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'Post antibiotic apocalypse': discourses of mutation in narratives of MRSA

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Abstract In this paper we will consider the question of mutation as it is manifested in press coverage of MRSA in UK hospitals. This represents a fertile field of discourse which brings into focus issues relating to microbes, people and working practices as well as the concepts of risk and vulnerability. A regular feature of reporting has been the presence of explanations for drug resistance involving repeated random mutations of the microbe to achieve progressively greater resistance and versatility, largely through a Darwinian process which is 'clever' at overcoming human attempts at elimination. More recently a discourse has emerged which foregrounds also the vulnerability of patients who are very young, old or otherwise immunocompromised, or whose own genetic makeup might put them at risk from the microbe. The hospital is decentred as a source of infection, and attention is turned instead to nursing homes and gymnasia as sources of infection in the community. This latter development mitigates the responsibilities of hospitals and statutory healthcare providers and turns the risk back towards the individual as a responsible actor in an ecology of mutation.

Keywords: MRSA, healthcare associated infection, mutation, discourse, narrative

Introduction

The focus of this paper is on how notions of mutation and monstrosity are formulated in the public debate and discussion of the hospital acquired infection methicillin-resistant Staphylococcus aureus (MRSA) and how these relate to broader currents in the cultural formulation of risk and responsibility under conditions of advanced liberalism. Aside from the human suffering involved, hospital acquired infections represent a particularly thorny theoretical problem within the dominant biomedical framework of healthcare. The sense of technological advance and progress in fighting infection – the sense of emancipation through scientific progress (Lyotard 1984) – is challenged by popular and technical discourses detailing the hazards of a sojourn in hospital. The kinds of narratives concerning iatrogenic problems, hospital acquired infections and adverse incidents in healthcare often implicate a perceived threat to deeply held beliefs about material, moral, or social order (Douglas 1966).

Discussions of problems such as MRSA, where it appears that our ability to overcome disease is regressing rather than progressing, are instructive because they open up for

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examination networks of social and material relations that might otherwise appear to be settled. They provide fertile ground to perform what Bowker (1994) has called 'infrastructural inversion': bringing to the foreground the central importance of technologies, people and work practices that ordinarily reside in the background (1994: 10–14). They invite a whole range of complex discursive work to render the situation intelligible.

The 21st century has seen an unprecedented level of concern about healthcare associated infection (HCAI), which was estimated to afflict around 100,000 people each year in England, kill about 5,000, and cost the UK's National Health Service £1 billion (National Audit Office 2000, 2004). Until 2007, a rising trend in mortality attributable to these infections was being sustained, despite efforts on the part of policymakers and practitioners (Office of National Statistics 2007). Such statistics and negative media reporting on poor hospital hygiene (Gould 2005) has led to a drive for hospital cleanliness and ambitions to achieve a reduction in healthcare associated infection (National Audit Office 2000, NHS Estates 2000, Department of Health 2002a, 2003b, 2004b, 2004c, NPSA 2004), not least because of its socio-economic burden (Plowman *et al*. 1999, 2001). Furthermore, HCAI and hospital cleanliness are 'perceived as serious problems by the British public and health workers' (Gould 2005). Despite falls in incidence being reported in the UK in late 2007 (Mooney 2007), progress towards UK government targets of halving the incidence of MRSA by 2008 were unlikely to be achieved (Day 2007). Reports suggest an increasing trend in the US (Spurgeon 2007). Thus, despite a range of hygiene and other prophylactic measures and numerous government-sponsored initiatives, the infection is proving difficult to reduce significantly to date. Despite concerns in the popular media that visible dirt in hospitals is linked to enhanced risk of patients contracting MRSA, the evidence from more formal research suggests that any link is far from clear cut (Dancer 2008, Green *et al*. 2006).

The notion of mutation is central in many accounts of how MRSA and other HCAI are continuing, despite efforts on the part of so many powerful human actors. The genealogy of discourses of mutation in biology has been dated to Hugo De Vries in 1901 who propounded the term in the context of Mendelian genetics (Crow 2003), but it was later in the 20th century that mathematically-inclined biologists such as Ronald Fisher and J.B.S. Haldane incorporated this concept fully as one of the primary factors in evolution. The position of mutation as a central plank in evolutionary theory was consolidated by Theodosius Dobzhansky's (1937) *Genetics and the Origin of Species*, and Julian Huxley's (1942) *Modern Synthesis*. Here, mutation and genetic recombination are understood to produce variability within a population of reproducing organisms, supplying the raw materials for Darwinian processes of natural selection (Crow 2003).

As Haraway (1992) notes, the idea of mutation challenges notions of constancy and identity which are at the heart of the orderly taxonomies of species found in enlightenment biology. The ability of Staphylococcus aureus to change and deploy new resistances represents a challenge to the notion that pathogens can be overcome with precisely targeted drugs whose effectiveness will be sustained. The versatility of Staphylococcus aureus and its ability to live within us is also a technical challenge to medicine. A distinctive feature of these debates is the way that they are played out in the public sphere. This is a noted feature of debates about genetics and biotechnology (Arnasson and Hjorleifsson 2007, Ten Eyck 2005) and most authors see the mass media as offering a culturally significant forum for such debates to take place (Bates 2005). Scholars of science reporting have noted a number of divisions in UK journalism, depending on whether the paper is positioned as a popular tabloid, middle market or 'serious' publication, with particular target audiences defined by socio-economic status, gender and age. Traditionally, serious journalism, as one might find

in the *Times*, *Guardian*, *Telegraph* or *Independent*, adopts the political, economic and scientific concerns and vocabularies of elite groups (Seale *et al.* 2007) whereas tabloid journalism reflects more personalised concerns relating to entertainment, sport and readers' experiences, and is expressed in more colloquial vocabularies (Esser 1999, Fowler 1991). Equally, a more populist human interest agenda has been detected in so-called serious newspapers (Uribe and Gunter 2004).

How we construct the nature of the human organism and the relationships it has with other kinds of organisms is particularly crucial in making sense of the activities, experiences and narratives surrounding HCAI. As Haraway (1999) reminds us:

> Organisms are made; they are constructs of a world-changing kind. The construction of an organism's boundaries, the job of the discourses of immunology, as particularly potent mediators of the experiences of sickness and death for industrial and post-industrial people (1999: 204).

