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Dirt, Germs and the Immune System

Thus far, the phenomenon of EID have been discussed in relation to the changes associated with late modernity, particularly concerns about globalisation and a heightened awareness of risk. As discussed in Chapter 4, the modern era began in Europe in the eighteenth century, with the advances in science and technology that accompanied the development of industrial capitalism. 'Modern' in this sense has a cluster of connotations relating to 'rational' and 'scientific'. Modern explanations of phenomena such as epidemics of infectious diseases ostensibly rely on rational evaluation of evidence gathered using scientific methods. 'Primitive' explanations of such phenomena, in contrast, rely on superstition or religious faith, and cast blame on individuals or groups by inventing causal connections between natural events and moral transgressions. This latter type of response is exemplified in allegations of witchcraft.

However, as discussed in Chapter 3, responses to AIDS in the 1980s, couched as they were in the language of accusation, racism and religious fundamentalism, hardly seemed very 'modern' in this sense. Alongside the apparently modern discourse around infectious disease there runs a parallel one, which links modern reactions to EID to more 'primitive' reactions to past plagues and pestilences. This chapter will explore how the way EID are conceptualised is influenced by pre-modern notions of dirt and contagion, and how such pre-bacteriological concepts are incorporated into more recent understandings of germs and the immune system.

Purity and Danger

In Chapter 4, there was a discussion of the English anthropologist Mary Douglas's later work on risk, in which she argues that despite being

apparently based on rational science, modern responses to risk are little different to (what she calls) 'primitive' ones. The discussion of dirt here picks up another, earlier, strand of her work, in which she argues that ideas of purity and pollution are central to cultural life in modern, as well as in 'primitive', cultures.

In her ground-breaking book, *Purity and Danger*, Douglas (1966) examined religious purity rituals and prohibitions, which had previously been dismissed as irrational relics from a more superstitious past. For instance, in Chapter 11 of the Biblical book of Leviticus, there are a series of food prohibitions that make 'a difference between the unclean and the clean, and between the beast that may be eaten and the beast that may not be eaten.' To a modern reader, putting aside for a moment what we 'know' about germs, the assignment of certain things as *kosher* seems, on the face of it, completely random. For example, in Leviticus, locusts, beetles and grasshoppers are classified clean and therefore edible, as are animals that are cloven-footed *and* chew the cud. Swine are classified as unclean and inedible, because although they are cloven-footed, they do not chew the cud. Things that live in the water are classified as edible, so long as they have fins and scales, therefore shellfish, which have neither, are classified as an 'abomination'.

Douglas argues that, far from being random, these prohibitions rest on a system of classification. Things that do not 'fit' the orthodox classification are regarded as polluted because they cross or violate symbolic borders. 'Pollution' here is used not in the same sense that we might talk of a river being polluted, but in the sense of a contagious state, something harmful and mysterious, and caused by outside interference. For Douglas, pollution is therefore not simply the binary opposite of cleanliness, it arises out of a confusion of categories (Campkin, 2007).

The prohibition against eating shellfish thus has its roots in the classification of fish as creatures with scales. Shellfish are seen as violating the orthodox classification of 'fish' and thus are to be avoided as polluted. From a modern germ theory perspective, the prohibition against eating shellfish in the Middle East in the days before refrigeration makes perfect sense, simply as a means to avoid food poisoning. This is known as the 'medical materialist' perspective, which would argue that even the most apparently exotic of ancient rites must have a basis in hygiene. But, as Douglas points out, even if some of Moses' dietary rules were hygienically beneficial, this interpretation casts him as a sort of enlightened public health administrator, rather than a spiritual leader.

While she rejects medical materialist interpretations of the symbolic rituals and beliefs of 'primitive' peoples, Douglas also rejects the

opposite view, which holds that there is nothing in common between modern ideas of cleanliness and 'primitive' rituals. For her, modern beliefs about dirt similarly express symbolic systems. The difference between pollution behaviours in different historical or anthropological contexts is only a matter of detail. However, there are two notable differences between ideas of dirt and defilement in modern and 'primitive' cultures. The first is that, for a modern European at least, the avoidance of dirt is not related to religion. The second is that modern ideas about dirt are dominated by knowledge of germs and the diseases they can cause, which stems from the advances in bacteriology since the 1880s.

Douglas thus argues that dirt has symbolic and metaphorical meanings beyond those offered by medical materialism and germ theory. As will be discussed in greater detail below, despite the differences between modern and 'primitive' notions of dirt, pre-bacteriological notions of contamination live on in the approach to dirt in modern thinking. Adapting Lord Palmerston's nineteenth-century phrase 'Dirt is matter in the wrong place', Douglas famously defined dirt as *matter out of place*. Dirt and pollution are thus socially constructed, and represent disorder, which must be restored by ordering and maintaining socially sanctioned boundaries between things considered clean and unclean.

