

# Impartiality and infectious disease: prioritising individuals versus the collective in antibiotic prescription

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## Abstract

### Background

Antimicrobial resistance (AMR) is a global public health disaster driven largely by antibiotic use in human healthcare. Doctors considering whether to prescribe antibiotics face an ethical conflict between upholding individual patient health and advancing public health aims. Existing literature mainly examines whether patients awaiting consultations desire or expect to receive antibiotic prescriptions, but does not report views of the wider public regarding conditions under which doctors *should* prescribe antibiotics. It also does not explore the ethical significance of public views or their sensitivity to awareness of AMR risks or the standpoint (self-interested or impartial) taken by participants.

### Methods

An online survey was conducted with a sample of the US public (n=158). Participants were asked to indicate what relative priority should be given to individual patients and society-at-large from various standpoints and in various contexts, including antibiotic prescription.

### Results

50.3% of participants thought that doctors should generally prioritise individual patients over society, whereas 32.0% prioritised society over individual patients. When asked in the context of AMR, 39.2% prioritized individuals whereas 45.5% prioritized society. Participants were

significantly less willing to prioritise society over individuals when they themselves were the patient, both in general ( $p=.001$ ) and in relation to AMR specifically ( $p=.006$ ).

### Conclusions

Participants' attitudes were more oriented to society and sensitive to collective responsibility when informed about the social costs of antibiotic use and when considered from a third-personal rather than first-personal perspective. That is, as participants came closer to taking the perspective of an informed and impartial 'ideal observer', their support for prioritizing society increased. Our findings suggest that, insofar as antibiotic policies and practices should be informed by attitudes that are impartial and well-informed, there is significant support for prioritizing society.

### **Introduction**

Antimicrobial resistance (AMR) is a global public health disaster with significant human and economic costs. Yearly estimates of the human lives lost to resistant infections have reached

700,000 people globally (O'Neill 2016) and are expected to exceed 10 million lives per year by 2050 if no actions are taken against AMR (O'Neill 2016). Patients with resistant infections are more likely to develop complications, and are up to three times more likely to die than patients with non-resistant infections (Cecchini, Langer, and Slawomirski 2015). In the US alone, AMR accounts for 20 billion USD in excess health service costs annually (Smith and Coast 2013).

Antibiotic use in human healthcare is a major driver of AMR, and an estimated 30% of all outpatient antibiotic prescriptions in the US from 2010 to 2011 were found to be inappropriate (Fleming-Dutra et al. 2016). Formulary restriction (prohibiting use of particular antibiotics) and preauthorization requirements have proven effective in reducing antibiotic prescriptions and resistance rates in inpatient settings (Davey et al. 2013, Kaki et al. 2011, Quale et al. 1996). However, less coercive measures – such as physician education and clinical guidelines – have been less successful (Davey et al. 2013). This may be partly attributable to the ethical conflict that doctors often face between acting in the best interests of their patients and acting in the best interest of society-at-large when considering whether to prescribe an antibiotic. There is evidence that doctors frequently prioritise individual patient health over public health when deciding whether to prescribe antibiotics – even when doing so contravenes clinical guidelines (Metlay et al. 2002). Many factors contribute to this tendency, but doctors' perceptions of patient expectations have been found to strongly correlate with unnecessary antibiotic prescriptions (Britten and Ukoumunne 1997, Cockburn and Pit 1997, Coenen et al. 2006, Lado et al. 2008, Macfarlane et al. 1997, Karras et al. 2003).

Although previous studies have found high rates of patient-reported expectations for antibiotics prior to their consultation (Britten and Ukoumunne 1997, Webb and Lloyd 1994, Stivers et al. 2003), it has also been found that doctors tend to overestimate these patient expectations, leading to antibiotic prescriptions that are neither clinically indicated nor expected by their

patients (Lado et al. 2008, Lam, Catarivas, and Lauder 1995, Macfarlane et al. 1997). This suggests that doctors may harbor misplaced assumptions about public expectations for antibiotics. Moreover, even when patients do expect antibiotics, catering to these preferences may be incompatible with advancing patient and/or public health (Gonzales et al. 2001).