Yet Staphylococcus aureus, with its ability to share DNA between individual microbes via plasmids and transposons, represents a challenge even to those boundaries, as advantageous traits are spread within and between colonies. The microbes implicated in MRSA outbreaks throw doubt upon the carefully constructed sense of order implicit in notions of biological individuals.

The threats posed by disease and the ways in which these are talked about have already been the subject of a great deal of scholarship. For example, Ungar (1998) examined the media coverage of 1995's Ebola outbreak and compared it to other diseases such as AIDS. He identified a set of themes which he termed the 'mutation-contagion package'. This comprises the notion that microbes are on the rampage; that they are 'cleverer' than us – evolving to 'outwit us', which reverses the more usual idea that infectious diseases can be conquered. In this 'mutation-contagion package', microbes and the environment are conjoined in an ecological parable involving population growth and antibiotic overuse, and with microbes knowing no boundaries (globalisation), and the notion that we are waiting for the next plague. However, Ungar (1998: 48) notes that very quickly, news reports of Ebola stressed 'containment' – concerning attempts 'to defuse, tame and redirect the threat' along with reports that early fears of how readily it could be transmitted were exaggerated.

This differs from press reports of MRSA in important ways. Washer and Joffe's (2006) account of MRSA coverage in UK print media detects many respects in which Ungar's (1998) analysis fits the UK situation, especially the idea of a 'mutation-contagion package'. In the case of MRSA, however, there were no promises of containment through 'medical progress'. Rather, the promise of containment arises from alternative therapies and through strengthening the immune system via non-allopathic measures. As the authors note, this invites the question of whether the 'hospital superbug' jeopardises faith in conventional medicine sufficiently for people to turn elsewhere for the hope of a cure.

The extensive mass media coverage and involvement of policymakers mean that MRSA mutation does not occur in a political or social vacuum. As we shall argue, the concept of mutation offers the possibility of forging new links between nature and culture and of reformulating the relationship between the individual, large organisations and the state itself. In what has variously been described as 'late modernity' (Giddens 1991) or 'advanced liberalism' (Rose 1999), governments are alive to the possibility of problematising the questions of government. In contrast to an earlier Keynesian, welfarist model, the position referred to as neoliberalism claims that 'opportunities' can be created through the activation

of market principles and laissez-faire economic policies. Neoliberalism is not just a set of political ideals, but is a 'political rationality' (Foucault 1991, Gordon 1991) or 'formula of rule' (Rose 1996) that informs how governance is practised. In the case of health and risk, the development of this position has involved an increased emphasis on 'responsibility' and 'choice' on the part of citizens and attempts to reduce the role of the state in provision whilst increasing the opportunities for entrepreneurs and private investors. The morphologies of embodiment we discover in popular discourses of health may have hitherto unexamined links to this process of governance.

The issue of risk, as is well known, is central to Beck's (1992) notion of a 'risk society' which he argues has replaced earlier industrial societies. Rather than a 'politics of goods', contemporary political and public life is dominated by attempts to conceptualise and manage risks. Central to the politics of a risk society are 'conflicts of accountability' over how the consequences of risk can be attributed, controlled and legitimated. Risks – such as that posed by MRSA – are generated within modernity, but their spatially distributed, unpredictable and imperceptible nature means that the institutions of modernity cannot 'comprehend or legitimize' them (Beck 1994: 10, 1996: 32).

Because of its manifest concern to policymakers, practitioners, journalists and the public at large, MRSA represents an important test case to explore the role of representations of mutation and their link with broader political practices of governance and public processes of risk management. The representations formulated by intermediary groups such as journalists may display the workings of the interface between professionals, policymakers and lay people (Morant 2006).

The study

Method

The empirical work in the present study was conceived so as to explore the public discourse of mutation and monstrosity surrounding MRSA via the printed news media. Specifically, in the course of the study the following research questions were devised:

- How do the writers construct notions of mutation and how does this relate to the identified impacts of the MRSA pathogen on healthcare and public policy?
- To what extent do notions of mutation and risk relate to the predominant political themes of advanced liberalism and how is this used to make sense of the challenges to public health presented by MRSA?

Design/methodology

The empirical work for this paper was informed by an approach based in thematic analysis (Braun and Clarke 2006) and to a lesser extent grounded theory. With the analytic strategy of thematic analysis, data exploration and theory-construction are combined and theoretical developments are made in a 'bottom up' manner so as to be anchored to the data (Braun and Clarke 2006, Glaser and Strauss 1967, Strauss and Corbin 1998).

The strength of this approach is illustrated by the way that existing theoretical presuppositions about the notion of mutation were challenged by the data, in that there appear to be broader issues at stake. For example, as we shall see, the idea that the mutations in Staphylococcus aureus exist in a kind of complex ecology which diffuses the responsibility of healthcare organisations and government for the risk, and refocused it back on the individual, was unanticipated at the outset.

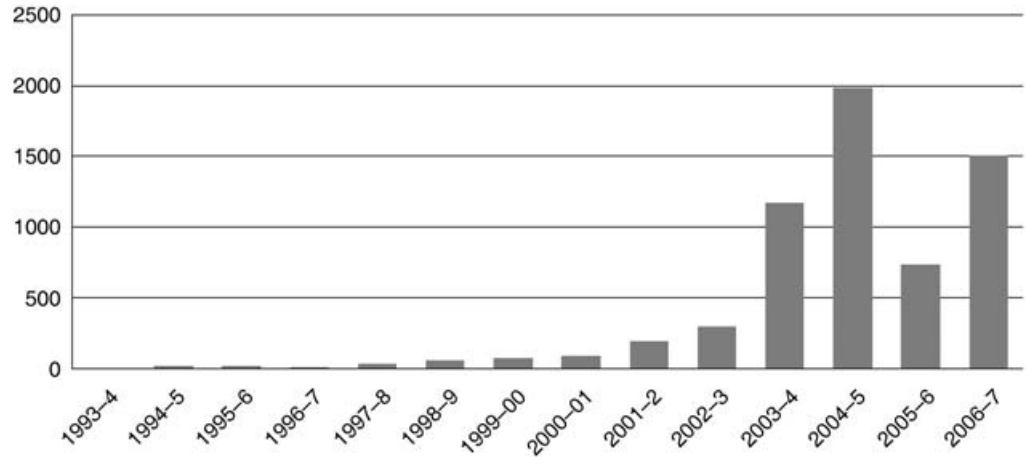

Figure 1 *Frequency of mentions of MRSA by year in UK national newspapers*

Sample

The Lexis Nexis database of print media news was searched for items relating to MRSA from the origins of the problem to the time of writing (25/12/2007). Early examples included the first occurrences of 'monster superbug' (*The Guardian* 23 May 1995) and 'mutate into potential killers' (*Evening Standard* 6 August 1992[1]) and that Staphylococcus aureus had an 'almost legendary' ability to mutate to attain antibiotic resistance (*The Guardian* 25 May 1994). The distribution of items over the sample period in UK national newspapers is shown in Figure 1.

