Antimicrobial Resistance

&

Medical Sociology

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Introduction

Antimicrobial resistance (AMR) is considered a pressing international public health problem associated with increased morbidity, mortality, and healthcare costs. There are few societal issues of greater importance than AMR. The UK's five year Antimicrobial Resistance Strategy notes that 'If the number of hard to treat infections continues to grow, then it will become increasingly difficult to control infection in a range of routine medical care settings and it will be more difficult to maintain animal health and protect animal welfare'.[1] Professor Dame Sally Macintyre, chair of the ESRC report 2014, has made it clear that social science has a role in understanding the issues which have led to AMR and that "The mechanisms which lead to antimicrobial resistance are biological. However the conditions promoting, or militating against, these biological mechanisms are profoundly social."[2]

Social scientists have a role and an agenda to meet in identifying and addressing some of these challenges at the national and international level. In this piece I outline the contribution that medical sociology (as a discipline within the broader field of social sciences) has provided in enhancing in our understanding of AMR. Medical sociology can be defined as the study of social and cultural factors relating to medical institutions, health professionals, and health care practices (within a variety of settings including the home), as well as the study of health inequalities and the production of medical or health knowledge. There are, of course, a myriad ways that scholars have approached the topic in terms of research method, although the majority of research I discuss will be qualitative in its methodology or theoretically driven, as well as having connections to other disciplines such as psychology, anthropology, political science, and clinical medicine and public health.

Public understandings of AMR

Ensuring that antibiotics are used responsibly and less often requires commitment and engagement from not only the scientific experts and health professionals, but also the wider public. But whilst the government is attending to the issue of how to promote appropriate and safe consumption of antibiotics, at present, the public do not share in this sense of awareness, responsibility, and urgency.[3] Essentially society does not see it as a societal problem. Evidence for this can be seen from the work of Hawkings,[4] in her interview-based study with wide cross section of members of the public finding that most people do not feel they have a personal role in either the problem of AMR or its solution. Lexical choice is important though, and this has implications for public health campaigns. The term 'antimicrobial resistance' is rarely used by the public. Hawkings notes that although the term antibiotic resistance was acknowledged as a concept that some members of the public had heard of, few were willing to try to explain. In contrast terms such as MRSA and 'super-bugs' were familiar to many participants. Furthermore these terms are typically associated with "dirty hospitals" rather than consumption of antibiotics, and therefore it is a problem that is distant to their own daily concerns unless they are expecting a hospital admission.[5] This belief reinforces the concept that this is not a problem for the community or for themselves. The lack of concern about AMR also arises not just due to both low sense of importance but also a low sense of personal risk of contracting a resistant infection.[3] There is also

some evidence that members of the public from more socio-economically deprived areas are more likely to believe that that the problem is not their responsibility, but rather the responsibility of the governmental authorities including health services,[4] reflecting links between socio-economic deprivation and lack of agency.

International research on the public understanding of AMR has also identified that lay explanations of AMR are incongruent to prevailing biomedical beliefs. For example research has identified a common belief that it is the body, rather than the organism, that becomes resistant.[6] The belief may be based on the reasoning that antibiotics become less effective with repeated use because the body (and not the bacteria) becomes 'used to' or 'immune' to them.[7]

Public understandings about how resistant organisms transfer between humans, and from animals to humans within the community is even less widely shared. Public health campaigns have focussed more on connecting antibiotic resistance with antibiotic use and less on advocating hand washing to prevent the spread of resistant organisms. The role of public health campaigns in shaping public perceptions of the problem and its causes requires more attention, and medical sociologists could consider whether there is merit in clarifying the mechanisms between personal antibiotic consumption and societal benefit, or whether to capitalise on the misunderstanding that the body becomes resistant and hence the personal vulnerabilities involved in antibiotic consumption.

Whilst some research claims that, on the whole, members of the public consider antibiotics to be safe and effective,[8] focus group research from New Zealand [9] demonstrates that members of the public are concerned that antibiotics can upset the body's balance, thereby increasing the likelihood of future infections. These views appear to be based on beliefs about immune responses within the body. Thus, if the body does not clear the infection itself, it has not been fully challenged, making it stronger to protect against the next infecting organism. Previous studies have tended to focus on what motivates inappropriate demand for, and use of antibiotics, and have tended to ignore existing views of the negative consequences of antibiotic use, lay people's reluctance to use antibiotics, and the strategies they use to avoid antibiotics. These could form a useful basis for developing educational and health promotion interventions that are relevant and acceptable to the target population.