Furthermore, as discussed in Chapter 4, this sense of spiritual purity and the danger of pollution becomes imprinted on a group, who use it to define who belongs within the group – who are 'people like us' – and who is classified as *other*. The perception of the dirtiness of *others*, whether they be 'the great unwashed' or 'smelly foreigners', thus reinforces dominant value systems and social boundaries (Campkin & Cox, 2007).

Douglas's later work picks up this theme and explores how and why *others* get blamed for misfortunes that affect the group, such as plagues. This 'primitive' pattern can be seen in responses to many EID discussed thus far: *others* are dirty/eat disgusting food/have bizarre rituals or customs/have perverted or promiscuous sex. Douglas demonstrated how fears of dirt and contamination become a source of social control, a weapon to exclude, thus exposing the moral dimensions that lie under the surface of even modern, apparently medical materialist, notions of cleanliness and dirt avoidance (Smith, 2007).

A quick and dirty history of personal hygiene

As Douglas points out, modern notions of dirt differ from 'primitive' ones in that they are dominated by germ theory and thus link dirt

to germs and to infectious diseases. However, this understanding is only about 130 years old. How then did people understand dirt and its connection to disease before germ theory?

In Europe, from the time of the Roman Empire until around the eighteenth century, the body and disease were understood via the ancient Greek system of humourism. The humours were thought to be fluids within the body (black bile, yellow bile, phlegm and blood), with disease conceived as the result of an excess or deficiency of one of these fluids. Treatments such as bloodletting, emetics and purges were aimed at expelling a harmful surplus of a humour and thereby restoring equilibrium.

The word for the dirt that caused disease was *miasma*, from *miamo*, 'to pollute', via the root *mia*, meaning 'defilement' or 'destruction' (Smith, 2007). Miasmas were associated with foul airs resulting from decaying organic matter from cesspools, corpses and marshes, and exacerbated by extreme weather conditions. Although it was clear to contemporaries that plagues such as the Black Death were contagious, the cause of contagion was not conceptualised as a particle, but rather as a property of the air, which had been corrupted by miasmas.

As health was thought to rest on the correct balance of the humours, and because the body was regarded as permeable, over time immersion in water came to be thought of as dangerous to health. For Christians, the avoidance of washing also took on a spiritual dimension. The early Christians were of course Jews, with a heritage of Talmudic laws commanding cleanliness, or at least ritual purification. But by the fourth and fifth centuries Christians had come to regard dirtiness as a badge of holiness. This mortification of the flesh was known as *alousia*, 'the state of being unwashed', and was chosen by hermits, monks and saints, for whom any cleansing, except baptism, signified worldliness and vanity. This early Christian lack of concern about cleanliness is unusual among world religions: while the Spanish Christians washed neither their bodies nor clothes, Andalusian Arabs were known as 'the cleanest people on earth'. Damning evidence at the Spanish Inquisition, levelled at both Moors and Jews, was that the accused 'was known to bathe' (Ashenberg, 2007).

In the middle ages, people of all classes washed only rarely, believing that bathing could lead to possible exposure to pestilential air, as well as disrupt the humours. Consequently, most people were infested with vermin such as body lice, which they attributed to an excess of bodily humours. To control the humours, and thus the vermin, one's clothes could be changed, or at the very least kept clean. Over the centuries, the

role of linen changed, and its regular renewal became a rule of cleanliness. Wiping was regarded as being the same as washing. Fresh white linen was thought to remove dirt by its intimate contact with the body, an effect surer and less dangerous than that of water (Vigarello, 1988).

Miasmatic theory also held that stenches could be inhaled and incorporated into the body, thus affecting an individual's odour or appearance. So, for example, excessive indulgence in coitus was thought to provoke an overflow of semen into a woman's humours. Prostitutes were thus said to stink, and were considered dangerous sources of contamination. It was claimed that Jews emitted the *foetor judaicus*, a sulphuric smell believed to be the cause of illness and death, which was said to disappear on conversion to Christianity (Nelkin & Gilman, 1988).

Miasmas were conveyed particularly by the breath and body odours; the foul smell of hospitals was thought to be caused by the patients' quickened respiration, sweat, pus and sputum, from which the effluvia of disease emerged. Infection could be avoided, and resistance to it increased, by wearing strong perfume or burning sweet-smelling pellets in a perfume pan. Such fumigants were thought to be capable of destroying the presence of plague in bodies, fabrics and clothing.

Apart from aromatics, the other tactic to destroy miasmas was ventilation. Pure air was thought to be the best antiseptic, and disinfection consisted of ventilation, draining off refuse and preventing individuals from crowding together (Corbin, 1986). This view remained current even in the time of Florence Nightingale, who held the germ theory of disease in contempt, and whose reforms of hospital sanitation during the Crimean War in the 1850s were based on her belief in dispelling miasmas with pure air.

Before the middle of the eighteenth century, correcting body odour through the application of perfume was also held to purify. Thereafter, the use of heavy perfumes gradually began to fall out of fashion, as perfume was said only to disguise putrid miasmas. Instead, attention began to be focused on the purity and healthiness of the air (Vigarello, 1988). The threshold of tolerance to smell suddenly lowered, at least amongst the elite, and odours began to be more keenly smelled. By the end of the eighteenth century, even the masses had this new sensibility, especially with regard to the smell of excrement (Corbin, 1986).

