because much of this milk was of a poor or very poor bacteriological quality, it is arguable that there were catastrophic consequences for infant life. Table 3 is a summary of the trends that can be traced and it may be helpful to add the following brief comments by way of explanation.¹⁷

Table 2.3. Factors Relevant to Cow’s Milk and Infant Mortality in the UK

	1880s, 90s	1900s	1910s	1920s	1930s
Breast-feeding					
First month	Decline?	Increase	Steady	Decline	Decline
Months 1-3	Decline?	Increase	Increase	Decline	Decline
Months 7-12	Decline?	Decline	Decline	Increase	Decline
Artificial feeding					
Patent foods	Increase, some danger	Common	Common	Common	Common
Condensed milk	Widespread use, esp. among poor, dangerous when skimmed			Better control of labelling	Safe

¹³ Fildes 1992, 53; Fildes 1998, 252, 258.

¹⁴ Fildes 1998, 253.

¹⁵ Foster 1997.

¹⁶ Roberts 1973.

¹⁷ For a similar approach on Norway, see Asdal 2014.

Powdered milk	N/a	Rare	Available, generally safe	Common	Common
Bottles	Long tubes popular	Boat bottles increase	Long tubes decline	Long tubes disappear	Safe
Contamination					
Farm	Very bad	Very bad	Bad	Slight improvement	Steady improvement
Transit	Some problems	Some problems	Some problems	Improvement	Safe
Adulteration	Very bad at first	Improving	Improving	Small problem	Safe
Preservatives and colorants	Common	Common	Declining	Disappear	None
Retail	Very bad	Improving	Improving	Safe in London when bottling introduced	Still a problem outside London
Home	Lack of storage	Newsholme v Delépine		Less frequently mentioned as a problem	
Heat treatment					
Sterilization	N/a	Introduced	Increasingly common	Popular with working class families	Decline as pasteurized milk available
Pasteurization	N/a	London 1903	Only common in London	Big cities only	Technology still not reliable

First, in the mid-nineteenth century most large towns and cities produced milk from herds kept within and immediately around the urban fabric. But from the 1860s London came to be supplied increasingly by rail, from longer and longer distances as special arrangements were made for milk trains and farmers were persuaded to switch from cheese and butter making. This availability of increasingly abundant supplies of ‘fresh’ cow’s milk encouraged consumption and, to facilitate this, new systems of delivery to the doorstep were arranged by a vibrant retail dairy industry. Some firms sold milk that they claimed was suitable for infants and invalids. In the 1870s and 1880s this specialised market grew. However, the long distances involved in the railway milk trade sometimes led to souring, especially in warm weather. In the 1870s one preventative measure was to add chemical preservatives. This became common and remained so for decades until such additives were eventually banned in 1912. A number of the chemicals used were toxic for infants, for instance boric acid which causes potentially fatal diarrhoea over long periods of exposure at high levels of concentration. The contamination of milk in the cowshed was also common and it was not until the activity of the National Clean Milk Society and others from the second decade of the twentieth century that consciousness of this problem was raised. As a result, it is very likely that pathogenic organisms were present in milk, a situation exacerbated by its frequent adulteration with water of an unknown purity.

A second innovation was that full cream condensed milks were introduced on a commercial scale in the 1870s. Within ten years they were outsold by sweetened ‘machine skimmed’ condensed milk which was popular because of its cheapness and good keeping

qualities. In the 1890s condensed milk accounted for about twelve per cent of London's milk consumption, and there were over 100 brands on the market. Coutts found that 'in certain districts a considerable proportion of babies are fed almost exclusively on this diet'.¹⁸ The nutritional danger for growing babies from this source came from the removal of the fat, the risk being especially concentrated in families unable to afford alternatives.

