# Chapter 23
# Antimicrobial Footprints, Fairness, and Collective Harm


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**Abstract** This chapter explores the question of whether or not individual agents are under a moral obligation to reduce their 'antimicrobial footprint'. An agent's antimicrobial footprint measures the extent to which her actions are causally linked to the use of antibiotics. As such, it is not necessarily a measure of her contribution to antimicrobial resistance. Talking about people's antimicrobial footprint in a way we talk about our carbon footprint may be helpful for drawing attention to the global effects of individual behaviour and for highlighting that our choices can collectively make a real difference. But can we be morally obligated to make a contribution to resolving a collective action problem when our individual contributions by themselves make no discernible difference? I will focus on two lines of argument in favour of such obligations: whether a failure to reduce one's antimicrobial footprint is *unfair* and whether it constitutes wrongdoing because it is *harmful*. I conclude by suggesting that the argument from collective harm is ultimately more successful.

**Keywords** Political philosophy · Ethics · Public health · Antimicrobial resistance · Collective action problems

## 23.1 Introduction

Anti-microbial resistance and a decline in anti-microbial efficacy are urgent collective action problems. Who should act on this problem? According to the World Health Organisation's recommendations, concerted action on this issue requires efforts from a diverse array of actors: patients, drug prescribers and dispensers, hospitals, policy makers, and food producers (WHO 2001: 68–70, see also Littmann and Viens 2015).

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In this chapter I explore the idea of an 'antimicrobial footprint' and discuss whether or not individual agents are under a moral obligation to reduce theirs. Importantly, I am not suggesting that reducing our antimicrobial footprints by way of individual behavioural change is the best or most efficient way of decelerating antimicrobial resistance, since that is an empirical question. However, given that the WHO identified individual agents such as patients and prescribers as agents of change, it seems that individuals' moral obligations deserve some discussion, which is why I will focus on those in this chapter. But before I do so, let me briefly point to another way in which individual agents are implicated in anti-microbial resistance: as consumers of products from animal industries. Notably, the aforementioned WHO report treats the implications of our aggregate meat consumption as an issue for regulation, but not one for individual behavioural change. In contrast, my argument includes individual consumer choices amongst the options individuals have for addressing antimicrobial resistance.

I will focus on two lines of argument for moral obligations to reduce one's antimicrobial footprint: whether a failure to reduce it is *unfair* and whether it constitutes wrongdoing because it is *harmful*. I conclude by suggesting that the argument from collective harm is ultimately more successful.

## 23.2 Antimicrobial Resistance as a Collective Moral Action Problem

Antimicrobial resistance is a collective action problem in that it is the result of many different agents' activities, it can only be solved by the concerted efforts of many different agents, and it seems rational for individual actors to free-ride because individual behavioural change (if taken in isolation) is neither responsible for the problem's occurrence nor could it ever remedy the problem.

Crucially, too, antimicrobial resistance is the *inevitable* result of using antimicrobials and thereby selecting microorganisms that are resistant to our drugs. Resistance will eventually emerge to any antimicrobial agent we use. This means that resistance as such is an effect that has to be factored into the 'good' that specific antimicrobials provide. To put it differently, it is only a matter of time for any antimicrobial drug to lose its efficacy. To undermine the public good of antimicrobial efficacy is to reduce overall efficacy and to produce resistance at a faster-than-necessary rate. Some have warned that we might be in danger of losing this public good altogether one day – a worst-case scenario, which we are currently capable of preventing. In order to do that, we need to slow down the process of emerging resistance through a more limited and more considerate use of such drugs.

But who is meant by 'we'? Unsurprisingly, many call for global regulation or even the socialization of the use of antibiotics in order to delay the erosion of this good (Smith and Coast 2002; Anomaly 2010). And no doubt, regulators, policymakers and industry leaders must be at the forefront of restricting the use of antimicrobials in a way that secures their continued efficacy.

But what about ordinary people – individual agents who consume antibiotics either directly (as patients) or indirectly (as consumers of animal products) or who prescribe them (as medical doctors)? The 'general community' was identified by the WHO as a target of intervention (WHO 2001). The assumption behind that seems to be that individual members of the general community *can* jointly reduce resistance. If that is the case, does it follow that we *ought to* do something about reducing resistance?

One of the starting points for answering this question is to establish what causal relationship obtains between our use of antibiotics and emerging resistance. According to WHO authors, "the relationship between use and resistance is not a simple correlation" when it comes to antimicrobials. "Paradoxically, underuse through lack of access, inadequate dosing, poor adherence and sub-standard antimicrobials may play as important a role as overuse" (WHO 2001: 15).

Further, it is not simply the case that those who are *causally* responsible for antimicrobial resistance are automatically *morally* responsible. That is, knowing how a problem came about, or which agent(s) caused it, does not necessarily tell us which agent(s) can be blamed for its occurrence or even who should fix it. *Retrospective moral responsibility* is often used synonymously with *moral blameworthiness.* The focus in this chapter will be on *prospective* – or *forward-looking – moral responsibility* in the sense of having a moral obligation to act or to bring about a certain outcome.