It is becoming clearer that in order to develop effective patient education and health promotion materials to reduce inappropriate antibiotic use we need to understand how people talk about, and think about, antibiotics and infection.[10] Possible approaches might include a discourse analysis of media reports, or analysis of naturally occurring conversations within settings such as schools, care homes, children's day care and health care settings. It has been noted by Norris and colleagues, for example, that media and public education campaigns about antibiotics often use military metaphors,[9] drawing on imagery of pathogenic bacteria as invaders, the body fighting infection, and portraying antibiotics as exhausted soldiers, being worn out in a war. But, the authors argue, there is little evidence about whether military metaphors feature in talk by members of the public. Rather, this speech is characterised more by a less aggressive and more personal contest: 'knocking it on the head' or 'clearing the infection'.

Clinicians' views of AMR

There have also been a number of social scientists (including sociologists) who have turned their attention to the issue of how clinicians understand the issues of AMR (see McCullough et al for a systematic review).[11] The first of these dates back to 1998 when Christopher Butler and colleagues in their study of the culture of antibiotic prescribing identifying that doctors knew of the marginal benefits for antibiotics but chose to prescribe in order to preserve good relationship with patients.[12] One international qualitative study of primary care clinicians' views reported varying levels of clinicians' understanding about what AMR is.[13] Most clinicians interviewed (from all 9 European countries) felt that AMR was not a problem in their practice, but rather saw it as a problem for other countries and healthcare settings. They also tended to ascribe treatment failure to the infection being of a viral aetiology. However, Northern European clinicians were more likely to be motivated by containing resistance whilst respondents from Southern and Eastern parts of Europe were more likely to value rapid treatment effect and were therefore more likely to prescribe broad spectrum antibiotics. Other studies of primary care clinicians' views of AMR have been conducted in other countries[14] with similar findings. Simpson[15] for example, found that GPs were required to walk a balancing act between their immediate duty to their patient, patient expectations for antibiotics, and their wider responsibilities to public health.

Sociologists have explored how hospital clinicians perceive AMR,[16][17] highlighting sub-optimal prescribing due to the culture of the profession. For example Charani and colleagues,[17] discuss how senior hospital doctors consider themselves exempt from prescribing policies and practice due to professional norms that valorise autonomous decision making within a culture of non-interference and professional hierarchy. Issues of power, medical identity and reputation are vital here. Thus prescribing is largely an unconscious and habitual practice governed by forms of interaction and social capital.

Other researchers have focussed their attention on antibiotic stewardship for other health professionals. For example Cope [18] in her qualitative study of dentists, found that perceptions of AMR varied widely between dentists and that dentists' antibiotic prescribing decisions were driven by both clinical pressures and wider public health concerns. Others have explored pharmacists' views, for example a qualitative study conducted in Australia of hospital pharmacists [19] identified the profession had considerable ambivalence towards the problem. There are perhaps more opportunities to explore these issues in depth with other non-medical prescribers (veterinarians, nurse practitioners, and other allied health professionals).

Other relevant sociological work to clinicians' prescribing behaviour can be found in research on diagnostic uncertainty. Studies which have explored clinicians' antibiotic prescribing decisions demonstrate how primary care clinicians in particular are required to make treatment decisions in the absence of diagnostic certainty of what the infecting organism is. [13][15] Timmermans and Angell,[20] contend that clinical uncertainty is a constant phenomenon that needs to be managed by doctors and their students. As such students and junior doctors have to learn how to manage uncertainty, not as a preparation for a more certain professional life as a qualified doctor, but rather a condition that is essential to being an effective clinical practitioner.

The Sociology of Deviance

The sociology of deviance is concerned with the violation of norms and socially created standards (see Douglas and Waksler 1982 for an overview).[21] Antibiotic prescribing and antibiotic consumption might be framed within the sociology of deviance. For example, social norms may define when it is appropriate to take an antibiotic. Judgements of deviance may not arise if a doctor has prescribed the antibiotic, but if that same antibiotic were purchased over the internet then the activity could be described as deviant by the medical professionals, but those who do the activity may consider it to be economically and socially rational. Another example where others might judge actions to be deviant include a doctor not prescribing antibiotics in contexts where medical markets are thriving, and antibiotics prescribing is considered to be socially normative behaviour. What is important here is that it is not the physical properties of the drug that explain the deviant identity, but the circumstances and the relationships in which it is used. Sociological concepts of stigma are also relevant here,[22] but antibiotic related stigma seems to only been studied in relation to serious life threatening infections such as TB and leprosy, and does not seem to have been explored in detail by sociologists studying common infections.