Around the end of the eighteenth century, it became fashionable for the upper classes to have baths and bathrooms in their homes, although their purpose was luxury rather than cleanliness. At around this time, the notion also arose that a cold bath produced vigour and resistance, and was beneficial to health. For the first time, bathing came to have an

explicitly hygienic role, not because it washed, but because it *strengthened*. The contrast was drawn between the character-building ordeal of the cold bath, and the enfeebling, effeminising luxury of the warm bath. Ideas about cold baths also intersected with the contemporary introduction of smallpox inoculation, which, like the cold bath, was thought to strengthen by operating on a supposed underlying resistance to illness (Vigarello, 1988).

In the early nineteenth century, the idea of the skin's respiratory function captured the attention of scientists on both sides of the Atlantic. It was proposed that if pores were clogged with dirt then carbon dioxide could not exit through the skin (Ashenberg, 2007). Soap now began to be used for washing, and began to be regarded as a tool of health rather than an elegant luxury. Although miasmatic explanations were still dominant, by the time of the 1832 'Asiatic' cholera epidemic in Europe, water now came to be seen as playing a protective role against disease, a dramatic reversal since the time of the Black Death. As discussed in Chapter 2, the terror of cholera, associated with the overcrowding, poor sanitation and filth of the nineteenth century urban slums led to campaigns to eradicate disease and cleanse the cities of their filth. These were at once vast improvements and often violently discriminatory, dovetailing with the increasing state regulation of individuals' bodies and freedoms, particularly in relation to the poor (Cohen, 2005).

References to the stench arising from the earth, stagnant water, corpses and carcasses diminished in the nineteenth century, and instead there was a growing obsession with the odours of poverty. Up to this point there had been a rough equality between the classes in terms of their smell. A new kind of distinction now arose between the classes. The absence of an intrusive odour enabled the individual to distinguish himself from 'the great unwashed', a term coined by Thackeray in 1849. Whereas in the eighteenth century the odour of bodies was connected with the climate, diet, profession and temperament, the new attitude connected odours to the poor (Corbin, 1986). Servants and working men smelled unpleasant, an attitude neatly summed up by George Orwell in *The Road to Wigan Pier*: 'The lower classes smell'.

Although William Budd and John Snow had proposed a theory of disease based on bacteria as early as 1849, their views failed to gain widespread acceptance. By the middle of the nineteenth century, European and American doctors had split into two broad camps: the sanitarians, or hygienists, who clung to the idea of miasmas; and the contagionists, who advocated germ theory (Sachs, 2007). Pasteur's *Germ Theory and its Application to Medicine* was published in 1861, but it took

a long time for germ theory to gain the upper hand. For a while, some believed in both germs and miasmas, as the new concept of germs fitted easily into older popular notions of living particles – *contagium vivum*. However, it was Koch's discovery of specificity, that each germ was a separate species with a life of its own, that ultimately undermined the miasmatic theory of the sanitarians (Smith, 2007). By the 1880s Pasteur's and Koch's discoveries had become predominant, marking the end of the belief in miasmas amongst scientists, and with it the link between smells and contagion.

Germs, hygiene and the immune system

The new science of bacteriology transformed the concept of dirt and the hygiene practices associated with it. Henceforth, families were said to need bathrooms in the war against germs. Providing baths for the working classes was seen as an important means of reducing the spread of infectious diseases across all strata of society. Soap producers funded campaigns to spread 'good' habits such as hand washing before eating and after going to the toilet. By 1938, a survey showed that soap ranked second only to bread and butter as one of life's essentials (Shove, 2003).

Although the word 'contagious' was dropped from medical discourse around 1910 (when the official US Public Health Handbook of Infectious Diseases first substituted the term 'communicable'), the older concept of contagion became elided with the new bacteriological concept of germs. Contagion located the source of disease as outside the body, in other people, the air they had breathed or the surfaces they had touched. Ideas and practices associated with the fear of contagion through contact with other people's germs were a vital lesson of childhood acculturation in Western societies in the early twentieth century. Children, or middle-class children at least, were warned of the dangers of germs from putting things in their mouths, and were instructed to wash their hands before eating (Pernick, 2002).

Another aspect of the concept of contagion was the emphasis on the danger of 'close contact', particularly sexual contact. An example of the dread of contagion, and of its links to sexual morality was what has been called 'syphilophobia'. In early twentieth-century America, there was a widespread belief that syphilis could be contracted through the brief contacts of everyday life – at the grocery, in the park, at the barber shop, or from toilet seats (the fear of infected toilet seats resurfaced in the late 1980s with regards to AIDS). The concern

was that 'immorally' contracted syphilis would be then passed to native, middle-class 'moral' Americans. The interest in 'venereal disease' was further heightened during both world wars, with the compulsory examination and incarceration of thousands of women suspected of prostitution or 'promiscuity' – a 'promiscuous man' considered oxymoronic. Despite campaigns emphasising that venereal disease affected all sections of society, the view persisted that certain groups, such as ethnic minorities and the working class, were particularly affected and therefore to blame (Brandt, 1985).