The sample upon which this paper reports consists of items retrieved from UK English language national newspapers from 1992 to 25th December 2007.

The terms 'MRSA' combined with 'mutation' yielded 1,073 items and 'MRSA' and 'mutate' yielded an overlapping pool of 390 items. To provide a sense of the historical trend, the distribution of items containing the terms MRSA and mutation is presented in Figure 2.

As the analysis progressed, moving from present day reporting towards the earliest occurrences, ideas and topics suggested by news items, particularly those relating to the mutagenic properties of the bacteria, were notably prominent and these were used as a basis for further investigation of earlier texts. The final analytic reading then addressed what the material expressed about the role of monstrosity, mutation and mutagenesis in the data set and extended into a close reading to extract themes relating to:

a) Accounts of what the pathogens implicated in MRSA infections do in order to survive in hospital environments;
b) Their similarities to and differences from other health problems;
c) The severity and prognosis of the problem;
d) What this means in terms of how risk is formulated and understood under advanced liberalism.

Validity, reliability and rigour

Whittemore *et al.* (2001) and Jorgensen (2006) advocate credibility, authenticity, criticality and integrity as primary criteria for evaluating qualitative research. Credibility (Lincoln

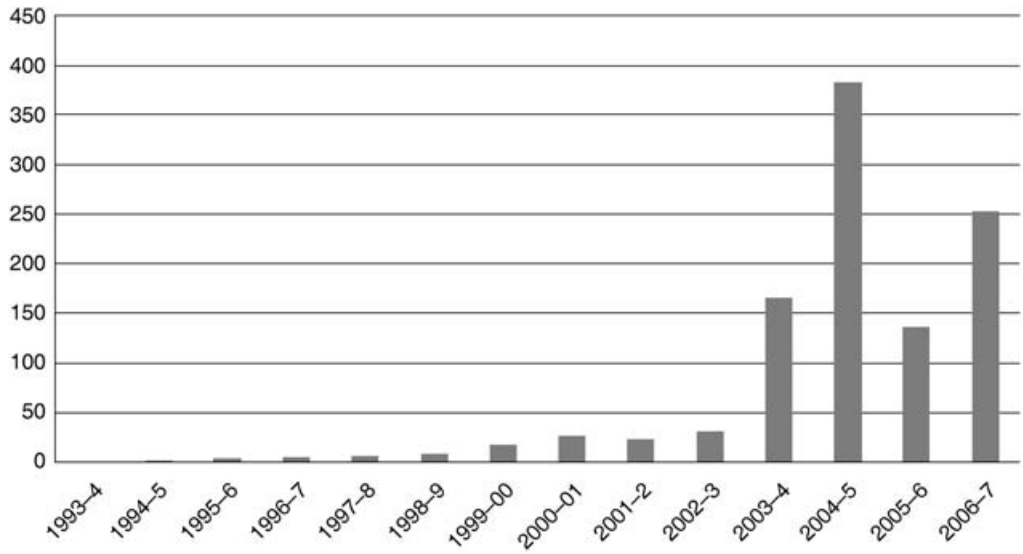

Figure 2 *Frequency of news items including the terms 'MRSA' and 'mutation' 1993–2007*

and Guba 1985), relates to whether the results of the research reflect the experience of the participants in a believable way. The themes presented here were identified by the researchers working separately, and differences were resolved in subsequent discussion. This enabled us to refine them in the light of feedback, thus addressing the challenge of preserving the original authors' definitions of reality (Daly 1997: 350) through a recursive process of validation against the source material. Authenticity was addressed by retaining a reflective awareness of our preconceptions, and retaining also the possibility of being surprised by findings. The criteria of criticality and integrity relate to the potential for many different interpretations that can be made, dependant on the assumptions and knowledge background of the investigators. To address this, two groups of researchers were convened at the authors' host institutions to review the emerging themes and to establish their credibility, plausibility and their resonance with experiences beyond the confines of the original study (Horsburgh 2003). Items for inclusion were thus selected on the basis of the agreement of the broader research team that they exemplified the themes emerging, subsequently narrowed in the light of considerations of space. Thus, the resulting organisation of data is both plausible and rigorously defensible in terms not only of the authors' interpretation but in terms of that of fellow researchers.

Results and discussion

The presentation of the results is organised around four interrelated themes which were detected in the source material and which cut across the divide between the tabloid and more 'serious' newspapers. These are:

1. *Context: evolving histories* which included discussions of the mutation and evolution of the microbe and its implications for human health.

2. *Apocalyptic predictions*. This incorporated both apocalyptic themes in the sense of anticipated devastation but also apocalypse themes in the sense of personal tragedies and in terms of the disclosure involved in the classical meaning of apocalypse as a 'lifting of the veil'.
3. *Versatility, toxins and places*. In order to accomplish the post antibiotic apocalypse, the versatility and toxicity of the microbe were formulated, as well as its ability to transcend spatial and corporeal boundaries.
4. *Ecologies of causality and the decentring of risk*. In connection with the predicted casualties and the versatility of the microbe, explanations have extended to incorporate the pre-existing vulnerability of certain patients, rather than solely questions of hygiene relating to hospitals. This decentring of risk has parallels with the way that risk is imputed to the individual in neoliberal social welfare policies.