There is, of course, a vast literature on medicine taking and adherence, yet much of this has been in relation to chronic conditions. Non-compliance with medicine has mostly been explained by theories of doctor-patient interaction or patients' knowledge and beliefs about the illness. Suboptimal adherence to antibiotics may occur in several ways: not starting a required course, omission of doses, early cessation of therapy (although there is evidence that shortening courses of AB therapy does not necessarily encourage AMR, and can limit adverse side effects[23]), errors in dose, inappropriate dose intervals, and perhaps most contentiously, self-medicating with antibiotics which were not prescribed by a clinician. Hawkings,[8] in her qualitative study of members of the public found that only a third of participants reported that they always took antibiotics as directed by their clinician. Hawkings developed a typology of non-adherent antibiotic user behaviours, both unintentional and intentional. As with other sociologists who have studied seemingly illogical health behaviours, Hawkings found that her participants had logical reasons for non-adherent behaviour. For example, why would one continue to take a drug that might be personally harmful after symptom resolution? Why not save left over drugs to self-medicate with for the next infection when it is so difficult to access a doctor's appointment? Ultimately different types of non-adherent behaviours might need different approaches to behaviour change.

The sociology of deviance in relation to antibiotic adherence is particularly relevant within a modern society in which the public have begun to move from a state of dependence and acceptance of medical (and other) authority to one of scepticism. There are other societal wide influences here as well, for example as result of increased access to medical knowledge (and drugs) via other routes such as the internet, the rise in consumerism within the National Health Service, and recent policy imperatives towards patient self-management.[24]

There is also perhaps merit in applying a sociology of deviance framework to clinician prescribing behaviour. Antimicrobial stewardship programmes amongst health professionals are beginning to show promise of reducing prescribing rates, but they have largely failed to influence prescribing habits in the way that had been hoped. Authors have previously described clinician prescribing as 'sub-optimal', 'irrational', or 'guideline incongruent', but perhaps for good reasons. Clinicians have favoured managing the immediate clinical risks and reputation, rather than long term population

consequences. For example Broom,[16] taking a Bourdieusian analysis of hospital doctors' prescribing practice, describes suboptimal prescribing as a realistic and practical choice within the habitus of the social world of the hospital.

Communication issues within antibiotic consultations

Communication and social interaction within the consultation is one particularly fruitful area of enquiry for sociologists wishing to understand antibiotic use. The issue of power asymmetry in general within medical consultation is well documented (see for example Silverman 1987 or Mishler 1984 [25][26]) , but has also been more specifically examined in relation to the common infection or antibiotic prescribing consultation.[27][28] Antibiotic use has been shown to be deeply embedded in doctor-patient dynamics, including being shaped by power/capital and performances of medical expertise.

Numerous studies show that GPs' 'irrational' or 'guideline incongruent' prescribing is done to cope with a variety of patient, practice, and workload pressures. Doctors' decisions to prescribe have been influenced by a multitude of factors such as patient demand[29], a desire to preserve good doctor patient relationships,[12] patients' previous experiences of non-antibiotic management which resulted in a poor outcome,[30] or perceptions of vulnerability.[31] However, other studies have demonstrate that most clinicians assume their patients want antibiotics when this might not necessarily be the case, demonstrating that communication within the consultation is often fraught with misunderstandings.[32]

Poor communication with the consultation can damage what has been termed the "therapeutic alliance". One European study on parents acceptance of antibiotic non-prescribing decisions found that trust, open communication and continuity of care played a key role,[33] but other studies have identified the importance of clinicians' credibility which parents judge on the basis of their clinicians' communication skills (both what is said and how it is said) and the physical examination.[32]

Other researchers have discussed how patients and clinicians communication can be 'at odds' with each other. For example Mustafa,[28] talked about the role of clinicians' running commentary (talk during the examination) in order to prepare patients for no problem diagnoses and minimise the potential need for antibiotics. Cabral,[32] also discusses the use of 'problem minimising language' within the consultation, but identified that parents often feel a need to justify their consulting behaviour, interpreting the doctor's diagnosis of 'just a viral illness' as trivialising the complaint (particularly if a doctor uses minimising language), and thus parents can stress their concerns which doctors, in turn, interpret as an expectation for antibiotics. In contrast, a consultation which results in an antibiotic prescription tends to confirm parents' beliefs about illness severity and re-affirms their perceptions of appropriate consulting behaviour.[34]

It is notable that many of the studies discussed in this section expose a fundamental problem of how to account for the way in which the power asymmetry operates so as to facilitate a decision that the doctor feels is in the best interests of the patient and the community. It is certainly difficult to empower patients and achieve patient centred care if their preferences are not commensurate with their own best interests, and the interests of the community. More discourse

analysis research might be valuable to examine the discursive strategies used by both doctors and patients when negotiating a prescribing decision. Such research could lead to better communication skills training and might act to reduce misunderstanding or conflict within the consultation.

The tension between patients and clinicians and the power dynamics within the consultation may also be exacerbated by government policies endorsing greater consumerism or patient advocacy (including initiatives such as the Patients' Charter) which may undermine medical professionalism through lay challenges to medical expertise.[35] Challenges to professionalism are part of a more general social trend of the demystification of expert knowledge rendering it more amenable to lay scrutiny. This erodes an idea at the heart of clinical autonomy: that the doctor is able to prescribe without external influence. An associated issue is the challenge from patients who specifically ask for a particular antibiotic, or challenge the prescribing rationale when an antibiotic has been issued.