By the 1940s and 1950s, the most important defence against the germs lurking in the environment just outside the body was by preventing their entrance into the body through cleanliness, washing and personal habits, such as not touching the mouth with the hands. American women's magazines of the period depicted the body as a castle, with mothers/women keeping the invading germs outside the castle walls through cleaning. Poliomyelitis epidemics in the 1950s led popular periodicals to turn their attention to defences *within* the body. By the 1960s and 1970s, the newly popularised concept of the immune response was as a single interconnected *system*, residing entirely inside the body. This notion led to a diminishing concern with hygiene and the cleanliness of the outer surfaces of the body (Martin, 1994).

It has been argued that the dominance of the military metaphor used in relation to infectious disease arose as a result of the coincidence of the emergence of germ theory from France in the 1860s and 1870s with the threat posed to France at that time by Prussian militarisation. Given that cultural milieu, the germs that caused disease came to be conceptualised as evil invaders. The military metaphor subsequently became the dominant way of understanding twentieth-century medicine, portraying diseases and the germs that caused them as enemies in a modern war, a threatening, alien *other* (Gwyn, 1999).

The appearance of AIDS in the 1980s led to an enormously increased interest in the immune system in both scientific and lay audiences. The HIV virus was understood as destroying the body's defences from the inside of the very cells responsible for its defence (Moulin, 2000). In her essay *AIDS and its Metaphors*, Susan Sontag (1989) argued that while the early AIDS epidemic had been dominated by the 'gay plague' metaphor, the middle of the 1980s saw a new set of metaphors come into play. These built on the military metaphors common in bacteriology, but also reflected the age of *Star Wars* and *Space Invaders*, as well as the dawning information age. Thus by a process of repeated exposure to certain metaphors it became natural to talk of the HIV virus *docking* onto the

T-cell, *reprogramming* the cell to produce more HIV and *hijacking* the body's own *defences*.

In the years following the appearance of AIDS, the immune system became central to Western scientific and lay conceptions of health. People were exhorted to 'strengthen' their immune system by attention to diet and by minimising stress, and thus to transform or train their immune system and render it superior (Martin, 1994). This way of conceptualising the immune system became embedded into representations of health and infectious diseases and, as discussed below, became particularly pertinent, for example, in the discourse around 'superbugs' in the late 1990s.

Although rooted in scientific notions, ironically the notion of the immune system as something that individuals can 'bolster' also transected with the growth of interest in the 'alternative' medicine movement, which saw an astonishing rise in popularity from the 1980s onwards. By 2005 alternative medicine was used by around half of the population of European countries such as France, Belgium, Germany and Denmark, and by up to 70 per cent of people in Australia, America and Canada. In 2005, one in ten people visited one of the estimated 47,000 alternative practitioners in Britain, compared to 35,000 medical General Practitioners (Shapiro, 2008).

Alternative approaches to health are often based on 'holistic' notions of disease being caused by a weakened immune system. Contaminants in the environment, such as 'junk' food or air pollution, are said to damage the immune system, as are conventional medical treatments, such as those for cancer or AIDS. The immune system is then understood to need support by various supplements and through special diets. This approach is rooted in the notion that we are individually responsible for our own health, and through self-help methods can wrest control of our bodies away from both the disease itself and from a 'biomedical model', which is regarded as alienating. Whilst alternative medicine is dismissed by most of the medical establishment as quackery, and as a softer form of victim blaming, its widespread popularity suggests both a loss of faith in conventional 'scientific' medicine and that its underpinning conception of the immune system has deep cultural resonance.

America saw a renewed emphasis on the invisible dangers lurking from germs in the light of the so-called 'war on terror'. A 2006 article in *The New York Times* reported on a range of new consumer products reaching the US market, including: *Purell-2-Go*, a hand-sanitising gel manufactured by the pharmaceutical giant Pfizer, which came in small bottles with rubber rings to attach it to backpacks, lunchboxes and key

chains ('We tried to make it fun', gushed a Pfizer spokeswoman); *Safe-T-Gard*, 'a combination dispenser of doorknob-sized tissues and trash receptacle' to be mounted on the wall next to public toilet doors; *Sanit-Grasp*, a U-shaped handle which allowed toilet cubicle doors to be opened using the forearm; a portable subway strap that promised to do away with 'reaching for a slimy overhead bar'; ultraviolet 'pens' that could be dipped into a glass of water to kill DNA; and an air purifier to be worn around the neck as a pendant. Echoing the importance placed on hand hygiene a century earlier, an American children's book published in 2005 called *Germs are Not for Sharing* instructed: 'When germs get on your hands, they can spread to other people... [w]hen you hold hands or play games or give each other high fives' (Salkin, 2006).

