Understanding Media Publics and the Antimicrobial Resistance Crisis

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Abstract

Antimicrobial resistance (AMR) imperils health for people across the world. This enormous challenge is being met with the rationalisation of prescription, dispensing and consumption of antimicrobials in clinical settings and in the everyday lives of members of the general population. Individuals need to be reached outside clinical settings to prepare them for the necessary changes to the pharmaceutical management of infections; efforts that depend on media and communications and, therefore, how the AMR message is mediated, received and applied. In 2016, the *UK Review on Antimicrobial Resistance* called on governments to support intense, worldwide media activity to promote public awareness and to further efforts to rationalise the use of antimicrobial pharmaceuticals. In this article, we consider this communications challenge in light of contemporary currents of thought on media publics, including: the tendency of health communications to cast experts and lay individuals in opposition; the blaming of individuals who appear to 'resist' expert advice; the challenges presented by negative stories of AMR and their circulation in public life, and; the problems of public trust tied to the construction and mediation of expert knowledge on the effective management of AMR.

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Introduction

Antimicrobial resistance (AMR) has been named by the World Health Organization as one of the 'biggest threats to global health' (World Health Organization, 2016). In 2015, AMR was listed on the United Kingdom's National Risk Register of Civil Emergencies (Cabinet Office, 2015). The *UK Review on Antimicrobial Resistance* has called for, among other public policy initiatives, "massive" (2016, p. 4) global communications to create public awareness and to foster urgent and effective action. In 2016, a consortium of non-government organisations issued a Global Investor Statement on Antimicrobial Resistance (http://www.asyousow.org/) drawing attention to the misuse of antibiotics in agricultural operations and global supply chains and highlighting the role of multinational corporations. That year, the Singapore Ministry of Health (Khew, 2016) announced a strategy to counter national 'addiction' to antibiotics. And even earlier than these initiatives – in 2012 – an antibiotic stewardship programme was established in South Africa, with collaborations across nations of the global North and South (Goff et al., 2017). A Ministerial Advisory Committee on Antimicrobial Resistance was established for South Africa in 2016. In all these communiqués and iniatives, there was a profound sense of urgency.

In this article, we consider the challenge of AMR communications – how the AMR message is mediated, received and applied – in light of perspectives on media publics and the social construction of expert knowledge. We draw mainly on examples from the resource rich global North, in countries where the debates have been most extensive, although as we illustrate, this issue is global. The AMR communications field is yet to address the important question of how to tailor messages for specific population groups in different national settings. What we

offer here is a first step in setting the agenda for dialogue on the contribution of the social sciences to inquiry which can more ably address the global character of AMR, the challenges of antibiotic stewardship, and related communications complexities.

AMR is a multifaceted health problem that compromises surgery, the management of chronic diseases, and the treatment and prevention of infectious diseases. It therefore affects specific groups who rely on, for example, antibiotics to manage chronic respiratory and dermatological conditions and after surgical interventions. Multi-drug resistant staphylococcus aureus (MRSA), carbapenemase-producing enterobacteriaceae (CPE), multi-drug resistant tuberculosis (MDR-TB), and drug resistant gonorrhoea and chlamydia are now all difficult to treat, creating problems for individual patients, their treating physicians, and health systems (Centers for Disease Control and Prevention, 2013). Common respiratory and ear infections – which account for most antibiotic prescriptions in general practice (Pinder, Sallis, Berry, & Chadborn, 2015) – are becoming harder to treat. Antimicrobials used for companion animals and in food production are thought to lead to AMR in humans and other animals. The *UK Review* reported that: "huge quantities of antimicrobials, in particular antibiotics, are wasted globally on patients and animals who do not need them, while others who need them do not have access;" the review estimated that, worldwide, approximately 700,000 people die each year due to drug resistant infections (2016, p. 4), a number which is estimated to increase to 10 million in 2050. Increased affluence along with rising and partly unregulated consumption of antibiotics is thought to be contributing to the recently observed increased prevalence of AMR in India, which is presently the biggest user of antibiotics, worldwide (Laxminarayan & Chaudhury, 2016).