In response to clinicians' difficulties with managing these common, yet troubled, consultations, a number of interventions have been developed to help clinicians engage in patient-centred conversations about the management of common infections and the consequences of unnecessary antibiotics use (for example see GP resources such as the TARGET tool (Treat Antibiotics responsibly, Guidance and Education Tool) and STAR (Stemming the Tide of Antimicrobial Resistance), as well as initiatives such as non-prescription pads and delayed antibiotic prescribing.[36]

Medicalisation

Medicalisation refers to the ways in which medical jurisdiction has expanded in recent years and now encompasses many problems which before were not defined as medical issues. Medicalisation has tended to be seen as a consequence of the medical profession exercising its power to control (particularly in the field of psychiatry and obstetrics) but actually it is more likely to be due to wider social processes.

The medicalisation of society has been a long standing theme within medical sociology. Illich is perhaps its most famous theorist with his critique of how medicines led to an over reliance on drugs and doctors, and have helped to sponsor a "morbid society".[37] Illich's other concerns about iatrogenic diseases (side effects), and high costs/ profits of pharmaceutical agencies are also of relevance here. While medicine does seem to control more aspects of our lives, questioning the drivers of medicalisation can lead us to examine the role of consumerism, managed care markets, and developments in biotechnology including the pharmaceutical industry.[38]

Medical technologies have been criticized as one form of medicalisation[39] which some commentators view as a potentially dehumanising process that restricts the autonomy of both experts and non-experts. For common infection this idea is perhaps most obvious for the emerging technologies of near patient (point of care) tests. An example of this kind of test is the C-Reactive Protein test which can measure the level of inflammation (a proxy measure of the severity of the illness) in a pin-prick of patients' blood. Some, mostly Scandinavian, countries are currently using near patient tests as a way to target antibiotic treatment more appropriately by distinguishing viral from bacterial infections. Whilst some clinicians and patients see the

emergence of this technology as useful way of reducing antibiotic prescribing others have warned of their concerns about medicalising such a common human condition. This, they argue, could lead to reinforcing help seeking behaviour and possibly an obligation on the part of the doctor to treat once a "positive" test result is found. [40] [41]

Other questions that medical sociologists might seek to answer include: how do technologies affect patients' illness experiences and what is the relationship between the technologies and professional knowledge?

Self-care is an integral part of society's response to ill health and self-medication is central to the self-care of minor illness. It is generally accepted that medicalisation has the potential to erode self-efficacy and resilience which is fundamental to the self-care of common infections. UK national health policy has recently promoted the general principle of self-care with over the counter medicines in order to reduce consultations in primary care for minor illness. Encouraging self-care and discouraging consultations for acute infections, alongside the difficulties many patients report in accessing health care appointments, may have some unanticipated disadvantages in relation to antibiotic use. Developed societies appear to be developing a culture of acceptance that more medical intervention is better. Indeed sections of society seem to have become locked into the concept that common ailments are disease, and where disease exists this needs to be eradicated. Our attitudes to common infections reflect the values of our culture: how we relate to nature, our pets and other people. Cultural values determine how one behaves as a patient, what it means to be ill, who agrees to be a patient (only about third of patients with common infection symptoms see a doctor), and who makes treatment decisions. The meaning of medicines, the perception of physical pain and psychological distress varies between cultures and between generations. Questions remain about how we can support self-care whilst simultaneously ensuring safe and appropriate use of antibiotics in the community.

Resilience is a term that is often talked about in terms of mental health, but it can also be usefully applied to people's ability to cope with common infections. A person who is resilient may be able to see past the infection, and not feel overwhelmed. Most people overestimate the effects of antibiotics, independent of their own immune system,[4] and perhaps undervalue their own body's ability to cope. Helping people to find acceptance that common infections are part of the normal human experience may enable people to cope better with symptoms.

Health Inequalities, Social Justice, and Social Movements

Medical sociology has a long history of concern with issues of health inequalities and social justice and how these relate to the distribution of (social) resources. In relation to antibiotics and AMR this could relate to how antimicrobials, and the expertise it takes to use them, become distributed throughout nations and globally. What kinds of inequalities are created as a consequence and who benefits? Thus sociologists can highlight moral and ethical dimensions of this unequal distribution and can contribute through public and political discourse around policy change.

Some medical sociologist have adopted Foucauldian concepts including bio-politics to theorise how individual health is pitted against issues of governance.[42] What is also clear is that medicine is

not universally available: society elites are at risk of receiving too much 'boutique care' while the global poor are lacking a basic level of care.