If it had been adopted early, pasteurization would have resolved the problem of bacterial contamination in liquid market milk. The technology was available in a crude form from the 1890s and seems to have been used thereafter by those dealers switching from preservatives, though the process was rarely declared to consumers. This was because of a long-running controversy about its possibly harmful effects of heat-treating milk that delayed the spread of pasteurization, in some regions until after the Second World War.¹⁹

Overall, the analysis of the milk/diarrhoea nexus recorded in Table 3 is different from a paper that has dominated the literature over the last 40 years. This was by Maurice Beaver, sometime Director of Public Health at the Nottingham Health authority and was published in 1973.²⁰ It has been widely cited as proof of the close historical connexion between infant mortality and milk, particularly the claim that improved milk supplies were correlated with a fall in infant mortality from 1900. This is despite there apparently being no primary research behind the various assertions made. To give Beaver his due, he was modest enough to acknowledge that his 'formulation may appear very naive, it is probably over-simplified.'²¹ Yes, it was simplistic, attributing reductions in infant mortality to a period when milk was still very poor in terms of cleanliness and disease. The present author's departure from Beaver can be summarized in four points. First, the wild fluctuations and high rates of the diarrhoeal infant mortality curve did not moderate until *after* the First World War. Second, milk was not bacteriologically safe until the 1920s at the earliest, and later in some regions of the UK.²² Third, the contamination of milk with chemical preservatives and artificial colorants was not resolved until after the First World War. Finally, the risk to babies from skimmed condensed milk also continued until the War. Beaver's proposed chronology of the link between better milk and lower infant mortality was therefore 20 years adrift of the evidence.

4. What About the Sanitary Environment: Domestic and Public?

¹⁸ Coutts 1911.

¹⁹ Atkins 2016.

²⁰ According to Google Scholar it has been cited 109 times, including on 15 occasions in the years, 2013-17.

²¹ Beaver 1973, 254.

²² Atkins 1992; 2010.

Any emphasis on milk as an explanation of infant mortality has been criticised by Woods et al., and incidentally they also dismiss the role of breast-feeding.²³ Instead they stress what they call the ‘urban-sanitary-diarrhoeal effect’, especially in the 1890s and years before the First World War, when there were a number of hot summers.²⁴ Their emphasis is upon overcrowded and insanitary housing, and poor street cleaning.

It is easy to see why the filthy conditions of both public and private spaces in Victorian and Edwardian cities might have presented a challenge to vulnerable infants. But it is worth remembering that this theme had its roots in the nineteenth century discourse of environmental hygiene. An example was the frequent reference to soil temperatures, which were said somehow to be a correlate of infant mortality because both rose, apparently in parallel, to seasonal peaks in the third quarter of the year. At its crudest this linking of the soil to child ill-health was reminiscent of environmental determinism, a reductive popular commentary on much social progress at the turn of the century. Such crude cause and effect reasoning has long since been dismissed by modern writers and replaced by a more sophisticated style of environmental thinking. The so-called ‘urban penalty’ of high death rates is now argued through a human ecology of diseases likely to have been vectored by water and certain foods.

Bob Woods and several subsequent writers claim a distinction between the high IMR in towns and cities and the much lower IMR for rural areas. But for breast-feeding the MOH data do not show much variation between urban and rural contexts, which is puzzling.²⁵ It is difficult to be definitive here because surveys by rural MOsH were very much in the minority due to a lack of the necessary resources. The expectation of a rural-urban divide is based on the experience of other European countries but the UK by the late nineteenth century had a fully integrated urban-industrial space economy, with even distant rural areas experiencing the economic and social impact of modernization.²⁶

An example is the increase in the amount of manure being produced in large cities right through to the First World War.²⁷ This provided a breeding ground for flies, and this insect was said to be capable of actively spreading germs to human food. Inadequate storage facilities giving ready access to flies were frequently commented upon, along with unwashed hands,

²³ Woods et al. 1988; 1989.

²⁴ For Ipswich there was no significant correlation between summer temperature and infant diarrhoea death rates. Hall and Drake 2006.

²⁵ For the broader topic of infant mortality from all causes there is a substantial differentiation by urban/rural and core/periphery. Gregory 2008.

²⁶ Kintner 1985.

²⁷ Atkins 2012.

leading to the cross-contamination of foodstuffs.²⁸ An example is the observation by the MOH of Perth that ‘among the poorer classes it is probably no exaggeration to say that not five per cent take any precaution to keep the milk sweet and wholesome. Too often it is placed away in some stuffy corner, left uncovered ...’.²⁹

Data published in MOH reports indicates a covariation between diarrhoea deaths and the numbers of flies caught in so-called fly cemeteries. Nigel Morgan in his paper on Preston goes a step further and raises this to his primary causal factor in the increasing infant mortality of the 1890s in that town and then its fall in the early twentieth century as motor vehicles began to replace horses.³⁰ Although the evidence is compelling, in my opinion flies are just one element among the many adverse circumstances in the late nineteenth century sanitary environment.