It is easy to lampoon American germ phobia as related to a sense of loss of control in a threatening post-9/11 world. Yet a similar renewed focus on the transmission of germs, particularly through poor hand hygiene, also pervaded the British media coverage of the 'superbug' MRSA. As discussed in the previous chapter, the British media and political discourse around MRSA was dominated by descriptions of dirty hospitals. An apparently modern discussion of the danger of dirt (because of the pathogenicity of bacteria) obscured a more fundamental and 'primitive' fear of an invisible danger lurking in the chaos of underfunded and poorly managed hospitals (Washer & Joffe, 2006).

Research carried out with a cross-section of the British public found that these media representations of MRSA were widely shared by the audience, as was the perceived solution of improved hospital hygiene, enforced by the return of the matron. Yet while scientific/biomedical accounts of MRSA would, at least in part, blame the emergence of antibiotic-resistant strains of bacteria on the overprescription of antibiotics, only a minority of the respondents in this research (the broadsheet-reading men) made any link between MRSA and antibiotic use. The distinction between healthy self and diseased *other* was transformed in the lay discourse around MRSA. Lay notions of the immune system led to a new distinction being made between the invulnerable healthy self with a 'boosted immune system' and the diseased immunocompromised *other*, such as the elderly or those already hospitalised. As with othering mechanisms seen in relation to responses to other EID such as AIDS, the distinction served the same function, which was to distance the perceived threat of MRSA from the self and project it onto *others* perceived to be at risk (Washer et al., 2008).

One of the difficulties in trying to disentangle those practices associated with modern germ avoidance from those which have their roots in

more 'primitive' notions of contagion lies in distinguishing those practices where we 'know' that the reason for the dirt avoidance practice is to protect against contracting an infection. It is easier to pin-point more 'primitive' notions of contagion within 'modern' practices in contexts other than those involving infectious diseases, where there are no germs which could contaminate, yet still people have practices that symbolically separate the healthy self from the contaminating *other*.

One such example is Jodelet's (1991) fascinating study of an open psychiatric institution in central France in the 1970s, where for several generations mentally ill patients had been placed in the care of local families. One of the most striking behaviours in the vast majority of placements was the families' separation of the lodgers' cutlery, crockery, glasses, and sometimes even laundry. The families themselves had difficulty accounting for these practices. Although they denied the possibility of contagion with the mental illness of the lodgers (in the medical sense), they still evidenced fear of some sort of 'magical' contagion.

This example of the separation of the lodgers' from the families' cutlery, crockery and glasses is a contagion practice that persisted even when it was accepted there were no 'germs' to catch. As Norbert Elias (1939) points out in *The History of Manners*, although we take individual cutlery entirely for granted, even as late as the seventeenth century in Europe the fork was a luxury item for the upper classes only, usually made of gold or silver. Before that, in the medieval period, everyone ate from the same dish with their hands. A medical materialist explanation might see the elimination of eating with the hands, the introduction of the fork, individual cutlery and crockery, and all other modern Western food rituals as being based on 'hygienic grounds'. But even as late as the second half of the eighteenth century there is hardly any evidence for that kind of motivation.

There is nothing to suggest that changes in manners came about for reasons that were 'rational' or were related to causal connections to health. The delicacy of feeling demonstrated through developments in Western table manners were only later justified through scientific understandings of hygiene. Modern sensibility is that it is unhygienic to eat with the fingers because of contact with the germs of others, who may be diseased. Yet, as Elias points out, to take bread or cake from one's own plate and put it into our mouths with our fingers is no more hygienic. Most of what we call 'hygiene' thus has the same function as 'morality', which is to condition children to a certain standard of socially desirable behaviour, even though it may appear that that behaviour is in the interests of health or human dignity.

As discussed in the previous chapter, in the Western media coverage of the SARS epidemic, one of the ways in which the Chinese were *othered* was through attention to their alleged poor hygiene, in particular the practice of spitting in public places. The media descriptions of such practices are clearly meant to invoke 'our' disgust at the way 'they' behave. Take this example of a report of a Chinese market during the height of the SARS panic, from a liberal British broadsheet, the *Independent on Sunday*:

... As I watched a man buying scorpions, the woman serving him hawked a gob of sputum from her throat, lurched to her feet and spat expertly behind my heel. Spitting is as natural as sneezing here – bubbles of phlegm pepper the streets – and could be spreading the virus. Of such simple habits are global epidemics made. (Laurance, 2003)

European squeamishness around spitting in public thus confirms the superiority of Western civilisation. Yet even in Europe, spitting in public was not only common amongst all classes until relatively recently, but was also felt to be necessary. Only through the seventeenth and eighteenth centuries did the practice become more and more distasteful, until it came to be considered shameful. Like the example of the use of cutlery to eat, this change in behaviour was driven by rising societal thresholds of repugnance, rather than by a medical materialist understanding of germs and their transmission through sputum (Elias, 1939).