Context: evolving histories

In the press coverage, there was a tendency on the part of some authors to contextualise the present-day 'crisis' over MRSA in relation to a long history, which ranged over the origins of antibiotic treatment and the consequent selection pressures operating upon the microbes. A recent example is Gray (2007: 19) writing in the broadsheet *Daily Telegraph*, who embeds the present problems within such a history:

> It was less than 100 years ago that a new development gave us the means to fight back. When penicillin, the first antibiotic, was discovered by Alexander Fleming, in 1929, it heralded a new era in health care. It became possible to treat infections by killing bacteria, but bacteria quickly developed resistance to these drugs.
>
> Since then, doctors have been waging an impossible arms race against bacteria. In just 20 minutes, a colony can double in size, meaning thousands of generations can be produced within a single day. With each generation, a few of the bacteria will develop genetic differences that can give them an advantage.
>
> When an infection is treated by an antibiotic, most of the bacteria are wiped out. But if one of the genetic mutations happens to be immune to the drug, it will survive and thrive. And it takes just a single bacterium to multiply into an entire population with antibiotic resistance (Gray, R. *The Daily Telegraph* 21/1/2007: 19).

The evocation of evolutionary processes under pressure from human intervention was regularly undertaken as an explanatory trope in discussions of MRSA outbreaks. To anchor this theme, authors regularly used allusions to evolutionary processes to give credit to their accounts.

The picture thus presented is of scientists beginning to unravel how these microbes work together, and even camouflage themselves, to cause disease, and a process of unveiling as the bacteria, immanent with complexity and danger, disclose themselves to the scientific gaze. The trope of mutation, despite its yielding formidable abilities to resist antibiotics, is brought within the grander narrative of evolution where change and mutation are contributors to a familiar process and therefore rendered intelligible within a scientific framework. Gradual mutation over thousands of generations sits more comfortably with the processes unified in Huxley's 'modern synthesis'. Mutation then, adumbrated in this way is part of a natural rather than an extraordinary process. Mutations were described in these evolutionary terms throughout the period under study. Gray's account above has

strong similarities with much earlier descriptions of the presumed process of mutation. For example in 1995 it was described in the following terms:

> Driven by the genetic maxim 'survive and reproduce', microbes relentlessly eat, divide and multiply, secreting defensive poisons to thwart their attackers, hiding when necessary, and, if all else fails, mutating. These mutations occur every second, most proving disastrous to the microbe. But every now and then – say, daily – a mutation occurs that gives some microbe a new advantage over its environment and competitors. When that happens and the microbe flourishes, it sometimes shares its new strength with other microbes. Resistance to an antibiotic can be passed around through movable bits of DNA, genetic matter called plasmids or transposons. Once an organism gains resistance this way, it can pass it on to the next generation as well (Garrett, L. *The Independent* 17/9/1995: 64).

The notion of mutation was also present, yet described in less detail, from an early stage in the tabloid press:

> The more doctors have bombarded them with antibiotics, the faster they have mutated to produce resistant strains. MRSA is the product of this microscopic war – and although the name implies it is only resistant to methicillin, it is in fact proof against other antibiotics (Penman, A. *The Daily Mirror* 16/1/1996: 6).

Another early example was provided by Jenny Hope in the mid-range *Daily Mail*:

> Dr Tom Rogers, who is helping organise a survey by the Hospital Infection Society, said the problem was 'part of the price we pay for modern medicine'. 'The better we get at eradicating bacteria, the more we expose the patients' immune systems to the remaining few that manage to evolve and become resistant to standard antibiotics' (Hope, J. *The Daily Mail* 8/4/1994: 29).

Some of the processes involved in this sequence of mutations and evolution are underscored as being different from those typically undergone in more familiar accounts of speciation in multicellular life forms. The issue of genetic material being shared between bacteria, challenging notions of bounded, somatic individuality is presented as a reason why the infections concerned are resilient in the light of cleanliness campaigns and medical interventions. Here is popular science author Ben Goldacre writing in *The Guardian*:

> . . . this really is an incredibly clever process: for example, once new resistance genes have evolved, bacteria can then share these genes with completely different bacteria nearby. They literally swap genes between each other. This is happening right now, in your body. They are clever, clever little buggers (Goldacre, B. *The Guardian* 11/2/2006: 13).

The rapid and rampant mutative potential of infectious agents is formulated in anthropomorphic terms as 'clever'. The bacterial biodiversity mechanisms are formulated in terms of evocative notions of sentience and cognition. The purposive quality of the mutations and evolutionary processes was echoed in a number of other accounts. For example the following by Sarah Boseley, health editor of *The Guardian*:

> One antibiotic after another has been rendered almost useless as the bugs mutate to overcome them . . . Staph aureus bacteria developed resistance to penicillin, the cephalosporins, the fluoroquinolones such as ciprofloxacin and methicillin; then, in 2002, the first case of resistance to the last-resort drug vancomycin was reported in the US. We are now running on empty and facing what Richard James, director of the Centre for Healthcare Associated Infections at Nottingham University, calls 'the post-antibiotic apocalypse' (Boseley, S. *The Guardian* 17/1/2007: 6).

The microbe then has undertaken a career in which it has progressively overcome the antibiotic lines of defence and the term 'apocalypse' can be taken here in several senses. First, its common usage in relation to the end of life as we know it, but also in this context the term can be understood in its classical meaning of lifting the veil. In a sense the failure of antibiotics to eliminate the risk represents a form of enlightenment or revelation in that it is productive of new forms of thinking. The microbes are disclosing themselves to the astute scientific gaze, but their complexity, resourcefulness and danger are being disclosed to the body politic as well.

Apocalyptic predictions

This process of mutation and evolution, then, is one of the reasons why change is more or less inevitable – moreover, change in which humanity will not necessarily be the immediate victor. In 2003 the *News of the World* reported as follows:

> MRSA superbug will kill 150,000 hospital patients in the next two years. This isn't scaremongering. This is the warning from top health expert Prof Hugh Pennington. A raging epidemic of the superbug MRSA is set to kill a shocking 150,000 hospital patients in the next two years. NHS infections could soar TEN-FOLD, striking ONE MILLION people. Many will have limbs amputated to save their lives (Michael, N. *The News of the World* 24/8/2003: 4).

In a similar way, journalists, especially in the broadsheet press, quoted from 'experts' such as Richard James to further anchor the stories' credibility. Here is *Guardian* health editor Sarah Boseley quoting James:

> 'We are facing a future where there will be no antibiotics and hospital will be the last place to be if you want to avoid picking up a dangerous bacterial infection – in effect, cut your finger on Monday and you'll be dead by Friday if there's nothing to prevent it', he says. 'Quite frankly, the impending crisis on the horizon can be called the "post-antibiotic apocalypse".' (Boseley, S. *The Guardian* 6/1/2007: 10).