Another interesting dimension of bioethics relating to AMR is that of trust and controversy. It is notable that AMR has not been associated with controversy or conspiracy in the same way as other modern social problems such as global warming, BSE, and MMR and as such seems to have been removed from any media debate about whether or not there is scientific truth in AMR. How a scientific fact becomes accepted as fact is, in itself, sociologically interesting. Related to the topic of public understanding of science, there has also been a sub speciality concerning itself with the rise in social movements organised around health related issues such as access to care and inequalities. This has been most strongly experienced with HIV/AIDS activism.[43][44] Foucauldian concepts of power and dominance can frame our understandings of "biological citizenship"[45] and reshape ownership of medical problems and their solutions within the landscape of scientific inquiry. Whilst activism is perhaps a more usual domain of conditions such as HIV, cancer and other chronic conditions, to some extent these new social movements are also occurring within antibiotic stewardship. We have, for example, the social movement of the 'antibiotic guardian' (www.antibioticguardian.com), which currently reports over 17,000 members, and these movements may have the ability to transform the public from passive patient-hood to survivor-hood, an actor who has solidarity with others, helping themselves and others to take control of their health care decisions.

Sociology of Risk and Vulnerability

Antimicrobial resistance has identified new meanings and categories of being at risk. In recent decades medical sociologists have been preoccupied by risk in relation to genetics, identifying risk as pre-disease: being at risk and therefore a patient yet not diagnosed.[46][47] Similar concepts may be applied to antimicrobial resistance risk which foregrounds the vulnerability of patients who are very young, very old, or otherwise immunocompromised. These concepts may start to locate the source of infection away from the hospital (the site AMR has traditionally been associated with) and may turn risk back to individuals and communities (homes, care homes, schools, and children's day care providers) as responsible actors. This has parallels with the way that risk is imputed to the individual in neoliberal social welfare policies. Thus the hazard and the site of culpability have moved,[48] perhaps to the extent that vulnerable members of society are seen to have the potential to infect hospitals. This has echoes with the work of the anthropologist Mary Douglas [49] who saw narratives concerning iatrogenic problems and hospital acquired infections implicate a perceived threat to deeply held beliefs about moral and social order. There is also, of course, relevance here to Ulrick Beck's [50] notion of the risk society – how contemporary and public life are dominated by attempts to conceptualise and manage risk. Thus risk becomes a political issue, about how the consequences of risk can be attributed, controlled and legitimated.

One very interesting approach to the sociology of risk in relation to AMR has been the study of how AMR has been portrayed in the media. For example the work of Brown and Crawford [48] examined public discourse of AMR within the printed news media, identifying how the media stressed the threat of AMR with analogies such as 'microbes on the rampage', 'evolving to out-wit us', and 'mutation and monstrosity' but (unlike media coverage of serious infectious diseases such as Ebola) there appeared to be no promises of containment through medical progress. Rather,

media discourse was rather more concerned with the promise of containment through human behaviour.

The social construction of the vulnerability of children is also pertinent to the sociology of risk; particularly in relation to how society vales and prioritises competing risks. Cabral et al[31] for example have studied the importance of notions of vulnerability of children in influencing parents' consulting decisions and clinician prescribing decisions. Prescribing is thus driven by fears for, and priority afforded to, children's safety. Although the vast majority of common infections are self-limiting, parents' decisions to consult and clinician's decisions to prescribe are influenced by perceived threat of severity, perceived benefits of the action, and conformity to perceived norms in relation to protecting children. We also know that parents are uncertain how to assess illness severity.[51] Most parents consult because they are simply seeking a medical evaluation rather than with a definite expectation of antibiotic treatment. High consulting rates for children are therefore not necessarily due to lack of understanding of the self-limited nature of the illness but rather due to enactment of the social roles of good parenting.[31]

