
Food Poisoning: An On-going Saga

Anne Hardy | 13 January 2016

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Executive Summary

- Food poisoning is a major public health problem.
- Statistics are notoriously unreliable: recorded notifications likely represent the tip of an extensive – and economically expensive – iceberg.
- Legislation, regulation, inspection, and broad education campaigns are ineffective methods of improving personal hygiene practice.
- Recent surveys show British hygiene personal and food practices to be poor.
- Evidence from Scandinavia shows that food poisoning outbreaks and residual non-outbreak cases can be effectively controlled.
- Evidence from history shows that women, as midwives and mothers, are effective educators of sanitary habits.
- Broad educational campaigns to improve personal hygiene standards are ineffective.

- Targeted education should be through midwives, mother and child clinics, child-care facilities, schools, GP and veterinary surgeries.
- Popular television cookery programmes should feature scrubbing up as a matter of course before starting work in the kitchen.
- The use of graphic educational material in public spaces - from rail and tube stations to public lavatories in schools, supermarkets, department stores, and restaurants etc - should be mandatory.

Introduction

In May 2015, for the second year running, England's Food Standards Agency devoted its annual Food Safety Week to – “The Chicken Challenge”. The focus was on the handling of raw chicken in the home and in catering facilities in a drive to reduce the worryingly high levels of food poisoning from the *campylobacter* bacterium. The FSA also produced a ‘toolkit’ to help local councils tackle the Challenge, and enjoined ‘supporters’ to sign up on their website. This second chicken awareness campaign was no doubt spurred by [the *Guardian* newspaper’s investigation into the chicken processing industry](#) published on 23 July 2014, which revealed shocking lapses in good practice and resultant high levels of campylobacter contamination in raw supermarket and catering industry chicken products.

Food poisoning is a very common affliction. Statistics are inevitably an underestimate, since a great many sufferers do not consult a doctor or report their cases. The FSA estimate that more than a million cases occur each year, so it is economically significant in terms of working days lost, as well as personally significant in terms of feeling terrible for several days. Yet despite widespread publicity for the *Guardian* investigation in 2014, and prime-time slots on several media outlets for the 2015 FSA campaign, this second attempt to spread the word on the dangers posed by raw chicken seems to have fallen on fairly stony ground. Just six local councils posted information for their constituents online, and a mere 3,521 supporters had signed up on the FSA’s website by early August. Arguably, the FSA’s approach is not generating enough interest to even begin to remedy the food poisoning epidemic.

Food Poisoning Habits

This is by no means a new story. The health hazards intrinsic to the modern poultry processing industry have been known since at least 1960, and concerns around the close association of food poisoning with raw or poorly cooked meat products is much older. Food poisoning was first identified as a public health issue in the 1880s, and the notification of cases was introduced in England and Wales in 1938. In the years after World War II, as notification statistics soared, local and national campaigns were launched to educate the general public, and especially commercial food handlers, in the principles of food poisoning prevention.

Salmonella were the dominant bacterial agents associated with food poisoning in Britain until overtaken by *Campylobacter* in the late 1970s. In the words of the British Association for the Advancement of Science, they are organisms with a beautiful name and 'some very unpleasant habits'. Microbial preferences and human carelessness are integral to the continuing, even escalating, problem of food poisoning in the developed world.

Salmonella was first identified as a food poisoner in 1885, during the bacteriological investigation of an outbreak caused by the consumption of the flesh of an emergency-slaughtered cow (a sick animal slaughtered before natural death in order that its meat might enter the human food chain).

The extensive and varied host populations for *Salmonella* bacteria include humans, domestic animals, wild birds, and reptiles. Their control involves not only human public health but also veterinary medicine and public health, and the world of the laboratories where these organisms are detected and studied. The historical route to understanding this complex world began in 1907 with the realisation that the real bacterial agents of spread are humans themselves, whether sick, or transient, or chronic carriers of the bacteria. The bacteria are excreted in their urine and/or faeces, and can then infect others, unless strict hygiene is practised.

Animal Carriers of Infection

In the mid-1890s, typhoid infection was linked to the consumption of sewage-contaminated shellfish. Early in the following decade, the agency of flies in seeding foods and especially milk, with pathogenic bacteria was the subject of determined scrutiny, leading to vigorous anti-fly campaigns using graphic posters which successfully encouraged the public to keep flies away from food and drink.