In an effort to meet this challenge, global public health systems (Department of Health, 2013; Ghafur et al., 2013) are improving the surveillance of AMR in human and animal populations and seeking to rationalise the prescription and dosing of antimicrobials in hospitals (Hulscher, Grol, & van der Meer, 2010), general practice (Bekkers et al., 2010; Simpson et al., 2009; Tonkin-Crine et al., 2013), and aged care (Gould, 2011). Public sector agencies have implemented professional education (Gauthier & Unger, 2013) and conducted interventions to improve prescribing practices (Simpson et al., 2009). The prevention of AMR is commonly cast as 'stewardship' (McKenzie, Rawlins, & Del Mar, 2013) or 'rational' prescribing (Kotwani, Wattal, Joshi, & Holloway, 2012). These concepts ask prescribers, dispensers and general population users of antimicrobials to reduce antimicrobial consumption and comply with prescription protocols and dosing advice (Pinder et al., 2015).

As noted, the *UK Review* advocated for a global communications strategy to increase public awareness and knowledge (UK Review on Antimicrobial Resistance, 2016), but there are significant challenges here, too. WHO has a leadership and agenda setting role in AMR, for example, the WHO's Antibiotic Awareness Week is held each year in November, when websites, press releases, tweets and other strategies are used to explain AMR and encourage 'stewardship' worldwide (Gauthier & Unger, 2013). Information and advice on AMR and related issues are included in national government and health websites, in Twitter feeds devoted to AMR awareness and science, YouTube videos, and printed and broadcast news items on AMR. In Australia, the National Prescribing Service has supported campaigns for the general public, including '#savethescript,' a competition for the best video on AMR awareness at Tropfest, Australia's short film festival (http://www.nps.org.au/media-centre/media-releases/repository/nps-medicinewise-presents-a-creative-challenge-on-antibiotic-resistance). In the United States, the Pew Charitable Trusts sponsors the

'Supermoms against superbugs' campaign with the slogan 'save antibiotics'

(http://www.pewtrusts.org/en/multimedia/video/2016/supermoms-against-superbugs-meet-the-movement). In the United Kingdom, Antibiotic Action seeks out coalitions of prescribers and users of antimicrobials (http://antibiotic-action.com/). In Thailand, an 'Antibiotics Smart Use,' campaign has, for the past decade, discouraged the use of antibiotics for common colds, acute diarrhea and simple wounds (Sumpradit et al., 2012). These examples imply that preventing AMR depends, in part, on the normative social systems in which prescribers, dispensers and consumers negotiate for prescription (Teixeira Rodrigues, Roque, Falcão, Figueiras, & Herdeiro, 2013). These negotiations imply more than the rationalisation of antimicrobial use because they ask patients to willingly endure symptoms, where an antimicrobial may have shortened the duration of discomfort, and to altruistically forgo antimicrobials for those other patients who may need them. AMR, therefore, compels individuals to think beyond personal benefit and reflect on our collective future (Orzech & Nichter, 2008).

Global communications face challenges, also, with regard to mistaken and deficient knowledge. In Sweden, for example, a random household survey found that 26.8% of participants believed that antibiotics were effective against viruses and 84.7% endorsed the mistaken idea that humans become resistant to antibiotics (Andre, Vernby, Berg, & Lundborg, 2010). A comparative study of antibiotic knowledge in 11 European countries found great variation, particularly with regard to inaccurate knowledge of antibiotic resistance, which ranged between 29% to 83% of respondents in Belgium and Lithuania, respectively (Grigoryan et al., 2007). A systematic review of research from Europe, America and Asia (n= 54 articles) found that public knowledge of AMR was partial (McCullough, Parekh, Rathbone, Del Mar, & Hoffmann, 2015), including beliefs that it: referred to personal