Nevertheless, compelling arguments have been made for giving public views some role in shaping healthcare. Some hold that involving citizens in determining healthcare goals has intrinsic value and is an integral component of democracy (Council of Europe 2000, Department of Health (UK) 1999, Health Canada 2000, World Health Organization 1978, Kim et al. 2009, Wait and Nolte 2006). Others assert that public involvement in health policymaking can reaffirm consumer rights to information, access, choice and redress (Wait and Nolte 2006). Public engagement in health policymaking may also result in more resilient policies through increasing public support (Bruni et al. 2008, World Health Organization 2007, Charles and DeMaio 1993, Williamson 2014, British Medical Association 2015). Finally, it might be argued that public attitudes have an evidential role in determining the ethical acceptability of a healthcare policy or practice, for example because public attitudes can be expected to converge on, or distribute around, the most defensible ethical position (Surowiecki 2004); because it is rational to defer somewhat to one's peers when faced with difficult moral quandaries (Nguyen 2010, Rowland 2017); or because healthcare policy should reflect the values of citizens (Kitcher 2001).

We suggest that insofar as public attitudes are used as evidence for ethical acceptability, it is *impartial* and *informed* public views that should be sought. This is because impartiality is central to ethics, and ethical judgments grounded on mistaken information are unjustified. Public views can be considered sufficiently impartial and informed when members of the public who are called to express their views become (imperfect versions of) 'ideal observers'.

To elucidate this expression, we need to invoke the philosophical tradition of the ‘ideal observer’ in moral theory. According to ideal observer views, what people ought to do when faced with an ethical quandary is either determined or evidenced by what people *would* do, or would approve of, if they were in ideal circumstances for rational deliberation (e.g. well-informed and free of distractions) and regarded the issue from an impartial point of view (i.e. with an equal consideration for the preferences and the welfare of all the parties involved) (Hare 1981). For example, on one influential version of the ideal observer theory, one ought to do what could be endorsed by someone who is 1) omniscient about facts, 2) omniscipient, 3) disinterested, 4) dispassionate, 5) consistent, and 6) normal in all other respects (Brandt 1955, 47, Firth 1952, 31). Of course, no human being can ever satisfy these conditions (Harrison 1956, 256). The theory is intended to specify an *ideal*. However, we can approximate them to a greater or lesser degree depending, for example, on how well-informed and impartial we are. To the extent that we value democratic processes of policy making for epistemic virtues—that is, because they tend to result in more justified policies—it would be desirable that the public’s approach to antibiotic stewardship was informed by an ethical, rather than a merely self-interested, perspective.

Unfortunately, published studies of public attitudes to doctors’ antibiotic prescribing practices mainly encouraged participants to view the issue from a self-interested rather than impartial perspective by seeking attitudes to *their own doctors’* prescribing practices and by studying patients soon to have clinical consultations rather than members of the wider public.

Participants were also not informed of the social costs of AMR. Alternatively, previous studies asked the public about possible strategies to avoid *misuse* of antibiotics (Degeling et al 2018), but not whether it would be acceptable to prioritize society’s interest in the preservation of antibiotic effectiveness over the individual’s interest in using antibiotics to treat certain infections. .

Our study aims to identify the attitudes that would be taken by the public were they to take a better informed and more impartial perspective—that is, a perspective that comes closer to that of an ideal observer – in cases of conflict between individual’s and society’s interest.

## **Methods**

Our survey (see Appendix A) investigated participants’ opinions on whether medical decisions should favor an individual patient’s health or collective wellbeing, both in the case of general health and AMR in particular. 163 US-American participants took part in our survey online via Amazon MTurk. Five participants were excluded from data analysis because they failed attention checks or did not complete the survey, leaving a total N of 158. Amazon Mturk is an online marketplace that allows people to take part in research online, for a small payment (usually in accordance with US minimum wage). MTurk participant samples have been shown to be more representative of the general population than college samples and standard internet samples often used in research, and MTurk yields high-quality data that has been shown to meet or sometimes exceed psychometric standards used in published research (Buhrmester, Kwang, and Gosling 2011). In our sample, 49% of participants were female, and 51% were male. They were aged between 20 and 74 years, with the highest percentage found between 25 and 34 years (24%). Almost all participants (98%) were from the US, and 80% were of white ethnicity. Participants were of a mixed educational background (e.g. 17% had a high school diploma as their highest level of education, 28% attended college, and 38% had a Bachelor’s degree), of mixed relationship status (e.g. 51% single, 49% married or in marriage-like relationship) and of mixed income levels (spanning a yearly income between under \$5,000 and over \$100,000). Most participants self-identified as “middle class” (48%). Regarding their political views, most participants stated to be “moderate/in the middle” (26%) or some degree of liberal (40%), while the rest stated to be some degree of conservative (34%).