During the interwar period, duck eggs were added to the list of incriminated foods. Ducks are careless layers, depositing eggs randomly, and besides, in the words of one researcher, they 'conduct their amours' in ponds and

ditches which may be polluted. Egg-shells may be penetrated by polluted water if left to lie in damp or wet conditions, or as they pass down the oviduct of the duck. The same mechanisms were later discovered to apply to hen's eggs

Meat-borne food poisoning had been identified in England as early as 1880, and by the early 1900s, microbiologists were investigating whether or not the *Salmonella* were natural inhabitants of animal guts. They concluded that, as with typhoid, the most likely means of onward transmission among humans and animals was a carrier state in an individual resulting from a previous infection, as well as contamination from the faecal discharges of sick and infected individuals.

The *Salmonella* as agents of food poisoning infection in humans attracted the attention of a small group of British researchers, and numbers of researchers globally, during the interwar period. Specifically, they were interested in the *Salmonella* either as a public health problem (a minority of researchers) or as a family group of bacteria whose complicated relationships fascinated microbiologists. Their researches turned up ever-increasing numbers of new members of the family, a pursuit which continues to this day.

Salmonella Science and Agricultural Practice

There are currently some 2,400 known types of *Salmonella*, and counting. The innovative technique of phage-typing, announced in 1938, enabled the typhoid bacterium to be broken down into sub-types. By 1940 18 different types and sub-types of the typhoid bacterium had been identified, and the technique was soon extended to allow the differentiation of *Salmonella* types. With such very precise identifications, the task of tracking down the causes of food poisoning outbreaks forensically, and even of apparently random scatterings of cases, became very much easier.

These advances in scientific method, applied to outbreak investigations from 1940, opened a new and complex world of research into food poisoning infection in the years after World War II. Intensive farming methods, developed in America from the 1920s, were soon shown to be highly favourable to *Salmonella* infection in cattle and poultry. A wide range of later developments, each of which was adopted on efficiency grounds because it appeared to make economic sense to the various agro-industries, were each found to compound the problems of infection. These included such practices as the concentration of slaughter facilities in abattoirs, the intensive

rearing of beef calves, the use of slurry as manure, sewage irrigation of crops in Europe and America, and the long-distance trade in animals, fruit, and vegetables made possible by the development of the haulage industry and air freight.

At the same time, especially in Britain and America, the food industries expanded as never before, with the mass-production and selling of ready-prepared items in shops, and the proliferation of food stations both encouraging the widespread consumption of foods prepared outside the home. In line with these developments, human cases of food poisoning rose ever higher. The number of recorded human incidents of salmonella food poisoning in England and Wales rose from 120 in 1941 to 5,312 in 1973, but the estimated number of food infections occurring in England and Wales in 1957 was 15,100.

Human Carriers of Infection

In the twentieth century, the environmental concerns of Victorian public health reformers were balanced by a sharper focus on the individual. The realization that humans were typhoid carriers in the first decade of the twentieth century, and the notorious case of Typhoid Mary Mallon in the USA, drew attention to the importance of personal hygiene within the wider field of public health. Typhoid Mary was a cook who was identified in 1907 as a healthy carrier of typhoid germs. Her condition was discovered following repeated outbreaks of the disease among the families she worked for, and as a result of her subsequent intransigent neglect of personal hygiene, she was eventually detained in solitary confinement for life. She subsequently entered the public health canon as an awful warning against unhygienic personal behaviours.

Consequently, the registration and management of known typhoid carriers became general policy in the US, and commercial food handlers in many states became subject to regular vetting for carrier status.

In Britain, however, while such intrusions into personal liberty might be wistfully contemplated, they were not introduced, at least until the introduction of a blood test circa 1945 made it practical to screen typhoid patients for carrier status before discharge from hospital. The new Public Health Laboratory Service began to compile a register of typhoid carriers from 1948.

The Failure of Regulation and Adult Education

Efforts to control food poisoning prevention in Britain have historically focused on public education, especially of commercial food handlers. However, despite the best efforts of the Central Council for Health Education, according to Mary Adams, deputy chair of the Consumers' Association in the mid-1960s, the general public continued to find the subject of food hygiene 'boring'. Popular responses to the 2015 Chicken Challenge campaign suggest little has changed.