As discussed above, miasmatic theory connected unpleasant smells with the sources of contagion and held that prophylaxis against disease was achieved by removing the smell, either by disguising it with aromatics or perfume or through ventilation. The acceptance of germ theory severed the connection that had previously existed between smell and disease. Over the past 100 years or so, the importance of smell has become increasingly marginalised in Western culture. Darwin, in *The Descent of Man*, postulated that humans lost their acuity of smell in the process of evolving from animals. Freud, in *Civilization and its Discontents*, held that smell had given way to sight when the human species began to walk upright, removing the nose from the proximity of scent trails and increasing the visual field (Classen et al., 1994). In the modern world, or the developed world at least, smell is mostly noticeable by its absence.

However, smell still connects modern understandings of germs to a more 'primitive' miasmatic fear of contagion. For example, a recurring *motif* of the British media's coverage of MRSA, as well as in the audience

responses to that coverage were lurid descriptions of toilets, bodily functions and their association with particular smells. These were contrasted with the antiseptic 'hospital' smell associated with the 'spotless', 'pristine' wards which the matron would enforce. The lack of a foul smell and/or the presence of a disinfectant smell in a hospital thus suggested to people that infection had been dealt with. This olfactory reassurance is in fact mistaken – disinfectant solutions are often used inappropriately and have been shown to be the sources of contamination and infections in hospitals (Ayliffe & English, 2003).

Be that as it may, the accounts of smells associated with 'superbugs' reveal traces of a cultural residue of pre-scientific conceptions of contagion, located within and alongside a framework of modern scientific understandings.

The hygiene hypothesis

Throughout the twentieth century in Western societies, levels of expected cleanliness both escalated and became standardised. For example, the daily shower came to replace the once traditional weekly bath, and an expectation arose that freshly laundered clothes should be worn each day. Conventions of cleanliness in contemporary Western societies demanded increasingly frequent washing, despite the decrease in environmental dirt arising from developments such as mains water and sewerage systems, paved streets, the use of cars rather than horses as transport, the introduction of electric power and decreasing dependence on coal (Shove, 2003).

Thus far, the narrative has been of a notion of 'progress' towards ever 'higher' standards of hygiene, by which is usually meant Euro-American standards of washing and disinfection. However, this increase in cleanliness has led to another recent strand of the discourse around dirt, which argues that 'we' are now *too clean*, and that rather than preventing diseases, this over-cleanliness is causing disease.

Over the past few generations, more affluent, Western countries have seen an enormous increase in autoimmune diseases such as Type 1 diabetes, Crohn's disease and multiple sclerosis, as well as of allergic diseases such as asthma, allergic rhinitis and atopic dermatitis. Whilst there is a familial element to allergies and asthma, it is nevertheless clear that their prevalence has increased: in some developed countries up to 40 per cent of children have asthma. There is also evidently some link between Western 'lifestyle' and allergic diseases. For example, recent immigrants from the developing world often develop allergies around five years after

immigration to the developed world; and after German reunification the previously lower prevalence of allergies in East Germany rose to the same, higher, prevalence as in West Germany (Kaufmann, 2009).

In 1989, Strachan first proposed the so-called 'hygiene hypothesis'. He showed that the prevalence of hay fever in British children, which had been increasing for 30 years, was inversely related to the number of children in the household. He suggested that unhygienic contact with older siblings led to infections with viral illnesses, particularly of the respiratory tract, such as the common cold, measles, mumps and rubella, and that this exposure conferred protection against hay fever. Thus he proposed that in wealthier countries declining family size, improvements in household amenities, and higher standards of personal cleanliness were responsible for a reduced opportunity for cross-infection in young families and a resulting rise in allergic disease such as hay fever (Strachan, 1989).

Since first proposed, evidence has accumulated to support the 'hygiene hypothesis'. For example, epidemiological studies of Italian Air Force personnel found that respiratory allergy was less frequent in those people heavily exposed to food-borne microbes transmitted via the faecal-oral route, such as *Toxoplasma gondii* and *Helicobacter pylori*. This suggests that hygiene and a Westernised semi-sterile diet may stimulate the tendency to develop allergies by influencing the overall pattern of pathogens that stimulate the gut, thus contributing to the epidemic of allergic asthma and rhinitis in developed countries. Such data support the hypothesis that allergies may be prevented by eating traditionally processed food, not treated with antimicrobial preservatives and not subjected to hygienic procedures (Matricardi et al., 2000).

Later studies have proposed that protection against allergies is not endowed by childhood viral illnesses but rather by early and continual exposure to non-disease-causing microbes, especially the kind that children come into contact with around other children and animals. For example, children growing up on farms are exposed to a greater diversity of microbes, yet have a lower prevalence of allergies compared to neighbouring children not brought up on farms but from the same villages. This indicates that even when there is no apparent illness an immune response is stimulated which protects against allergies, and, conversely, the lack of such exposure seems to promote immune disorders in people with an underlying predisposition for them. The suggestion is that harmless 'colonisation' by environmental bacteria that pass through the body acts as an immune regulator (Sachs, 2007; Schaub et al., 2006).