Participants were given short scenarios that described a potential conflict between an individual patient's health and collective wellbeing in society and asked, on a 7-point Likert scale, whether "always the individual" (value 1) or "always society as a whole" (value 7) should be prioritized in the given scenario. Scenarios covered hypothetical decisions in two contexts: a generic, not-further-specified doctor's decision concerning a generic not-further-specified patient; and the participant's own doctor's decision concerning the participant. Both contexts were given for the general case and for the case of AMR, giving a total of 4 scenarios, which were presented to participants in random order (see supplementary materials for all four scenarios). In addition, we collected demographic information (e.g. age, gender, ethnicity, socio-economic status), and participants completed the Oxford Utilitarianism Scale (OUS) (Kahane et al. 2017), a validated scale measuring people's individual tendency to endorse utilitarian views, i.e. views according to which morality requires to always maximize expected utility impartially. This was included as some ideal observer theorists have argued that an "ideal observer" would necessarily be utilitarian (Hare 1981). The OUS contains two (highly inter-correlated) subscales, one indicating people's endorsement of impartial beneficence (OUS-IB) and the second their willingness to accept instrumental harm (OUS-IH) for the greater good. Our study was reviewed and granted ethical approval from *X blinded for review X*. As demographics did not influence our results, we do not report them in the following.

## **Results**

We analyzed the data checking for differences both depending on context (generic doctor vs. own doctor) and on case (general health case vs. AMR).

Figure 1 provides an overview of the descriptive statistics across participants for all four scenarios. >Insert Figure 1 here<

With regard to context, participants prioritized society significantly more when asked what a generic doctor should do ( $M=3.65$ ,  $SD=1.58$ ) compared to what their own doctor should do ( $M=3.30$ ,  $SD=1.70$ ),  $t(157)=3.46$ ,  $p=.001$  in the general case. Also for the AMR case, participants thought that generic doctors should prioritize society more ( $M=4.04$ ,  $SD=1.57$ ) compared to what their own doctor should do ( $M=3.79$ ,  $SD=1.63$ ),  $t(157)=2.77$ ,  $p=.006$ . This is perhaps not surprising: when people do not know whether they would be personally affected by a certain doctor's behavior, as in the case of the generic doctor, it is rational for them to adopt a more impartial perspective, prioritising society's good over an individuals' good.

With regard to case, we found that in both contexts, participants thought that society should be prioritized more when they were informed regarding the costs of AMR and presented with a case involving an explicit risk of AMR than when asked about the general practices of doctors. This was true when participants were asked what generic doctors should do (AMR case  $M=4.04$ ,  $SD=1.57$ ; general case ( $M=3.65$ ,  $SD=1.58$ );  $t(157)=-2.75$ ,  $p=.007$ ), and what their own doctor should do (AMR case  $M=3.79$ ,  $SD=1.63$ ; general case  $M=3.30$ ,  $SD=1.70$ ;  $t(157)=-4.00$ ,  $p<.001$ ).

Regarding participants' underlying moral views, as measured by the Oxford Utilitarianism Scale, we found that the more participants subscribed to utilitarian moral views, the more they indicated society should be prioritized over individual patients in all questions reported above (all  $r_s \geq .195$ , all  $p_s \leq .015$ ). The same pattern held true for both sub-scales, impartial beneficence (IB; all  $r_s \geq .140$ , all  $p_s \leq .080$ ) and instrumental harm (IH; all  $r_s \geq .160$ , all  $p_s \leq .046$ ).



## Discussion

Which public attitudes should inform medical policy and practice? As mentioned above, ideal observer theory suggests that, if public attitudes are to be given a role in determining or evidencing the ethical acceptability of medical policies and practices, we should seek the attitudes of better-informed and more impartial observers. Our study suggests that those observers are likely to be more sympathetic to withholding antibiotics than the attitudes of less well-informed individuals taking a more self-interested perspective.

We found that participants were significantly more willing to deem that society should be prioritised in antibiotic prescription practices when they were made aware of AMR risks—i.e. when they were provided with knowledge of relevant facts—and when they were presented with scenarios framed in third-personal terms—when taking a more impartial perspective. In our study, participants were made aware of antibiotic risks through a short educative paragraph (placed between the abstract and AMR-specific scenarios) that drew a causal link between antibiotic use and AMR development, and indicated the implications of AMR for society. We speculate that some participants had a *prima facie* objection to forfeiting patient welfare for the greater good, but were willing to override this objection when the social costs of antibiotic prescription were made concrete and salient.