Meanwhile, education in personal hygiene among commercial food handlers, proved a similarly uphill task. Efforts were directed instead towards applying standards for environmental hygiene, including inspection techniques, stricter regulations on building construction practices, and on sanitation facilities provided. However, these efforts appear to have made little impact on the notification figures: In 1978, Barrie Sheard, an environmental health officer with 25 years' experience in local government, concluded that 'we must all have taken the wrong road' in commercial food hygiene. Despite best efforts, the food industries in the 21st century remain vulnerable, as repeated outbreaks of norovirus infections linked even to world-class restaurants, such those in Heston Blumenthal restaurants in 2009 and 2014, make very clear.

Given the continuing problems with food poisoning, not eased by the discovery of a whole new range of agents since the later 1970s – campylobacter, cryptosporidium, norovirus, hepatitis strains, e. coli, and, increasingly, drug-resistant forms of e. coli and of *Salmonella* - it seems that legislation, regulation, and health education, remain inadequate strategies.

Which Road to Remedy?

Sheard's judgment poses the question: - which road should have been taken? It was a question which he made no attempt to answer. But it is clear from the experience of other countries, notably of the Nordic states, that food poisoning is not a necessary hazard of modern life-styles. Although food-poisoning outbreaks do occur in Scandinavia, the numerous small-scale, un-related incidents which characterise the British experience are absent. These constitute a chronic burden of illness and small-scale fatalities among the British population. In Norway, Sweden, and Finland most cases of salmonellosis are imported, not created by bad practices within the country. Denmark has in recent years made considerable strides in reducing *Salmonella* infections by instituting a control programme for broiler chickens, layer hens, and pigs, and has recently turned its attention to *Campylobacter*.

Being a small and well-organised country is evidently a help in gaining control – but so is a food-culture which in Scandinavia still favours home-cooking over ready meals, take-aways, and even frozen food. Standards of personal and public hygiene in Scandinavia have also been considerably higher than in Britain at least since the end of the nineteenth century. Whilst Scandinavian schools were being constructed with appropriate provision of lavatories and handwashing facilities from the 1880s onwards; the journal *Public Health* noted as recently as 2000, that many British many schools still lacked such provision.

Ultimately, the prevention of food poisoning comes down to the practice of effective personal hygiene by each individual. That proper facilities are provided is crucially important – as is the underlying imperative of effective sanitary education to ensure their use.

Women as Sanitary Revolutionaries

Home education in childhood seems to provide the key to engraining sanitary habits. American women, it has been argued, learned their sanitary lessons from Florence Nightingale, whose *Notes on Nursing* – a guide for homes, not hospitals – was published in the US in 1860 and achieved a wide circulation. When Civil War erupted the following year, American womenfolk, mindful of the recent terrible sufferings of soldiers in the Crimean War, adopted sanitary practices in both the field hospitals and the home – and no doubt educated their families.

Other routes to hygienic female behaviours were also possible. In 19th century Denmark, for example, the drive to reduce high levels of infant mortality saw midwives trained in rigorously aseptic birthing practices taking the lessons of personal cleanliness to women and homes. In industrial and urban Britain, by contrast, the laborious training of the nation in the correct use of lavatories took place before the widespread acceptance of germ theory. The importance of education in handwashing as a necessary corollary to the sanitary disposal of human waste was therefore not recognised. This problem was compounded by Victorian fears of sewer gas, which meant that housing stock was generally designed with the water-closet isolated from the hand-washing facility. Well into the inter-war period, British housing developers were rejecting public health representatives' requests to unite lavatory and hand-basin in the same room in new buildings. Thus the very construction of British domestic spaces facilitated the avoidance of hand-washing. Moreover, the British appear to have been somewhat resistant to hygiene in general. There is clear evidence in early twentieth century British medical journals of impatience with American standards of cleanliness.

Lavatory Hygiene

Lavatory hygiene is a persistent British problem. In 1999, for example, the *Times* newspaper's medical correspondent, Dr Thomas Stuttaford, pointed to superior American habits of personal hygiene as the reason for lower levels of diarrhoeal infection in the US as compared with Britain. A 2003 study also cited in the *Times*, found that Britons suffer more from travellers' diarrhoea than their American, Australian, or European cousins – the inference being that this is caused by failures in hand hygiene.