immunity rather than microbial resistance; was a low risk for the individual; was caused by the action of others, and; was a problem for health systems and not for the general public. A review of behavioral perspectives on AMR for the UK's Department of Health (Pinder et al., 2015), found that knowledge was in general insufficient to support AMR interventions and that publics were confused by scientific assumptions, including that antibiotics are not needed for self-limiting infections. The idea that some infections do not need to be treated may be hard for individuals to accept, particularly when faced with different infections with similar symptoms which do require treatment (Ingram et al., 2013). Pinder et al. noted, too, that publics are confused by messages to curb requests for pharmaceutical treatments with respect to AMR, in light of other health messages that individuals should seek out early diagnosis and treatment for various conditions, such as cancer, heart disease and infectious diseases.

Outside clinical settings where public health communications are dependent on media technologies and practices (Hawkings, Wood, & Butler, 2007), AMR messaging is subject to significant complexity. For example, news media are seen to convey authority and new information (Brown & Crawford, 2009), but they may also undermine AMR interventions because they promote messages of blame and social decline (Donyai, Okafor, Virgo, Amin, & Nasr, 2013). This tension imbues communications strategies with the 'Goldilocks' problem, as Briggs and Nichter put it (2009, p. 191); that is, settling on the 'just right' styling of messages that support health goals without compromising them. Another consideration for AMR communications is that information provision can widen – not reduce – gaps between groups according to level of education and access to media technologies. As Shim (2008) has shown, strategies to improve online information-seeking enlarged the cancer knowledge gaps between education groups in the United States, and therefore potentially produced inequality effects in health outcomes. Public communications on AMR may primarily reach engaged

media elites and so reinscribe social, cultural, linguistic and global inequalities, particularly with regard to communication on the science of AMR. This dynamic is exacerbated in countries where access to and the regular use of media technologies is limited, and when even with wide coverage, literacy in the use of internet for information is uneven.

In addition, the expert knowledge systems of biomedicine are imbricated with rapidly transforming media cultures (Seale, 2003). As Clarke and Shim observe:

> *Today, information on health and illness is proliferating through all kinds of media, especially newspapers, on the Internet, in magazines, and through direct-to-consumer prescription. More than being a subculture, biomedicine is today so much a fundamental element of mass culture . . . Thus the production and transmission of health and medical knowledges are key sites of biomedicalisation in terms of both the transformation of their sources and distribution channels and the reformulation of who is responsible for grasping and applying such knowledges* (2011, p. 178).

Media on AMR, then, can be thought of as sites of the biomedicalisation of social worlds. For example, the CDC's 2015 Antibiotic Awareness Week advertising included a poster that read:

> *Taking antibiotics for colds can be harmful to your child's health — in fact, unnecessary antibiotics can make future infections harder to treat. Work with your child's healthcare provider to find the best treatment for your sick child* (https://www.cdc.gov/getsmart/week/downloads/ad-childs-face.pdf, accessed 28 September 2016).

This poster therefore constructed dialogue between the expert knowledge provider and the concerned parent who is asked to collaborate on the use of alternatives to antibiotics. It shows

how media convene expert – public relationships to establish alternative modes of biomedical intervention. Building on the relation of biomedicalisation with mediation, Briggs and Hallin (2016) have developed the idea of 'biomediatisation, ' a term they use to mark the involvement of media cultures in the biomedical shaping of social life. Public communications on AMR, through this lens, do not simply transmit expert advice to publics in the 'hypodermic' mode, as it has been called (Corcoran, 2013); AMR convenes publics as biopolitical subjects and, to some extent, invites them into dialogue with expert knowledge systems. Importantly, too, we live in the viral media age. Media cultures are no longer simply relays of communication between experts and audiences, if that was ever true; they are constituted in mobile digital media, web-linked biosensing, user produced content and networks, alongside the continually transforming modes of global news and entertainment media. Media and life are therefore rhizomatically entangled (Kember & Zylinska, 2015) with implications for public engagement with expert advice on AMR. As Seale (2003) and others argue, it is vital to understand the constitution of contemporary media publics if the response to the AMR crisis is to be effective.