The potentially vast scale of the epidemic, whose plausibility is anchored through liberal use of expert predictions across tabloids and broadsheets, is interspersed with individual tales of tragic irony:

> The devastated husband of a nurse killed by a new strain of the superbug MRSA days after giving birth has launched a battle for the truth. Maribel Espada, 33, underwent an emergency caesarean operation at the hospital where she had worked for four years. But she was unwittingly at the centre of an outbreak of a deadly mutation of the superbug and died six days after becoming a new mother (Pilditch, D. *The Daily Express* 20/12/2006: 21).

In this case, events follow the personalised, tragic pattern previously found in tabloid journalism, where people who were previously healthy and independent are rendered abject or even killed by infections. Yet this was a theme also adumbrated in the broadsheets; for example Inge describes his experience of an MRSA infection after an operation for a heart valve problem:

> I contracted an infection which should have no business in a scrubbed and sterile environment. Methicillin-resistant Staphylococcus aureus (MRSA) is a monster – a microbe harmlessly present in, for example, nose mucus, but potentially deadly once inside the body (Inge, C. *Daily Telegraph* 21/11.2000: 24).

Or

> I was gobsmacked by the filth: When hospital consultant Leyla Sanai became a patient herself she was shocked by the state of Britain's wards (Sanai, L. *The Guardian* 21/1/2003: 14).

As we might expect from previous accounts of tabloid versus serious 'journalism' on health issues (Seale *et al.* 2007) this personalised, colloquial style of reporting was also particularly apparent in the popular press: 'I thought my baby would die of a bug she caught in hospital' (Cowden, A. *The Sun* 12/10/2007: 4). The sense of invasion was central to the tragedy – in the idiom of Mary Douglas (1966) it was occasioned by matter being out of place. The further out of place it becomes, the more tragic the outcome. Once outside the nose and in an operating theatre, and from there to a surgical wound, it becomes deadly as it discloses its capabilities. The theme of apocalypse in the sense of lifting the veil and revealing the microbe's capabilities is present in these personal accounts too, in terms of what they disclose about hitherto unanticipated potentials for sickness and disability – 'I was gobsmacked'.

Versatility, toxins and places

In order to repeatedly confound the boundaries, barriers and hygiene practices and maintain a perpetual potential for apocalypse, an important feature of press accounts was their reliance on notions of versatility in the mutations. The clinically significant ones were depicted as capable of inserting themselves into our bodies and our everyday affairs. The mutative versatility of the microbes means they are continually acquiring new capabilities and skills, toxicities and levels of virulence:

> Panton-Valentine Leukocidin (PVL) is a toxin produced by some strains of Staphylococcus aureus, bugs which are present in a third of the population. Less than two per cent of people carrying the bugs will be positive for PVL. Some will develop skin lesions, abscesses, and in worst cases blood poisoning and lung infections (Curtis, P. *The Guardian* 23/12/2006: 5).

As well as penetrating the personal boundaries and the very personhoods of patients themselves, the microbe was spread out over the topology of our social space. It is, for example, in the human food chain:

> Pork, beef and chicken in supermarkets could be infected with a strain of MRSA, according to a report today by organic campaigners which warns that the issue could

> become 'a new monster.' The bacterium is sweeping northern Europe and has already infected one in five of all pork products on sale in Holland, from where Britain imports almost two-thirds of all its pork . . . (Wallop, H. *Daily Telegraph* 25/7/2007: 9).

The bacterium's international reach is facilitated by the global food trade of its human hosts. Its home is also vouchsafed by the lifestyles and forms of consumption of its victims. Perhaps especially, in the light of its preoccupation with the lifestyle concerns of a predominantly female, middle England readership (Seale *et al.* 2007), *The Daily Mail* presented these possibilities most graphically:

> Dr Ron Cutler, an MRSA expert at the University of London, confirmed that poorly cleaned towels issued free by health clubs might be responsible for spreading the bug. He said: 'This is a very dangerous organism. I would strongly advise people to take their own towel to the gym. In a hospital you know bedding and towels are cleaned to a certain level. But in a gym you have no idea.' Dr Angela Kearns, the head of the agency's Staphylococcus reference laboratory, said CA-MRSA can cause boils leading to severe infections which may need treatment in hospital (Hope, J. *The Daily Mail* 1/3/2005: 41).

Or, more succinctly, as *The Daily Mail* put it later:

> Forget dirty hospitals: now MRSA is on the loose in gyms and playgrounds – and it's even deadlier (Bracchi, P. and Trump, S. *The Daily Mail* 26/10/2007: 1).

Consequently, the horror of MRSA can be seen to have spread out over the human topography beyond the clinic. Once the infections are outside the hospital, the privatisation and individual ownership of goods such as sports equipment and towels becomes rational and prudent as a way of mitigating the risk to which the individual is subject.

Through this and further examples which we shall describe below, it is possible to argue that in the last few years the question of risk has been reconfigured and with it the vocabularies of illness and causality. As *staphylococcus aureus's* mutations sediment into popular culture, so too a way of writing and speaking about risk is emerging that has the individual as its focus, rather than hospitals.

Ecologies of causality and the decentring of risk

Thus, in the contemporary climate, some more recent accounts of the disease exceed the hospital and its provision of a home for the microbe, and instead place the sufferer as an agent in the causal ecology. Healthcare associated infections are not just about the ubiquity and toxic qualities of the microbe. Rather, it is the vulnerability of the patients themselves that is constitutive of the minatory powers of the superbug – patients may, for example, be very old, very ill or very young.

> The MRSA we've known about for years is the one you get in hospitals. It's a common enough bug everywhere, occurring naturally on the skin of many healthy people. But in hospitals it is potentially lethal because it gets into the bloodstream as a result of injuries or surgery. In healthy people the body might be able to fight it off, but in the old, ill or weakened, it can cause severe blood poisoning (Crompton, S., *The Times* 1/12/2007: 2).