In addition to the insect vector argument, a popular trope in the public health literature of the first decades of the twentieth century was to blame the housewife.³¹ The living spaces of the poor were said to be dirty due to lack of cleaning effort and working mothers, because they were unable or unwilling to breast-feed on demand, were said to be neglecting their offspring, with disastrous health consequences.³² A leading proponent of this patriarchal style of argument was Arthur Newsholme, a prominent MOH (for Brighton) who became Medical Officer of the Local Government Board. In turn, many MOsH supported him by conducting simultaneous surveys of domestic hygiene and infant deaths, and the charge of maternal neglect seemed somehow to stick. These MOsH tabulated domestic cleanliness against infantile mortality but none of the supposed correlations were statistically significant. One problem was defining and measuring the dirty domestic environment and so quantifying the risk of infection. The terms used in surveys were very vague, such as a house or tenement being ‘fair’ or ‘unwholesome’, and therefore of little of scientific value.

5. The Bacterial Load of Milk

²⁸ Fildes 1998, 269.

²⁹ *Annual Report of the Medical Officer of Health, Perth 1923*, 17.

³⁰ Morgan 2002.

³¹ Moore 2013.

³² As Niemi (2007) points out, there was more enthusiasm for identifying careless mothers as culprits than there was for the alternative, social reform to eliminate poverty.

Although there are potentially a number of aetiological causes of infantile diarrhoea,³³ the majority in the UK for our period are likely to have been viral (e.g. norovirus) or bacterial. No specific cause was ever conclusively identified during our period but in retrospect the most likely culprit was enteropathogenic *Escherichia coli*.³⁴ It was not until the early 1940s that Dr John Bray of Hillingdon Hospital, Middlesex, discovered the role of *E. coli* in infantile summer diarrhoea.³⁵ The offender on that occasion was O111K58 but there are many different serotypes of *E. coli* that cause diarrhoea of varying degrees of pathogenicity.³⁶ Since the 1950s there have been fewer outbreaks among infants and small children and the seasonality so characteristic in the late nineteenth century has disappeared.

Table 2.4. *E. coli* in London milk at Successively Increased Dilutions

	Samples	None	10cc	1cc	0.1cc	0.01cc	0.001cc	0.0001cc	0.00001cc
Cows	20	30	40	25	5	0	0	0	0
Railway	20	0	5	35	45	0	10	5	0
Wholesale	20	0	0	20	15	40	20	5	0
Dairy shops	20	0	0	0	15	35	25	15	10
Purveyors	20	0	0	0	20	20	25	25	10

Source: Houston 1906.

It seems likely that *E. coli* was spread to infants through milk. Taking London as an example, it is immediately apparent in Table 4 that country milk from largely uncontrolled farms was a major source of risk and that contamination became progressively worse along the milk food chain.

6. Infant feeding bottles

The MOH data indicate that a common feed was milk deliberately mixed with water, which must have posed a risk of undernourishment, possibly one reason why ‘marasmus’ (wasting) appeared so frequently on infant death certificates. Another common observation in the late nineteenth century was that the design of babies’ feeding bottles was faulty. The Biberon Robert, introduced in France in the 1806s, was a glass bottle with a long rubber tube that allowed the infant to feed at will. Soon very popular all over Europe, this bottle was

³³ Contemporary nosologies included gastritis, gastro-enteritis, epidemic enteritis, enteric fever, summer diarrhoea, cholera infantum, with some suggestions that marasmus and convulsions should also be included.

³⁴ Until 1919 this had been known as *Bacillus coli communis*.

³⁵ Bray 1945; Bray and Bevan 1948.