In response to calls for global communications on AMR, in what follows we consider the complex ways in which publics are convened in contemporary media environments, through the lenses of our disciplinary orientations to sociology, psychology, anthropology, media and science communications. We consider how publics engage with the expert knowledge systems of AMR, in the context of high choice media and the related tendency to cast experts and lay individuals in opposition, blame individuals who appear to 'resist' expert advice, and the turn to self-blame. We also explore the AMR 'crisis' as a communications challenge and reflect on the reconfigured challenge of trust in efforts to communicate a health crisis to global publics.

High Choice Media and AMR Publics

It is common to assume that health communications are linear, that is, experts construct a message and transmit it to publics for their edification. In 2009, the UK government took this approach when it sent a leaflet to all households, explaining the H1N1 influenza pandemic, its symptoms, and the action that individuals should take to avoid infection or to moderate transmission (Hine, 2010). This so-called 'hypodermic' approach to health communications (Corcoran, 2013) is at times modified through some acknowledgement of a circular relationship between expert and audience. Social research is often conceptualised in this way, as it is seen to feed back to experts the perceptions of publics to improve how messages are designed and delivered. AMR communications – as in the examples we have discussed – borrow from this hypodermic premise, but also, in some forms, ask publics to not simply acquire knowledge, but to also 'pledge' themselves to the AMR rationalisation project. As we have indicated, these efforts to inform and persuade need to be considered in light of the profoundly complex ways in which contemporary societies are biomediatised and the transforming ways in which both experts and publics help to construct media-based AMR knowledge systems. This conceptual shift is important for AMR because it helps to avoid the sedimentation of an expert-lay duality in framings of the field and a related tendency of reciprocal blaming and othering.

Deepening choice in relation to media consumption with related transformations and multiplications of audiences and their participation in media cultures (Livingstone, 2013) amplify the challenges faced by communications on AMR. For example, news media are available on multiple platforms – often mobile – and in different formats. A recent news story from *The Guardian* was headlined 'UN meeting tackles the 'fundamental threat' of antibiotic-

resistant superbugs' and appeared on the newspaper's website, and on Facebook and via Twitter from anyone who cared to post a link there. Online newspapers embed video, too, giving these websites a multi-media capability which converges (Livingstone, 2013) on the appearance of television news websites. Consumers, therefore, are no longer simply turning pages and changing channels: they can click through hyperlinks and download content as their interests and their devices guide them. More than 62% of adults in the US obtain news from social media, according to a 2016 survey by Pew Research Center (http://www.journalism.org/2016/05/26/news-use-across-social-media-platforms-2016/). Audiences exercise some choice in these environments and move nomadically according to the exigencies of whim, curiosity, need and practical circumstances (Wathen, Wyatt, & Harris, 2008). This migration between sources combined with individual choices of access to information gives AMR communications their complex potency as forms of biomediatisation.

While active consumers select health media, they can also produce it, for example, in blogs, threads and online chats (Wathen et al., 2008). Publics, therefore, can no longer be assumed to rely on the same media for news about health-related issues or to be only receptive (Bennett & Lyengar, 2008). Reception research has provided extensive evidence that audiences exposed to the same message interpret it differently, depending on education, context and personal experience (Livingstone, 1998). But in high choice media environments, audiences construct their AMR knowledge in ways that we do not fully understand. For example, how do they make choices of which media to consume? How do they interpret it? Which aspects elicit engagement with the AMR agenda and which do not? These questions imply that global AMR communications will require a new evidence base situated in perspectives on digital society and supported by salient knowledge generation methods including, media ethnography, sociology of knowledge, and contributions from science and technology studies.