The frailty and susceptibility of elderly patients is also posited in some quarters as being responsible for the seasonal variations in the incidence of healthcare associated infections:

> The Health Protection Agency said the 22 per cent rise in Clostridium difficile figures at the start of this year echoed a similar increase at the start of 2006. It could be attributed to more frail and elderly people being admitted to hospital during the winter, Dr Christine McCartney, an HPA microbiologist, said (McRae, F. *The Daily Mail* 25/7/2007: 1).

Elderly clients are not only making hospital figures look worse – they may also be the source of the problem:

> Gordon Brown came under fresh attack last night for appearing to blame the spread of killer superbugs in hospitals on the elderly. The Prime Minister reportedly said the deadly MRSA and C. diff infections are transferred to hospitals by patients brought in from care homes, who are carrying the superbugs (*Daily Express* 19/10/2007: 1–2).

This was an interpretation of Gordon Brown's response to some intensive questioning on healthcare associated infections at Prime Minister's Question Time which was not taken up explicitly by other papers at the time, although it was said he had performed poorly ('Why have deaths from hospital superbugs TREBLED under Labour?' *The Sun* 18/10/2007). However, it signals a new shift in the discourse of MRSA. Hospitals are developing a new identity in this framework, as institutions which have a less central role in healthcare associated infections. Indeed, some of these infections are no longer seen as being to do with healthcare at all. With the identification and specification of MRSA and C difficile in the community, outside the hospital environment, new explanatory spaces are opened up. It is gyms, non-NHS nursing homes and vulnerable members of the community itself that are impregnating the hospital. The hazard, and the site of culpability, have moved.

As part of this process of refocusing the hazard, where the role of individuals is foregrounded, a set of new predisposing factors are identified, deep within the biological individual. As well as the demographic predispositions, there may be some of us who harbour a much more specific vulnerability:

> A professor in Trinity College Dublin says preliminary results from tests indicate that those at risk of dying from the MRSA superbug have a defective gene. Luke O'Neill believes that an immune system protein called Mal plays a role in determining whether those who become infected with MRSA ultimately die (Tallant, N. *Sunday Times* 25/11/2007: 7).

The identification of people and organisms in terms of their hereditary make-up and defects or propensities is not itself new, yet their mutation potential and how this intersects with hazards elsewhere in the topography of risk is formulated in new ways; in this case, in terms of the predicted human casualties within the UK's NHS. As Novas and Rose (2000) suggest, formulating the account of biology in a particular way will create an obligation to act in the present in relation to the potential futures that now come into view. The task of risk managers and mediators can now be formulated as one of downgrading the risk of MRSA in hospitals in relation to the other hazards faced by patients:

> The Health Protection Agency . . . revealed the results of a small study of MRSA deaths – a random sample of 52. It found that most had underlying illness which would probably have killed them within a year (Boseley, S., *The Guardian* 2/11/2007: 9).

The vulnerability of the patients and their advanced state of illness is implied as a factor. In a sense, then, the rates of MRSA are seen as stubborn in the face of policy initiatives and government targets because hospitals have been extending their work into the territory of 'sub-prime' patients.

The discourses and practices of genomics and evolutionary genetics here link up with those of risk. This notion of risk and responsibility does not extend solely to the biology of individuals and their position in the lifecourse. There are behavioural and social elements to this newly extended formulation of how best to combat MRSA:

> Papworth Hospital in Cambridgeshire shows a video to employees on the best way to wash their hands. After viewing the film, staff receive a badge that reads, 'Ask – are my hands clean?' This is to encourage patients to challenge staff on the cleanliness of their hands. Tremendous. You are sick in hospital but somehow must remain alert to check your healthcare professional has clean hands. The badge and video campaign has been fuelled by concerns over MRSA (McCartney, M. *Financial Times* 27/10/2007: 4).

As several commentators, have noted, newer neo-liberal discourses of healthcare position responsibility for the management of wellbeing with the individual (Crawshaw, 2007). If McCartney is taking the correct implication from these phenomena, the responsibility for managing the risk is being extended to the patients as well as the staff.

These shifts in the locus of responsibility have important implications for how the risks posed by mutation are conceptualised and the kinds of policies and forms of discovery which are predisposed by this kind of understanding. Also, the notions of mutation and monstrosity in this context have shifted. From being a random process of mutations in the microbes, some of which have yielded advantageous adaptations for MRSA, the process has been reconfigured as one which leads to new concepts of healthy citizenship and individual vulnerability.

Discussion

The presentation of stories about MRSA and the explanation of events draws on a variety of themes, of which an important cluster concerns mutation and evolution. As we have summarised here, this can be seen in terms of the evolving history of the microbe, expert-referenced and personally embellished apocalyptic predictions and disclosures, the versatility of the organism and the decentring of risk. Credibility was established through expert reference (Wathen and Burkell 2002) and through enmeshment with established scientific approaches such as evolution. Figures, even speculative ones as well as expert opinion and personal testimony, all contribute to the sense of 'evidentiality' (Hobbs 2003) and the construction of 'feasible futures' (Oddie 1999). Whilst we cannot readily comment on the effects of this journalism upon the audience, it is clear that writers negotiate credibility through reference to authoritative sources, or in the case of writers such as Goldacre, with scientific credentials of their own. Interestingly, the themes of mutation and evolution, undergirded by expert reference, cut across the erstwhile divide between tabloid and broadsheet papers, which was no less apocalyptic in the traditionally more sober columns of the broadsheets (Uribe and Gunter 2004) and regularly deployed what Nerlich (in press) has called the 'catastrophe frame'. Also common across the spectrum of newspapers are the idiomatic set pieces of personal tragedy and suffering which themselves have a revelatory or apocalyptic character.

In press discourse, then, the notion of mutation is positioned as creating the figure of MRSA, and, especially in discussions of ecologies of causality and the decentring of risk, this in turn has latterly opened up readings of human characteristics that foreground our own demographic vulnerabilities and disadvantageous genetic mutations. Those deemed frail and vulnerable to the mutations in Staphylococcus aureus already embody the dominant neoliberal culture's dispreferred traits. Thus, the discourses surrounding MRSA connect with a broader process of stabilising the social norms of the culture. In some accounts of the condition, MRSA patients are being refigured as lacking in responsibility, strength and self-reliance. They are increasingly formulated as suffering limitations in their inability to control the disease themselves and hence are socially and morally devalued – they might have 'died anyway' – in a way that strengthens society's boundaries of what is normative and proper.