We also found that, when considering whether individual doctors should prioritize society over individual patients, participants were significantly more individualistic when they themselves were the patients and their own health was at stake than when the scenarios were presented in third personal terms. This was seen in both the abstract scenario and in the context of AMR. These findings suggest that AMR health education initiatives may benefit from encouraging patients and the public to form expectations that are more impartial, and providing information about the social costs of antibiotic use in the form of AMR.

Our study showed that those who scored more highly on the OUS were more likely to prioritise society over self. This is to be expected as utilitarianism gives impartiality a central place in morality, though it is not the only theory to do so. If those members of the public who adopt the perspective of the impartial observer are best placed to have input into public policy, it could be useful to have a screening tool for identifying individuals strongly disposed to impartiality. The OUS—and IB in particular—could serve as a starting point for the development of such a tool, although it should be refined to accommodate highly impartialist non-utilitarians. Alternatively, and perhaps more controversially, if we thought that it would be more desirable to attain more balance between impartial and impartial perspective in policy processes, and assuming that a policy process already included a majority of impartial individuals, the OUS could even be used to identify those individuals who have less penchant for impartiality, so that their perspective could be taken into account during the policy process.

Our study has several limitations. As almost all participants were US citizens, they would be most familiar with a fee-for-service healthcare system, and may have found withholding individually beneficial treatment to be less acceptable than in socialized healthcare systems (such as in Australia and the UK), where rationing is common. Although balanced (see demographics above), our sample may not be fully representative of the US population, for example because all of our participants were required to have internet access and to be users of the MTurk interface. Moreover, whilst the differences we report are statistically significant, the absolute differences on the scale used are often only small. Furthermore, the scenarios used in our survey concerned clinically mild and self-limiting infections, and we cannot generalise to more clinically severe cases.

## **Conclusions**

Our study provides empirical data on attitudes to antibiotic prescription of the wider public—rather than patients awaiting their consultation. It is also the first to examine the sensitivity of attitudes to awareness of AMR risks and to presentation of scenarios in first- or third-personal terms, and to ask people about the tradeoff between individual interests and society's interests. We found that participants were significantly more willing to prioritise society when they were made aware of AMR risks and when they were presented with scenarios framed in third-personal terms. We found significant associations between the OUS and prioritising society over self, which probably reflects a greater orientation to impartiality.

Further empirical studies could be performed examining doctors' conceptions of medical virtue and the extent to which they align their own priorities with patient welfare or public health aims. The development of a screening tool for identifying highly impartial public participants could be further explored.

### **Key Words**

Drug Resistance, Microbial

Drug Resistance, Bacterial

Anti-Bacterial Agents

Patient Preference

Medical Overuse

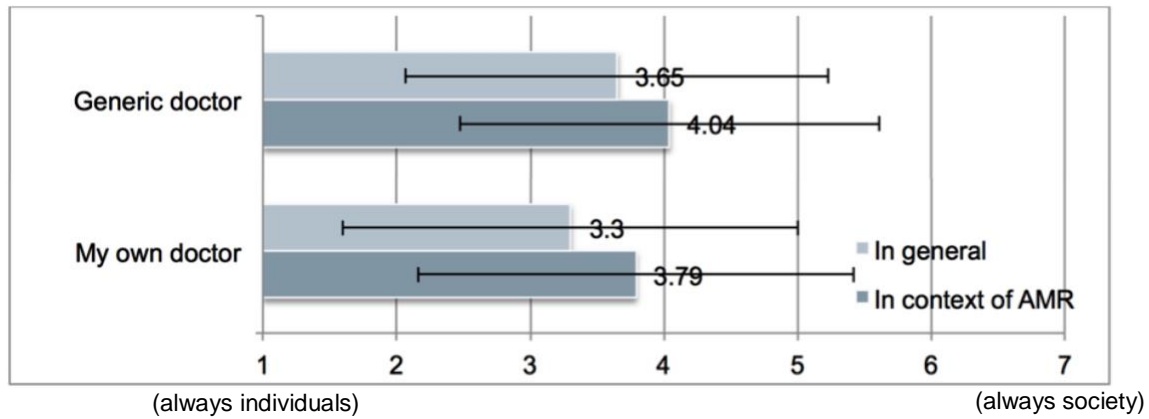
Ethics

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**Figure 1. Means and standard deviations indicating prioritization of 'individuals' or 'society' in all four scenarios**