³⁶ The complex phylogeny of *E. coli* includes salmonella and shigella.

nevertheless difficult to clean and in many households it became a source of infection.³⁷ We can agree with Valerie Fildes that ‘it seems likely that the eradication of the long-tube feeding bottle was a major factor in the ... fall in infant mortality’.³⁸ Some MOsH collected data on the relative numbers of long tube and ‘boat’ bottles in use in their district. In the first two decades of the twentieth century mothers were subject to relentless propaganda about the health benefits of breast-feeding but, failing that, they were also encouraged to abandon the old tube bottles. The MOH data indicate that tube bottles were used in about 68 per cent of cases of artificial feeding in 1904 where a child had died, falling to nil by 1925.³⁹

Conclusion

The physical make-up of cow’s milk and commercial formula foods – their nutrient profile, bacterial load, and adulteration with water and other substances – along with the replacement of breast-feeding with equipment that could not be sterilised, were collectively responsible for much of the infant diarrhoea that was a major cause of infant mortality in the late nineteenth and early twentieth centuries. It was only after the First World War that the situation changed. Breast-feeding increased (for a time), the quality of cow’s milk was better, the design of feeding bottles improved, and the whole context of social support also progressed.

The MOH reports are an important source of information for reconstructing this chronology of infant feeding and infant mortality. The most important contribution they made, at both the local and national scales, was to an understanding of the proportion of babies who were not breast-fed or at least not breast-fed for long enough for immunity to be passed on. Much of the diarrhoea mortality was in this group and the downturn in the diarrhoea deaths curve was postponed until after the First World War, at exactly the time that most of the indicators had taken a positive turn (Figure 1).

In my work on the MOH infant feeding database I have so far been unable to find a statistically significant (negative) correlation between the incidence of breast-feeding and the distribution of infant diarrhoea deaths. This is because the very high mortality was instead among the artificially fed. It is to this group that research now needs to turn. Paul Huck was correct when he claimed that ‘safe milk supplies for the minority of infants who were not

³⁷ Obladen 2014.

³⁸ Fildes 1998, 267.

³⁹ Birmingham MOH Annual Reports.

breast-fed could have had a big effect on overall infant mortality, because it is precisely these infants who contributed a disproportionate amount of the mortality'.⁴⁰

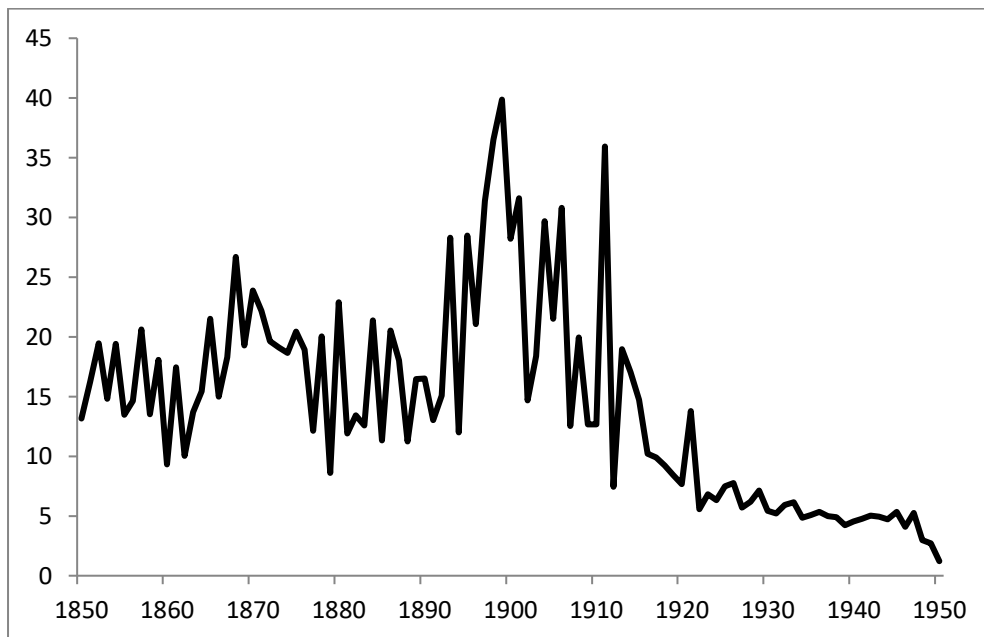


Figure 2.1. England and Wales: Infant Mortality Attributed to Diarrhoea, Per Thousand Born

Source: *Registrar General's Annual Reports and Annual Abstract of Statistics*.

⁴⁰ Huck 1997, 384.

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