New languages and techniques of understanding are being applied to the problem of mutation, and thus come into an association with all the other shifts that are assembling a sense of risk to the somatic individual. The norms of public good and social welfare which were part of what has been called the Keynesian consensus are called into question by the microbes' assault. Antibiotic treatments have shifted in the space of a generation from a prudent prophylactic public health measure to something which is seen as a cause of the problem. The idea of enterprising, self-actualising, responsible personhood that characterises 'advanced liberal' societies has increasingly informed health policy (Clarke 2005). This valorises an individual who is self-sufficient enough not to need to partake of public goods – having his or her own towels – and who is not prone to the weaknesses that increase susceptibility to MRSA. This has also involved a refocusing of the ethics of health and illness that play a part in how MRSA is formulated.

Elsewhere in health policy and healthcare, life has become a strategic enterprise, 'the categories of health and illness have become vehicles for the self-production and exercise of subjectivities endowed with the faculties of choice and will' (Greco 1993: 358). The pre-eminence of MRSA and related healthcare associated infections in the news media is symptomatic of late-modern rationalities of healthcare and its governance. The discourse of health itself has undergone a process of 'dedifferentiation' (O'Brien 1995), inasmuch as it has spread outward from its narrow sectoral focus in medicine and has become a ubiquitous feature of everyday life. Health issues and risks are the subject of discussion in a whole range of diverse settings and may reflect tectonic shifts in policy and ideology. The discourse surrounding MRSA, we would argue, has begun to reflect these tensions surrounding individuality and responsible citizenship. As Crawshaw (2007) argues, much writing and policy about heath care and individual wellbeing in contemporary life is imbued with wider neo-liberal arguments which promote the privatisation of risk management as the responsibility of the individual.

Such discourses are, as we have seen, emerging in connection with MRSA, and contrast with earlier models of welfare where it was assumed that there was a contractual relationship between the state and the individual citizen. Under neo-liberalism, as Rose (1989) and O'Malley (1992) have argued, citizens become agents of their own government outside state sponsored welfare and health provision, and are increasingly required to invest in prudent strategies for risk management in order to maintain their own wellbeing.

Taking their place within broader neoliberal discourses of genetic risk, the discourses of mutation therefore serve to mitigate the state and the healthcare organisations' liability for the risk of healthcare associated infection. Such self-governance of risks, especially those to the body or moral welfare, shifts the costs of regulation from corporations, the state and the wealthy downwards towards the poor (Ericson *et al.* 2003: 66–98).

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Note

1 A 'local' paper and hence not formally included in our sample.

References

Arnasson, V. and Hjorleifsson, F. (2007) Geneticization and bioethics: advancing debate and research, *Medicine Health Care and Philosophy*, 10, 417–31.

Bates, B. (2005) Public culture and public understanding of genetics: a focus group study, *Public Understanding of Science*, 14, 47–65.

Beck U. (1992) *Risk society: towards a new modernity*. London: Sage.

Beck, U. (1994) The re-invention of politics: towards a theory of reflexive modernization. In Beck, U., Giddens, A. and Lash, S. (eds) *Reflexive Modernization: Politics, Tradition and Aesthetics in the Modern Social Order*. Cambridge: Polity Press.

Beck, U. (1996) Risk society and the provident state. In Lash, S., Szerszynski, B. and Wynne, B. (eds) *Risk, Environment and Modernity: towards a New Ecology*. London: Sage.

Bowker, G.C. (1994) *Science on the Run: Information Management and Industrial Geophysics at Schlumberger, 1920–1940*. Cambridge, MA: MIT Press.

Braun, V. and Clarke, V. (2006) Using thematic analysis in psychology, *Qualitative Research in Psychology*, 3, 77–101.

Clarke, J. (2005) New Labour's citizens: activated, empowered, responsibilized, abandoned? *Critical Social Policy*, 25, 447–63.

Crawshaw, P. (2007) Governing the healthy male citizen: men, masculinity and popular health in Men's Health magazine, *Social Science and Medicine*, 65, 1606–18.

Crow, J.F. (2003) Evolution. In Cooper, D.N. (ed.) *Encyclopedia of the Human Genome*, New York: Wiley.

Daly K. (1997) Re-placing theory in ethnography: a postmodern view, *Qualitative Inquiry*, 3, 3, 343–365.

Dancer, S.J. (2008) Importance of the environment in meticillin-resistant *Staphylococcus aureus* acquisition: the case for hospital cleaning, *Lancet Infectious Diseases*, 8, 101–13.

Day, M. (2007) Plan to halve MRSA cases by 2008 will not be achieved, *British Medical Journal*, 334, 116.

Department of Health (2004a) *Hospital Cleanliness: PEAT Report on Hospital Cleanliness*. London: Department of Health.

Department of Health (2004b) *Revised Guidance on Contracting for Cleaning*. London: Department of Health.

Department of Health (2004c) *Towards Cleaner Hospitals and Lower Rates of Infection: A Summary of Action*. London: Department of Health.