The effects of high choice media environments where people choose, to some extent, what pathways they take, and therefore construct media experiences for themselves, are amplified by the idea of 'private publics,' that is, the friendship and acquaintance networks built up in Facebook and Twitter which comprise audiences of a personalised kind. Viral marketing strategies are designed to tap into these user-constructed networks to harness tacit processes of social influence to promote products and ideas, including for AMR. For example, @battlesuperbugs (joined Twitter May 2015) is coordinated by researchers at George Washington University and has over 1963 followers (as at 17 March 2017), who are a mixture of health agencies, researchers and apparently non-affiliated individuals. The user-driven formation of audiences, however, implies that media consumers construct 'echo chambers' or 'filter bubbles' which potentially reinforce their beliefs (Jamieson & Cappella, 2010), amplifying the fragmentation and re-assemblage of public life according to particular worldviews. For example, in relation to vaccination the so-called 'anti-vaxers' and 'anti, anti-vaxers' appear to be locked into a heated argument across media over the science and ethics of biomedical technologies (see, for example, @AVshame). User-driven audience construction and the 'local' epistemologies they give rise to indicate that expert knowledge systems are agonistically performed across media. It follows that it would be mistaken to conceptualise knowledge systems on AMR as a dichotomy of 'expert' versus 'lay.' AMR knowledge appears to find its form and function in the rhizomatic qualities of its mediation where binaries (expert/lay, top-down/bottom-up, inside/outside) are co-opted, overturned and erased. How to engage with this complexity is an unresolved challenge for health media researchers across the world (Groshek & Bronda, 2016).

As indicated, a key problem for the new and "massive" (UK Review on Antimicrobial Resistance, 2016, p. 4) global communications on AMR is the politics of blame. We know from other health interventions that communications and media can reinforce blaming of publics as unknowing, ill-educated and resistant to expert advice (Brown & Crawford, 2009). Antimicrobial resistance all too easily stands as synecdoche for public resistance. As noted, research has found that individuals talk of their bodies and selves as resistant to antibiotics rather than the technically correct idea that they are infected with drug-resistant microbes. This idea of individual resistance has been identified in urban Europe (Brookes-Howell et al., 2012) and regional China (Reynolds & McKee, 2009), indicating an important cross-cultural dimension of the personalisation of AMR risk.

The personalisation of antibiotic resistance indicates that messaging on AMR is subject to a form of paternalism which holds that patients mishandle their bodies despite scientific knowledge. This construction of the unruly subject of AMR is not new. In his 1945 speech accepting his joint Nobel Prize for the discovery of penicillin, Alexander Fleming used the story of Mr and Mrs X to illustrate the problem of AMR as he saw it:

> *The time may come when penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man may easily underdose himself and by exposing his microbes to non-lethal quantities of the drug make them resistant. Here is a hypothetical illustration. Mr. X. has a sore throat. He buys some penicillin and gives himself, not enough to kill the streptococci but enough to educate them to resist penicillin. He then infects his wife. Mrs. X gets pneumonia and is treated with penicillin. As the streptococci are now resistant to penicillin the treatment fails. Mrs. X dies. Who is primarily responsible for Mrs. X's death? Why Mr. X whose negligent use of penicillin changed the nature of the microbe* (1945).

Fleming's moral tale was designed to alert his audience of the inherent dangers of AMR. His story, however, also stands as an example of blame narrative (Douglas, 1992), which, as has been discussed, appears to shape how individuals (mis)understand their role in the growing AMR crisis. Blame and self-blame indicate that how AMR messages are constructed in public life is also a vital influence on communications and the related construction of expert knowledge on AMR.