This failing lies at the root of the British food poisoning problem. A 2007 Hygiene Council survey found two-thirds of Britons deficient in basic hygiene practice, with men the worst offenders. Hand washing is not a high priority. One tenth of the population did not wash their hands after going to the lavatory; twenty-two percent failed to do so after handling animals or pets. Forty-three percent of British parents did not wash their hands after changing a nappy – at least one parent contracting polio by this route following their baby's excretion of active virus after immunisation.

Urine, it should be understood, can be as dangerous as faeces, capable of spreading both hepatitis and typhoid. International outbreaks of hepatitis have been caused by fruit pickers with unwashed hands, and consumers who don't wash raspberries.

British kitchen hygiene is also seriously deficient. A survey undertaken ahead of National Food Safety Week 2013 found that eighty percent of those surveyed had one or more kitchen behaviours which put them at risk - such behaviours as using one chopping board for both raw meat and vegetables without cleaning in between uses, keeping badly wrapped joints of raw meat on upper refrigerator shelves where their juices could drip onto unprotected produce below, and failure to wash hands after handling raw meat. Add in the known risks in the broiler industry, and you have the Chicken Challenge theme for 2014 and 2015.

Effecting a Change of Habits

The historic examples of the US and Scandinavia suggest that the proper education of women was crucial to establishing habits of personal hygiene in any given population (always supposing that clean water supplies and

adequate sanitation are available). In modern societies, where child care is now often shared between parents, the proper sanitary education of both men and women, boys and girls, should be the aim of every public health agency.

Since at least 1947, distinguished microbiologists are frequently cited in the press as declaring that if everyone washed their hands everything would be much better. Some have even, on occasion, been heard to state that things were better before antibiotics began to be widely used in the 1940s. While the extensive use of antibiotics in modern animal husbandry has brought problems of its own, modern standards of meat hygiene remain superior to those existing even into the 1950s, when killing sick animals 'to save their lives' and enable their carcasses to enter the human food chain was a regular practice. Meat may, however, still be contaminated in the processing. Chicken meat is especially problematic. Good kitchen hygiene is an imperative in domestic and commercial kitchens alike.

The American and Nordic examples show that it is possible to create hygiene-conscious nations through targeted campaigns of graphic public health education which reach beyond food handlers to the general public, and which are reinforced by the universal provision of appropriate washing facilities in all public and private lavatories.

Conclusions

The prevention of food poisoning involves the practice of scrupulous personal hygiene and a sanitary consciousness in all food-handling whether in the preparation or the consumption. Graphic hygiene education campaigns have in the past proved effective, and family education is also important. Education at a very basic level from earliest childhood on is the most effective way of engraining sanitary practices, especially if reinforced by both parents. Ante-natal classes, often attended by both parents-to-be, should incorporate instruction in basic hygiene, and midwives should again become sanitary educators; continuing sanitary reminders should be given to adults as well as children at GP clinics; child minders, day nurseries, and infant schools should provide training in hygiene; school cloakrooms should be supervised at break times. Television chefs could be required to set a good example. We should see Nigella and Bake-Off contestants scrubbing up before they begin. The particular specific dangers from not washing after handling dogs, cats, cattle, pigs, and poultry, should be flagged in both veterinary and GP surgeries.

Public places and public transport are traditional spaces for public health messages. Trains, tubes, and buses, as

well as public lavatories, should carry more graphic warnings: the eradication of public spitting was largely effected through notices enjoining 'No Spitting' in public places and on public transport, which created shame around the practice. Modern notices enjoining clients to Now Wash Your Hands in public lavatories are, however, of limited effectiveness, as was the London County Council's lavatory paper imprinted with the same message between the Wars. The public act of non-handwashing is quickly and discretely achieved, unlike spitting. Better perhaps to copy the early anti-fly posters, with their vivid pictorial messages. The creation of disgust around flies was a major achievement of the early 20th century: the creation of disgust for dirty hands should be an achievement of the twenty-first century.

Further Reading

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About the author



Anne Hardy is Honorary Professor at the Centre for History in Public Health, London School of Hygiene and Tropical Medicine. Her latest book, *Salmonella Infections, Networks of Knowledge, and Public Health in Britain, 1880-1975*, was published by Oxford University Press in 2015.

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