Dobzhansky, T. (1937) *Genetics and the Origin of Species*. New York: Columbia University Press.
Douglas, M. (1966) *Purity and Danger: an Analysis of Concepts of Pollution and Taboo*, London: Routledge and Kegan Paul.
Ericson, R.V., Doyle, A. and Barry, D. (2003) *Insurance as Governance*. Toronto: University of Toronto Press.
Esser, F. (1999) 'Tabloidization' of news: A comparative analysis of Anglo-American and German press journalism, *European Journal of Communication*, 14, 3, 291–324.
Foucault, M. (1991) Governmentality. In Burchell, G., Gordon, C. and Miller, P. (eds), *The Foucault Effect: Studies in Governmentality*. London: Harvester Wheatsheaf.
Fowler, R. (1991) *Language in the News: Discourse and Ideology in the Press*. London: Routledge.
Giddens, A. (1991) *Modernity and Self-Identity*. Cambridge: Polity Press.
Glaser, B.G. and Strauss, A. (1967) *The Discovery of Grounded Theory*. New York: Aldine.
Gordon, C. (1991) Governmental rationality: an introduction. In Burchell, G., Gordon, C. and Miller, P. (eds), *The Foucault Effect: Studies in Governmentality*. Chicago: University of Chicago Press.
Gould, D. (2005) The fall and rise of cleanliness in British healthcare and the nursing contribution, *Journal of Research in Nursing*, 10, 495–509.
Greco, M. (1993) Psychosomatic subjects and 'the duty to be well' – personal agency within medical rationality, *Economy and Society*, 22, 357–72.
Green, D., Wigglesworth, N., Keegan, T. and Wilcox, M.H. (2006) Does hospital cleanliness correlate with meticillin-resistant Staphylococcus aureus bacteraemia rates? *Journal of Hospital Infection*, 64, 184–6.
Haraway, D. (1992) The promises of monsters: a regenerative politics for inappropriated others. In Grossberg, L., Nelson, C. and Treichler, P.A. (eds) *Cultural Studies*. New York: Routledge.
Haraway, D. (1999) The bio-politics of post-modern bodies: determination of self in immune system discourse. In Price, J. (ed), *Feminist theory and the body*. Edinburgh: Edinburgh University Press.
Hobbs, P. (2003) The use of evidentiality in physicians' progress notes, *Discourse Studies*, 5, 451–78.
Horsburgh D. (2003) Evaluation of qualitative research, *Journal of Clinical Nursing*, 12, 2, 307–12.
Huxley, J. (1942) *Evolution: the Modern Synthesis*. London: Allen and Unwin.
Jorgensen, R. (2006) A phenomenological study of fatigue in patients with primary biliary cirrhosis, *Journal of Advanced Nursing*, 55, 6, 689–97.
Lincoln Y.S. and Guba E.G. (1985) *Naturalistic Inquiry*. Newbury Park, CA: Newbury Park.
Lyotard, J.-F. (1984) *The Postmodern Condition: a Report on Knowledge*. Manchester: Manchester University Press.
Mooney H. (2007) Annual incidence of MRSA falls in England, but C difficile continues to rise, *British Medical Journal*, 335, 958.
Morant, N. (2006) Social representations and professional knowledge: the representation of mental illness among mental health practitioners, *British Journal of Social Psychology*, 45, 817–38.
National Audit Office (2000) *The Management and Control of Hospital-acquired Infection in Acute NHS Trusts in England*. London: The Stationery Office.
National Audit Office (2004) *Improving Patient Care by Reducing the Risk of Hospital-acquired Infection: a Progress Report*. London: National Audit Office.
National Patient Safety Agency (2004) *Clean your Hands Campaign*. http://81.144.177.110/cleanyourhands (accessed: 31/10/2006.)
Nerlich, B. (in press) 'The post antibiotic apocalypse' and the 'war on superbugs': catastrophe discourse in microbiology, its rhetorical form and political function, *Public Understanding of Science*.
NHS Estates (2000) *Standards for Environmental Cleanliness in Hospitals*. London: The Stationery Office.
Novas, C. and Rose, N. (2000) Genetic risk and the birth of the somatic individual, *Economy and Society*, 29, 485–513.
O'Brien, M. (1995) Health and lifestyle? A critical mess: notes on the dedifferentiation of health. In Bunton, R., Nettleton, S. and Burrows, R. (eds) *The Sociology of Health Promotion: Critical Analysis of Consumption, Lifestyle and Risk*. London: Routledge.

Oddie, G. (1999) Backwards causation and the permanence of the past. In Tooley, M. (ed.) *Time and Causation: Analytical Metaphysics*. London: Taylor and Francis.

O'Malley, P. (1992) Risk, power and crime prevention, *Economy and Society*, 21, 3, 252–75.

Office of National Statistics (2007) *MRSA Deaths Continue to Rise in 2005*. http://www.statistics.gov.uk/CCI/nugget.asp?ID=1067&Pos=1&CoIRank=1&Rank=208 accessed 10/3/2007.

Plowman, R., Graves, N., and Griffin, M.A. (2001) The rate and cost of hospital-acquired infections occurring in patients admitted to selected specialities of a district general hospital in England and the national burden imposed, *Journal of Hospital Infection*, 47, 198–209.

Plowman, R., Graves, N., Griffin, M., Roberts, J.A., Swan, A., Cookson, B., and Taylor, L. (1999) *The Socioeconomic Burden of Hospital-acquired Infection*. London: Public Health Laboratory Service.

Rose, N. (1989) *Governing the Soul: the Shaping of the Private Self*. London: Routledge.

Rose, N. (1996) Governing 'advanced' liberal democracies. In Barry, A., Osborne, T. and Rose, N. (eds) *Foucault and Political Reason: Liberalism, Neo-liberalism and Rationalities of Government*. Chicago: University of Chicago Press.

Rose, N. (1999) *Powers of Freedom: Reframing Political Thought*. Cambridge: Cambridge University Press.

Seale, C., Boden, S., Williams, S., Lowe, P. and Steinberg D. (2007) Media constructions of sleep and sleep disorders: a study of UK national newspapers, *Social Science and Medicine*, 65, 418–30.

Spurgeon, D. (2007) Prevalence of MRSA in US hospitals hits new high, *British Medical Journal*, 335, 961.

Strauss, A.L. and Corbin, J. (1998) *Basics of Qualitative Research Techniques and Procedures for Developing Grounded Theory*. Thousand Oaks, CA: Sage Publications.

Ten Eyck, T.A. (2005) The media and public opinion on genetics and biotechnology: mirrors, windows, or walls? *Public Understanding of Science*, 14, 305–16.

Ungar, S. (1998) Hot crises and media reassurance, *British Journal of Sociology*, 49, 36–56.

Uribe, R., and Gunter, B. (2004) Research note: The tabloidization of British tabloids. *European Journal of Communication*, 19, 3, 387–402.

Volpe, E.P. (1995) Evolution. *Grolier Multimedia Encyclopedia*, version 7.0.2., s.v. 'evolution'.

Washer, P. and Joffe, H. (2006) The 'hospital superbug': Social representations of MRSA, *Social Science and Medicine*, 63, 2141–52.

Wathen and Burkell (2002) Believe it or not: factors influencing credibility on the web, *Journal of the American Society for Information Science and Technology*, 53: 134–44.

Whittemore R., Chase S.K. and Mandle C.L. (2001) Validity in qualitative research, *Qualitative Health Research*, 11, 4, 522–37.