The AMR Crisis Story and its Implications

In additon to a tradition of paternalistic blaming of the uneducated and unruly, AMR messages are difficult to stage for publics. AMR resonates with the other stories of global crisis and catastrophe, such as climate change and the unprecedented destruction of ecosystems around the globe. AMR is at times figured in news media as the 'superbugs crisis,' for example: *Scientific American* carried a story headed 'Superbug explosion triggers U.N. General Assembly meeting' (Maron, 2016); the editors of *The New York Times* entitled their own story 'The world wakes up to the danger of superbugs' (The Editorial Board, 2016). The superbugs frame underlines the problem as a frankensteinian flashpoint not just for health but one among many concerns of science, expert knowledge, uncertainty and the future of life on the planet. AMR is frightening – an effect on which the news media relies in its use of 'superbugs' – and this use of fear may increase avoidance of AMR messages (Tannenbaum et al., 2015). Moreover, superbugs stories can be shockingly graphic, as in the case of limb amputation to halt the progress of an otherwise untreatable infection (Martin, 2015). However, a resort to factual, less frightening, messaging may also lead to problems. Expressing the AMR message in the excluding language of science (microbiology, statistics, and risk calculation) may fail to connect with how individuals think, feel and act on their

health and of those others (animals included) for whom they provide care. The AMR message also has the potential to spawn negative health impacts in a range of other conditions if people are taught to reduce help seeking following initial symptoms. This dilemma is another way in which AMR communications are subject to the Goldilocks problem: how to engage publics without turning them away, which individuals can easily do in the high choice media environments they construct for themselves.

Telling the AMR crisis story and what is now required of individuals also comes up against entrenched, well supported, cultures of the pharmaceutical treatment of illness. Informing the general public of the imminent obsolescence of pharmaceutical technologies on which they have come to rely – antibiotics, antivirals and antifungals – runs counter to the more dominant biomedical narratives of promise and hope for the eradication of disease (Petersen, 2015). The requirements placed on AMR subjects – as discussed above in relation to the CDC's Antibiotics Awareness Week poster – also run counter to longstanding and richly nuanced media-based promotion of pharmaceutical technologies to treat disease, to restore health, and to enhance body and mind (Williams, Martin, & Gabe, 2011). As Dumit has suggested (2012), the pharmaceuticalisation of social life has been so successful, it is possible that health is now understood by many to exist only because of pharmaceutical technologies. Asking people to reduce their use of antimicrobial pharmaceuticals, then, may run up against embedded assumptions and practices which continue to be supported by the resources of the pharmaceutical industry, including their own use of media to extend messages figured around 'a pill for every ill.' This push me/pull you effect in media culture may be a source of confusion for publics addressed by global communications campaigns on AMR.

Along with media complexity, the negative aspects of AMR, and expectations of access to drugs for health, narratives on health are polyphonous: stories of genetic technologies, high tech medicine, personalised and precision medicine, are all in circulation in public life. In addition, the general public blend urban myth with scientific knowledge (Washer, Joffe, & Solberg, 2008) and 'lay epidemiology' on the distribution and causes of disease are told and retold in social media (Chew & Eysenbach, 2010). For example, in the United Kingdom, MRSA has been attributed to 'dirty' NHS hospitals and the action of a generalised and foreign 'other' (Joffe, 2011). In South Africa, media reports of superbugs 'stalking' hospitals are recurrent (Keeton, 2016). It is likely that the AMR crisis is framed by pre-existing stories on health scares (Ungar, 2000).

Trust, Expert Knowledge and Reflexivity

In relation to AMR, trust can be assumed to be willingness on the part of individuals to believe, endorse and enact expert advice. But trust in abstract systems also features in conceptualisations of reflexive modernisation (Giddens, 1990). Individuals depend on experts and expert knowledge to guide them in their life decisions, including for their health. As noted, the encouragement of early detection, treatment and vaccination for some conditions, occur alongside messages that individuals should not rush to seek out, for example, antibiotics for throat infections. Publics are asked to act, therefore, in contradictory ways, specific to particular states of illness or discomfort. The emergence of AMR is also evidence of a failure of expert knowledge, a perspective which de-stabilises expert messaging. AMR is a manufactured risk (Giddens, 1998), because it has emerged through efforts to reduce the risks that occur with surgery, and the treatment of chronic illness and infectious diseases. Public awareness of the manufactured qualities of risk and the potential of expert advice to be incomplete or mistaken forms the backdrop to the interpretation of AMR messaging.