## Appendices

### Appendix A: Survey

Demographics	
What year were you born in?	_____
What is your gender?	Female
	Male
	Other
What is your nationality?	_____
Which of these options best described your ethnicity?	White
	Black or African American
	American Indian or Alaska Native
	Asian
	Native Hawaiian or Pacific Islander
	Hispanic or Latino
	Other
What is your highest level of education completed?	Less than a high school degree
	High School Diploma

	Vocational Training
	Attended College
	Bachelor's Degree
	Graduate Degree
	Unknown
What is your marital status?	Single
	Married
	De facto relationship
Please choose the category that describes the total amount of income you earned in 2017. Consider all forms of income, including salaries, tips, interest and dividend payments, scholarship support, student loans, parental support, social security, alimony, child support, and others.	Under \$5,000
	\$5,000-\$10,000
	\$10,001-\$15,000
	\$15,001-\$25,000
	\$25,001-\$35,000
	\$35,001-\$50,000
	\$50,001-\$65,000
	\$65,001-\$80,000
	\$80,001-\$100,000
Over \$100,000	
Please indicate the option that most accurately describes your political views.	Extremely Conservative
	Conservative
	Slightly Conservative
	Moderate/Middle
	Slightly Liberal
	Liberal
	Extremely Liberal
What is the socio-economic class of the family you grew up in?	Lower class
	Lower middle class
	Middle class
	Upper middle class
	Upper class

**Prioritization of 'individual patients' vs. 'society' in general context**

Doctors occasionally have to choose between decisions that are best for their



patient and those that are best for society as a whole. For example, when patients have highly infectious diseases, doctors may break patient confidentiality to notify the relevant public health authorities, and/or quarantine the patient to prevent spread of infection to others. Also, doctors may prescribe less expensive (yet less effective) drugs for their own patients, to reduce costs and allow hospitals to redistribute funds towards other patients.

<p>Do you think that in general, doctors should make decisions that prioritize their patient or society as a whole? Please rate on a scale of 1-7, where 1 is always prioritizing the patient and 7 is always prioritizing society as a whole.</p>	1
	2
	3
	4
	5
	6
	7
<p>Do you think that your own doctor should make decisions about your medical care that prioritize you, or society as a whole? Please rate on a scale of 1-7, where 1 is always prioritizing you and 7 is always prioritizing society as a whole.</p>	1
	2
	3
	4
	5
	6
	7

### **Prioritization of 'individual patients' vs. 'society' in context of AMR**

Bacteria are a type of microbe that can be killed with drugs called 'antibiotics'. Bacteria can become resistant to certain antibiotics – when this occurs, these antibiotics can no longer kill the bacteria. This phenomenon, called 'antibiotic resistance', is a type of 'antimicrobial resistance'. Every time a patient uses antibiotics, there is a risk that 'antimicrobial resistance' increases in the community. This means that there are more bacteria in the community that are resistant to antibiotics. When other patients contract infections that are caused by these antibiotic-resistant bacteria, it is harder to treat their infections. This can lead to worse outcomes, and even death.

<p>Consider a scenario where a patient has a mild bacterial urinary tract infection. If the doctor did not prescribe antibiotics, the urinary tract infection would still fully resolve by itself. If the doctor did prescribe</p>	Yes
	No

<p>antibiotics, however, the urinary tract infection would resolve faster.</p> <p>Should the doctor in this scenario prescribe the antibiotic?</p>	
<p>When deciding whether or not to prescribe an antibiotic, doctors can prioritize their patient (by prescribing the antibiotic so that the infection heals faster), or society as a whole (by withholding the antibiotic and reducing the development of ‘antimicrobial resistance’). Do you think that doctors making decisions about antibiotic prescriptions should prioritize their patient or society as a whole?</p> <p><i>Please rate on a scale of 1-7, where 1 is always prioritizing the patient and 7 is always prioritizing society as a whole.</i></p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p>
<p>There are some situations where your own health would improve with antibiotic treatment – for example, if you had a mild bacterial infection. This is a test question to make sure you are paying attention.</p> <p><i>Please skip this question and leave the answer blank.</i></p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p>
<p>There are some situations where your own health would improve with antibiotic treatment – for example, if you had a mild bacterial infection. Do you think that in general, your own doctor should make decisions about prescribing antibiotics to you, which prioritize your own health (by prescribing the antibiotic) or that of society as a whole (by withholding antibiotic treatment)?</p> <p><i>Please rate on a scale of 1-7, where 1 is always prioritizing you and 7 is always prioritizing society as a whole.</i></p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p>