This new conceptualisation of the relationship between people and germs has led some to be concerned about the potential harm that antibiotics may cause, as they kill normal 'good germs' in the gut. A number of studies have found an association between antibiotic use in children and asthma, although this may be because in many countries children with asthma are likely to have been inappropriately prescribed antibiotics (Sachs, 2007; Schaub et al., 2006).

The popularisation of the notion of 'good bacteria' associated with the hygiene hypothesis has led to the launch of 'probiotic' supplements added to yoghurts, which have become one of the fastest-growing sectors of the dairy market, despite their benefit to healthy people being uncertain. Probiotics have an ambivalent status, being marketed as science-based products and yet also advocated as an advance in alternative medicine. Their official advertising, which is subject to advertising standards regulation, claims only that they 'maintain digestive health' by 'improving digestive transit'. However, media coverage claims that they can prevent infectious diseases, improve thinning hair, even prevent autism. The ills of modernity, such as improper diets, stress and lack of energy are said to be particularly susceptible to 'treatment' with probiotics. The media coverage of probiotics does not question the assumption that we need to 'top up' our 'good bacteria'. Consumers seem to be increasingly buying into the promise that probiotics can rebalance an inner order in a risky and disorderly outer world (Nerlich & Koteyko, 2008).

The return of the anti-vaccination movement

As well as concerns about modern attitudes to hygiene harming the immune system by not stimulating it enough, another related strand of the contemporary discourse around the immune system and infectious diseases argues that negative health consequences follow from *overstimulation* of the immune system through vaccination.

Modern Western anti-vaccination movements have inherited some of the nineteenth-century anti-vaccination libertarian rhetoric (as discussed in Chapter 2), although not the religious interpretation of vaccination as interfering with God's will. Instead, parents in the developed world now often conceptualise vaccination as 'interfering with nature'. The modern anti-vaccination debate started in the 1970s, with concerns in Britain that pertussis (whooping cough) vaccination was linked to brain damage. As a result, pertussis vaccination coverage fell from around 70 to 80 per cent to around 40 per cent of British

children. In 1979, the British government introduced a Vaccine Damage Payment Act and confidence in pertussis vaccination was gradually restored.

The 1980s and 1990s saw new anti-vaccination groups emerge in many Western societies, facilitated by the then novel technology of the Internet. These groups were often associated with the advocacy of alternative medicine and made a range of claims about the harm said to be associated with vaccinations. They argued that the diseases were anyway declining, that vaccines were a violation of civil liberties, that adverse events were under-reported, that vaccines caused idiopathic illness and that they eroded immunity, and that vaccine policy was motivated by profit and promoted by 'big pharma' (Blume, 2006).

In 1998, a study published in the medical journal *The Lancet* reported data from 12 children suggesting a possible temporal association between the measles, mumps and rubella vaccine (MMR) and the development of inflammatory bowel disease and autism (Wakefield et al., 1998). The resulting furore led to MMR vaccination rates dropping to a record low in the UK. Falls in MMR coverage were reported in other northern European countries, the USA, Australia and New Zealand, although though not to the same extent as in Britain. The research in question was independently reviewed several times, and scientific opinion very strongly refuted the suggestion of any link between MMR and autism. The paper was later retracted, and the study's author, Dr Andrew Wakefield, was charged with professional misconduct.

It has been suggested that the MMR controversy had greater resonance in Britain because it came so soon after the BSE episode there. Journalists and the public alike were suspicious of government and health officials and questioned expert opinion (Singh et al., 2007). The confidence of British parents was also shaken by the refusal of the prime minister, Tony Blair, despite relentless media speculation, to confirm or deny whether his own infant son had received the vaccination. As a result of poor MMR coverage, in 2006, Britain had an epidemic of measles, with 300 cases, the largest outbreak since the introduction of the MMR vaccine at the end of the 1980s.

Similar anti-vaccination sentiments found fertile ground in the Netherlands and in Germany, where as a result of declining vaccination coverage 17 children and adolescents died from complications of measles between 2003 and 2007 (Kaufmann, 2009). Research in the Netherlands found parents who were opposed to vaccination were well educated but resisted (particularly the measles) vaccination on the grounds that they were convinced that it could impair the immune

system, or that vaccinations in general had long-term and unknown side-effects. Their decisions were sometimes based on assumptions about the learning capacity of the immune system. Parents believed in keeping the immune system 'strong' through the use of alternative medicine (Streefland et al., 1999).

A study of English parents regarding their MMR decisions also found that more experience of alternative medicine correlated with rejection of the MMR, although not all parents who used alternative therapies refused to vaccinate, and conversely not all non-vaccinators embraced alternative therapies. In light of the proposed link between the BSE and MMR controversies made above, parents in this study seldom mentioned the controversy over BSE as influencing their lack of trust over MMR, and a few actively denied that the BSE controversy had influenced their views on MMR. They tended to conceptualise their child's health as shaped by family history, birth and other illnesses, and they incorporated concerns about sleep, allergies, dietary tolerances, character and behaviour as all influencing a child's particular vulnerabilities to disease or vaccination. Parents reflected not on 'risks' or 'safety' in general, but whether they thought the vaccination was right for *their* child (Poltorak et al., 2005).