In a special issue of the *European Psychologist*, researchers argued that weakening trust regarding emerging infectious diseases needs to be countered with more effective dialogue of experts and the general public (Bangerter, 2014). Given that expert knowledge is subject to biomediatisation, it is crucial that effective dialogue on AMR is also conducted in mediated public life. The gathering force of choice-based media consumption implies that effective responses need to engage with the techno-social and hermeneutical agency of individuals and publics, for example, their abilities to navigate across media platforms and related capacities to engage with messages in a critical and reflexive manner. Sometimes referred to as critical literacy (Sykes, Wills, Rowlands, & Popple, 2013), the focus in this framing of AMR communications is on assisting individuals to decode the many, potentially contradictory, messages they may consume, construct and share. Implicit in this framing of AMR communications is that different publics have different knowledges and that technological and biomedical literacies are also dynamic and shifting. Less prominent in these framings of critical literacy, however, are the structural conditions of action on health over which even the most literate individuals may not have the power to control. This situation is further complicated in contexts – particularly but not only in the global South – where science literacy is limited.

Conclusion

The immense AMR challenge includes the need to inform publics world-wide that an important pharmaceutical resource is no longer available as it was and that, without effective and prompt action, the health gains of the twentieth century – unevenly distributed as these were – will be lost to history. This way of conceptualising the problem, however, assumes that expert knowledge is transmitted from experts to publics and that given the 'just right'

dose of information and persuasion, they can be joined with efforts to mitigate a global crisis. This way of thinking of communicative action leads to an epistemology of deficiency and error on the part of publics – auditing what they do not or mistakenly know and do in error or fail to do – and energises blame narratives and moral tales that deepen the sense that the disengaged, excluded, uneducated and unruly are part of the problem. This turn to blame is a powerful form of paternalism that is seen in the self-blaming, synecdochal 'I am resistant' beliefs on the part of some individuals. This dichotomy of expert and lay also constructs dialogue on expert knowledge as conflictual and therefore furthers questions of public trust and scepticism in both the global North and South, as we have seen in recent health scares, including the 2009 influenza pandemic.

As we have discussed, however, social worlds are already highly biomediatised and public life is very often convened as a matter of the health of individuals, nations and the world. Media publics are, in part, self-constituting; they help to construct the social potency of expert AMR knowledge across media. This way of framing the communication problem of AMR indicates that the expert to lay public address is not the only or even the primary manner in which publics engage with expert knowledge. As yet, we know very little about how AMR messages and their attendant expert knowledge and moral lessons travel in high choice media environments in different parts of the world. We need methods of inquiry that are better fitted to the ways in which media publics constitute themselves and act on AMR. But we can assume that media publics are not simply addressed by experts; they ignore, miss out, resist, appropriate, comply, participate, advocate, reinterpret and reinvent. In addition, previous health scares and their stories will inform how publics engage with AMR messages.

Effective address to AMR is not only a matter of better dialogue between experts and publics, although this is likely to be of some value. Given that media technologies and practices are entangled with life, it seems to us that new, creative solutions to AMR also need to be conducted in media. Efforts in this vein could address AMR by engaging with the meanings, encoding and transmission, interpretation and appropriation of expert knowledge across different media forms. Public policy and communications that appreciate the complexities of biomediatised social worlds can enhance public communications on AMR. They can assist public health systems to construct more effective interventions that account for the complex mediation of the AMR message, and address unintended consequences such as the amplification of social inequality and the erosion of public trust.

The AMR crisis will have enormous impact on life around the world. It is therefore crucial that we use all we know of media publics and expert knowledge systems and inventively take forward the public policy, research and communications agenda. New research approaches are called for that critically scrutinise the relations between publics and science and their impact on public health messaging and relatedly identify the global dimensions and local particularities of the AMR communications challenges which lie before us.

Acknowledgements

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