The last issue that I wish to discuss under this section relates to the sociology of dirt and the hygiene hypothesis. The work of the anthropologist and cultural theorist Mary Douglas[49] on the social construction of dirt is particularly pertinent here. Douglas talks about dirt as a matter of disorganisation, or things that are "out of place". To illustrate, soil for growing plants is beautiful and life giving, but when in the kitchen it offends and is seen as a risk. Dirt offends order. What Douglas saw as key to this was the issue of boundaries. There is relevance here to how people understand the role of dirt in the spread of resistant organisms. Where do people believe infected organisms reside? To date the AMR campaigns have focused more on antibiotic stewardship and less on activities that might prevent the spread of resistant organisms. Curtis[52] reviewed the research on motivations for hygiene behaviours across eleven countries, finding that key motivators for handwashing included disgust, nurture, comfort and affiliation. Fear of disease generally did not motivate handwashing. There is, however, good evidence that handwashing can reduce common infections such as respiratory tract infections.[53] More sociological research around people's beliefs, behaviours and social understandings of handwashing would be beneficial. There is also the opportunity to study health professionals' understandings of dirt and infection. One of the earliest sociologists to study this was Julius Roth in 1957,[54] noting that infection prevention practices are not always based on scientific evidence but become a ritual of expected and agreed behaviour. More recently in 2013 the work of Jackson[55] has explored how nurses enact health protective behaviours both to demonstrate to patients their role in infection control, but also to protect against micro-organisms and the unknown and unpleasant nature of dirt. Other work by Morrow and colleagues,[56] demonstrate that clinicians see MRSA as something that occurs elsewhere due to the actions of others. Thus the role of gloves, aprons, and uniforms have a symbolic reference, but this protection might go beyond hygiene and may actually be more to do with professional barriers (Douglas 1966). Another important UK public health campaign that is relevant here is the "Ask me if I've cleaned my hands" campaign which encourages patients to question clinicians' practice and make infection control everybody's business. Patients are therefore being cast in the role of surveyor, in the hope that the constant observation will improve clinicians' behaviour.

Most readers will, no doubt, be familiar with the Hygiene Hypothesis first proposed by David Strachan in 1989[57] which proposes that the lack of germs and infections experienced by children in

the modern age might be related to a rise in childhood allergies. Whilst there is evidence that exposure to germs strengthens our immune system, the hygiene hypothesis seems to have been slightly misinterpreted by some members of the public who now believe that society is too clean for our own good. Could the public be losing their confidence in hygiene and cleanliness? How is hygiene managed in the home (and in other settings, day care, care homes, hospitals, prisons) and to what effect? Novel research methods such as time use diaries, video observation and household analysis might be able to help sociologists study and rethink what it means to be hygienic.

Self-medication

Self-medication (with pharmacological agents) is becoming more common in both developed and developing countries as a supplement to, or even instead of, medical care. Antibiotics can now be purchased over the internet, in 'drugs stores' and in pharmacies. The situation in developing countries is even more problematic with the dual challenge of unregulated access to antibiotics and high burden of infectious disease. This, of course, leads to multi-resistant organisms, which in turn stimulates the over prescription of broad spectrum antimicrobials due to treatment failure with narrow spectrum drugs.

Sociologists and other academics have perhaps spent too long focusing their efforts on understanding the prescribing behaviour of clinicians, and consequently have neglected the huge problem of self-medication with antibiotics. There is a large and growing market in obtaining antibiotics on-line, occasionally with an on-line diagnosis on the basis of presenting symptoms and brief history taking, but clearly lacking a physical examination. As Fox[58] has commented, the internet has potential to transform the relationship between prescribers, dispensers and consumers. The power relationships and conflicts between stakeholders including states, social groups, professional groups, and commercial interests are huge. Governance issues (concerns of state and individuals to sustain security and integrity of the former and liberty and rights of the latter) are usually the domain of political science, but, within sociology, governance can be seen as control over an activity, and information technology has transformed the system governing drug consumption. Fox goes on to note the emergence of a global "e-pharmacy' is eroding our notions of what it means to be a patient and a health professional, and upsetting balance between ensuring public safety and freedom of choice and autonomy.[58]

Conclusion

In this brief I have attempted to show how antimicrobial resistance can be understood through the lens of medical sociology. I hope that this summary of the sociological research has demonstrated the rich and diverse ways in which medical sociologists have contributed to the knowledge base surrounding the problem of AMR. AMR does not happen, and cannot be solved, without society. It is very important that medical sociologists continue to engage in critical analysis of health beliefs and behaviours relating to antibiotics. In doing so, I would hope they would forge links with other, related, disciplines – comparative studies, political science, psychology, social theory and anthropology are perhaps the most obvious.

As Prof Dame Sally McIntyre has commented, AMR has been seen as a biomedical problem that has a technological solution. It is now time to refocus this approach so both the problem and solution are viewed as social issues.