The re-emergence of anti-vaccination movements echoes some aspects of Giddens's conception of late modern societies, as discussed in Chapter 4. The new anti-vaccination movement is facilitated by one of the features of the globalised late modern society, namely the mass media and the Internet. The movement also links to Giddens's conception of the reflexivity of late modernity, and reflects the detraditionalisation of society. In earlier societies the pronouncements of 'experts' (in religion, science or medicine) provided secure 'knowledge' that people were expected to follow. However, in late modern societies growing numbers of parents are beset by doubt about the risks of vaccination, and question expert opinion.

This speaks to the changing relationship with 'expert' knowledge and lack of trust in the institutions of modernity, including medicine, the media and government. Potential risks, such as those felt to arise from vaccinations, are reflexively examined by individual parents. Risks are then framed as relating to *their* particular child's health and in relation to new constantly incoming scientific and lay 'knowledge' about the risk of vaccination. The critical stance against vaccination is a logical consequence of the wresting of control away from medical 'experts' and the shift towards consumerism, informed choice and empowerment in health, in light of which educated Western patients and parents also

expect to make informed choices in other areas, for example in the rise of the natural childbirth movement (Blume, 2006).

This discussion of the MMR here also links with Beck's *Risk Society* thesis. The risks said to arise from vaccinations, do not occur 'naturally' but are a product of medical intervention. At the same time it is scientists and medical 'experts' themselves who judge the safety of vaccinations. The MMR scare captures many of the features the *Risk Society*. Anti-vaccinationists hold that the chains of cause and effect to the alleged vaccination adverse events are difficult or impossible to trace. Although MMR is most often thought to lead to immediate harm by causing autism soon after administration of the vaccine, some anti-vaccinationists have argued that the risk has a potentially long latency period and allege long-term reactions to vaccines due to them damaging the immune system (Dew, 1999). The risk of MMR vaccination is also said by its opponents to be incalculable, its consequences impossible to estimate scientifically. MMR also seems to fit the Beckian model insofar that the consequences of MMR – allegedly autism – may be so catastrophic that no amount of compensation would offset the risk.

The growth in interest in alternative medicine, with its roots in the scientific conception of the immune system, and its association with the modern anti-vaccination movement also speaks to a new relationship between the ideas of dirt, germs and health in late modern society. The 'hygiene hypothesis' brings us back to Douglas's idea that dirt as *matter out of place*. Germs are now recast, not as negatively associated with dirt, but as necessary. 'Good germs' *in the right place* are seen as essential for the maintenance of health, by 'testing' and 'strengthening' the immune system. This definition of 'good germs' includes respiratory viruses, pathogens from farm animals, even food-borne microbes transmitted via the faecal–oral route.

A century ago, the new germ theory perceived the avoidance of other people's germs through strict hand washing and other hygiene practices as essential for the maintenance of health. In this new understanding, the germ phobia that leads Americans to avoid touching handrails on public transport is now portrayed as damaging their immune systems and thus their health. 'Good germs' are recast as necessary for the avoidance of an epidemic of diseases of the immune system that are associated with modernity. The immune system is understood as needing to 'learn from the environment' in order to function correctly. Thus the hygiene hypothesis links to the notion that the 're-emergence' of infectious diseases is in part linked to modernity, and to ideas about the 'unnatural' semi-sterile processed foods and of 'harmful' antibiotics, which are now

no longer thought of as 'magic bullets', because they alter the 'natural' 'good' bacteria in the human gut (Rook & Stanford, 1998).

The discussion of changing conceptions of dirt to something seen as in some sense 'good for us', brings us back to Douglas's notion that modern beliefs about dirt express symbolic systems and have metaphorical meanings beyond those offered by medical materialism and germ theory. One of the sources of resistance to vaccination lies in the sense of dread of contamination of a clean, pure, healthy body, particularly of a baby (Spier, 2002). Instead of vaccinations protecting against contaminating germs, this new social construction incorporates medical materialist notions of cleanliness and pollution with a cluster of lay understandings of the role of dirt, of hygiene, germs and the immune system. This worldview perceives non-vaccination as restoring the 'natural' order of things. It is not so much that modern notions of dirt and germs have replaced 'primitive' ones, nor has the pendulum swung back in some way in the light of the 'hygiene hypothesis' to pre-modern conceptions of cleanliness. Rather, the discussion in this chapter points to the conclusion that 'primitive' pre-bacteriological conceptions of dirt and its relationship to contagion coexist with biomedical notions.

While concerns about damage to the immune system and threats from naturally occurring epidemics grew through the 1990s, another different strand of the discourse around germs, contamination and containment gradually came into view. The next chapter will explore how, in parallel to the EID discourse, a new threat garnered increasing attention. This new discourse used much of the same language, metaphors and concepts as those used around EID, and the solutions to both problems were said to be shared. The next chapter will explore how the EID discourse was metaphorically hijacked by the newly emerging discourse around bioterrorism.