References

1. Department for Environment FaRA. UK Five Year Antibmicrobial Resistance Strategy: 2013-2018. Whitehall, London, 2013.
2. Macintyre S. Anti-Microbial Resistance: Setting the Social Science Agenda. Report of an ESRC Working Group. http://www.esrc.ac.uk/files/funding/funding-opportunities/amr/anti-microbial-resistance-setting-the-social-science-agenda/, 2014.
3. McCullough A, Parekh S, Rathbone J, et al. A systematic review of the public's knowledge and beliefs about antibiotic resistance. J Antimicrob Chemoth 2016;**71**(1):27-33.
4. Hawkings N, Wood F, Butler CC. Public attitudes towards bacterial resistance: a qualitative study. J Antimicrob Chemoth 2007;**71**(7):1155-60.
5. Joffe H, Washer P, Solberg C. Public Engagement with emerging infectious disease: the case of MRSA in Britain. Psychological Health 2011;**26**(6):667-83.
6. Brookes-Howell L, Elwyn G, Hood K, et al. 'The body gets used to them': patients' interpretations of antibiotic resistance and the implications for containment strategies. Journal of General Internal Medicine 2012;**27**(7):766-72.
7. Pechère J. Patients' interviews and misuse of antibiotics. Clinical Infectious Diseases 2001;**15**(33):170-73.
8. Hawkings N, Butler CC, Wood F. Antibiotics in the Community: a typology of user behaviour. Patient Educ Couns 2008;**73**(1):146-52.
9. Norris P, Chamberlain K, Dew K, et al. Public Beliefs about Antibiotics, Infection and Resistance: A Qualitative Study. Antibiotics 2013;**2**(4):465-76.
10. Edgar T, Boyd S, Palame M. Sustainability for behaviour change in the fight against antibiotic resistance: A social marketing framework. J Antimicrob Chemoth 2009;**63**:230-37.
11. McCullough A, Rathbone J, Parekh S, et al. Not in my backyard: a systematic review of clinicians' knowledge and beliefs about antibiotic resistance. J Antimicrob Chemoth 2015;**70**(9):2465-73.
12. Butler C, Rollnick S, Maggs Rapport F, et al. Understanding the culture of prescribing: A qualitative study of general practitioners' and patients' perceptions of antibiotics for sore throats. Brit Med J 1998;**317**:637-42.
13. Wood F, Phillips C, Brookes-Howell L, et al. Primary care clinicians' perceptions of antibiotic resistance: a multi-country qualitative interview study. J Antimicrob Chemoth 2013;**68**(1):237-43.
14. Bjorkman I, Berg J, Viberg N, et al. Awareness of antibiotic resistance and antibiotic prescribing in UTI treatment: a qualitative study among primary care physicians in Sweden. Scand J Prim Health 2013;**31**(1):50-55.
15. Simpson S, Wood F, Bulter C. General practitioners' perceptions of antimicrobial resistance: a qualitative study. J Antimicrob Chemoth 2007;**59**:292-96.
16. Broom A, Broom J, Kirby E. Cultures of resistance? A Bourdieusian analysis of doctors' antibiotic prescribing. Soc Sci Med 2014;**110**:81-88.
17. Charani E, Castro-Sanchez E, Sevdalis N, et al. Understanding the determinants of antimicrobial prescribing within hospitals: the role of "prescribing etiquette". Clinical Infectious Diseases 2013;**57**(2):188-96.
18. Cope A, Wood F, Francis N, et al. General dental practitioners' perceptions of antimicrobial use and resistance: a qualitative interview study. British Journal of Dentistry 2014;**217**.

19. Broom A, Broom J, Kirby E, et al. What role do pharmacists play in mediating antibiotic use in hospitals? A qualitative study. Bmj Open 2015;**5**(11):e008326.
20. Timmermans S, Angell A. Evidence-Based Medicine, Clinical Uncertainty, and Learning to Doctor. Journal of Health and Social Behaviour 2001;**42**(4):342-59.
21. Douglas J, Waksler F. *The Sociology of Deviance: an introduction*. Boston: Little, Brown, 1982.
22. Goffman E. *Stigma: Notes on the management of a spoiled identity.* New Jersey: Prentice Hall, 1963.
23. Lambert H. Don't keep taking the tablets? The Lancet 1999;**354**(9182):943-45.
24. Nettleton S. *The Sociology of Health and Illness*. Oxford: Politity Press, 2013.
25. Mishler E. *The Discourse of Medicine: Dialectics of Medical Interviews*. Norwood, New Jersey: Ablex, 1984.
26. Silverman D. *Communication and Medical Practice: Social Relations and the Clinic*. Thousand Oaks, CA: Sage, 1987.
27. Gwyn R, Elwyn G. When is a shared decision not (quite) a shared decision? Negotiating preferences in a general practice encounter. Soc Sci Med 1999;**49**:437-47.
28. Mustafa M, Wood F, Butler C, et al. Managing expectations of antibiotics for upper respiratory tract infections: a qualitative study. Ann Fam Med 2014;**12**(1):29-36.
29. Mangione-Smith R, McGlynn E, Elliott M, et al. The relationship between percieved parental expactations and pediatrician antimicrobial prescribing behaviour. Pediatrics 1999;**103**(4 Part 1):711-18.
30. Kumar S, Little P, Britten N. Why do general practitioners prescribe antibiotics for sore throats? grounded theory interview study. Brit Med J 2003;**326**(7381):138-43.
31. Cabral C, Lucas P, Ingram J, et al. "It's safer to...." parent consulting and clinician antibiotic prescribing decision for children with respiratory tract infections: An analysis across four qualitative studies. Soc Sci Med 2015;**136-137**:156-64.
32. Cabral C, Horwood J, Hay A, et al. How communication affects prescription decisions in consultations for acute illness in children: a systematic review and meta-ethnography. BMC Fam Pract 2014;**15**(63):doi: 10.1186/471-2296-15-63.
33. Brookes-Howell L, Wood F, Verheij T, et al. Trust, openness and continuity of care influence acceptance of antibiotics for children with respiratory tract infections: a four country qualitative study. Family Practice 2014;**31**(1):102-10.
34. Cabral C. Influence of Clinical Communication on Parents' Antibiotic Expectations for Children With Respiratory Tract Infections. Ann Fam Med 2016;**14**(2):141-47.
35. Weiss M, Fitzpatrick R. Challenges to medicine: the case of prescribing. Sociology of Health and Illness 1997;**19**(3):297-327.
36. Little P, Dorward M, Warner G, et al. Importance of patient pressure and perceived pressure and perceived medical need for investigations, referral and prescribing in primary care: nested observational study. Brit Med J 2004;**328**(7437):444.
37. Illich I. *Medical Nemesis: The Expropriation of Health*. London, England: Calder and Boyars, 1975.
38. Conrad P. *The Medicalisation of Society*. Balitmore: John Hopkins University Press, 2007.
39. Zola I. Medicine as an Institution of Social Control. Sociological Review 1972;**20**:487-504.
40. Wood F, Brookes-Howell L, Hood K, et al. A multi-country qualitative study of clinicians' and patients' views on point of care tests for lower respiratory tract infection. Family Practice 2011;**28**(6):661-69.
41. Butler C, Simpson S, Wood F. General practitioners' perceptions of introducing near-patient testing for common infections into routine primary care: a qualitative study. Scand J Prim Health 2008;**26**(1):17-21.

42. Armstrong D. The Rise of Surveillance Medicine. Sociology of Health and Illness 1995;**17**:393-404.
43. Epstein S. *Impure Science: AIDS, Activism, and the Politics of Knowledge*. Berkeley: University of California Press, 1996.
44. Brown P, Zavestoski S, McCormick S, et al. Embodied Health Movements: New Approaches to Social Movements in Health. Sociology of Health and Illness 2004.
45. Greenhough B. Biopolitics and Biological Citizenship. The Wiley Blackwell Encyclopedia of Health, Illness, Behaviour, and Society. http://onlinelibrary.wiley.com/doi/10.1002/9781118410868.wbehibs152/abstract, 2014:145-48.
46. Scott S, Prior L, Wood F, et al. Repositioning the patient: the implications of being at risk. Soc Sci Med 2005;**60**(8):1869-79.
47. Marteau T, Senior V. Illness representations after the human genome project: the perceived role of genes in causing illness. In: Pteri K, Weinman J, eds. Perceptions of Health and Illness. Amsterdam: Harwood Academic, 1997:241-66.
48. Brown B, Crawford P. 'Post antibiotics apocolypse': discourses of mutation in narratives of MRSA. Sociology of Health and Illness 2008;**31**(4):508-24.
49. Douglas M. *Purity and Danger: an analysis of concepts of pollution and taboo.* London: Routledge and Kegan Paul, 1966.
50. Beck U. *Risk Society: towards a new modernity.* London: Sage, 1992.
51. Francis N, Wood F, Simpson S, et al. Developing an 'interactive' booklet on respiratory tract infections in chidren for use in primary care consultations. Patient Educ Couns 2008;**73**(2):268-93.
52. Curtis L. Handwashing and other environmental interventions needed to control viral infections in long-term care facilities. Journal of the American Geriatric Society 2009;**57**(1).
53. Little P, Stuart B, Hobbs F, et al. An internet-delivered handwashing intervention to modify influenza-like illness and respiratory infection transmission (PRIMIT): a primary care randomised trial. Lancet 2015;**386**(10004):1631-39.
54. Roth J. Ritual and magic in the control of contagion. Americal Sociological Review 1957;**22**(3):310-14.
55. Jackson C, Lowton K, Griffiths P. Infection prevention as "a show": A qualitative study of nurses' infection prevention behaviours. Int J Nurs Stud 2013.
56. Morrow E, Griffiths P, Rao G, et al. "Somebody else's problem?" Staff perceptions of the sources and control of methicillin-resistant Staphylococcus aureus. American Journal of Infection Control 2011;**39**(4):284-91.
57. Strachan D. Hayfever, Hygiene and Household Size. Brit Med J 1989;**299**(6710):1259-60.
58. Fox N, Ward K, O'Rourke A. The birth of the e-clinic. Continuity or transformation in the UK governance of pharmaceutical consumption? Soc Sci Med 2005;**61**(7):1474-84.