Clearly, any answer to the question of prospective moral obligations must be based on empirical data concerning which actions will really make a difference to antibiotic resistance. One of the great difficulties for making the case for moral obligations to change individuals' behaviour lies in the fact that no individual (human) agent's actions will make a measurable or perceptible difference to solving the problem. It is an issue on which only the aggregation and combination of countless individual actions and enduring behavioural change will have a real impact.

Both common-sense morality and traditional moral theory often struggle in dealing with collective moral action problems – cases where what is wrong or right cannot be determined by looking at individuals and their actions in isolation, but where instead these must be considered in conjunction or in aggregation. Increasingly, scholars are making an effort to rethink traditional ethical approaches with a view to better account for collective agents, actions and effects (May and Hoffman 1991; French and Wettstein 2006; French and Wettstein 2014; Hess et al. 2018). One of the early attempts to do so will be discussed further down: Derek Parfit proposed that we re-think our 'moral mathematics'. According to Parfit, we need to revise our notions of wrong and right, harm and benefit regarding aggregate effects, where individual actions only make a significant difference in conjunction with countless actions of others (Parfit 1984). It is easy to see that such collective moral action problems abound: Apart from anti-microbial resistance, climate change, and overfishing are cases that come to mind.

So who should act on these problems? The most obvious response would be to point to states and state agents and the need for new policies and regulation. And there is no doubt that such agents are in principle best suited for dealing with such

complex large-scale problems. But there is a role for 'ordinary citizens' where governments fall short of doing what is required. Where climate change mitigation is concerned, for instance, the combined actions of individual agents can make a significant contribution to closing the so-called emissions gap, that is, the gap between the emission reductions countries have currently committed to and the reductions required for limiting global warming to a maximum of 2 °C (Dietz et al. 2009; Ostrom 2010; Wynes and Nicholas 2017).

Whether or not anti-microbial resistance is a problem that can be fixed or improved through the aggregate effect of individual behavioural change by patients and doctors, consumers and producers is ultimately an empirical question. But, in line with the *WHO Global Strategy for Containment of Antimicrobial Resistance,* I will proceed on the assumption that collectively individual actors can make a significant difference. Can this ground an obligation for patients, doctors, consumers and producers to make a joint effort towards reducing the use of antibiotics? In the following, I will re-assess some of the philosophical arguments defending ascriptions of individual obligations in combating collective action problems. I will introduce the idea of an 'antimicrobial footprint' and discuss whether not contributing to the public good of antimicrobial efficacy is unfair and whether or not it constitutes harmful behaviour. I will conclude by suggesting that not reducing your antimicrobial footprint (where it is possible for you to do so at an acceptable cost) is potentially wrong because it is harmful (even if your individual actions as such make no difference to antimicrobial resistance).

## 23.3 Antimicrobial Footprints

Let me start by introducing a new concept: that of an *antimicrobial footprint*. An individual agent's antimicrobial footprint would result from the extent to which her actions are causally linked to the use of antibiotics. The idea mirrors that of a carbon footprint, a measure which – however imperfect (Wright et al. 2011) – reflects the amount of greenhouse gases released into the atmosphere as a result of individuals' actions. Importantly, it links global effects to individual behaviour and highlights that our choices can collectively make a real difference. It may be a helpful tool, then, to start talking about our antimicrobial footprint in a way we talk about our carbon footprint.

With regard to antibiotics, a person's antimicrobial footprint would not necessarily be a measure of her contribution to resistance, but merely of her overall direct and indirect use. Direct use would involve using such drugs as a patient, prescriber or agricultural producer. Indirect use would involve the consumption of goods from animal industries that were produced by overusing antimicrobials. Our diet, then, plays a major role in accelerating resistance (Giubilini et al. 2017) (see also the chapter by Anomaly "Antibiotics and Animal Agriculture). It is important to note, though, that underuse of antibiotics also causally contributes to resistance, not just overuse.

To reiterate, the anti-microbial footprint is – just like one's carbon footprint – an imperfect measure. As mentioned above, the causal links between our use of antimicrobials and resistance are not always straightforward. But the concept as such draws attention to an important fact – that every single one of us is causally and morally implicated in the problem of antimicrobial resistance.

Note further that – just like with our carbon footprint – our antimicrobial footprint will differ depending on our needs and circumstances. If we live in a climate which forces us to heat or cool our dwellings during major parts of the year in order to be healthy and safe then our carbon footprint will necessarily be greater than that of a person living in a milder climate. Likewise, if we suffer from health conditions that require the use of antibiotics we will necessarily have a greater antimicrobial footprint. Reducing our carbon footprint as well as reducing our antimicrobial footprint must not involve unacceptable cost.

But just like in the case of greenhouse gas emissions, there are many instances where we can reduce our antimicrobial footprint at an acceptable cost. First, research shows that patients often ask for such drugs (and are prescribed such drugs) when it would not have been necessary (WHO 2001, see also chapter by Oakley). If doctors can avoid prescribing such drugs and patients stop insisting on them where they are not needed this can make a significant difference for the better.

Another way to reduce one's antimicrobial footprint at an acceptable cost (and with numerous co-benefits such as improved health) is to become vegetarian (or vegan) or at least to have a meat-reduced diet (or else to resort to game and fish caught in the wild). This is a factor that is missing from many public debates concerning antimicrobial resistance and also missing from the WHO report (2001) mentioned earlier.

Let us assume for the sake of argument that a reasonable way of promoting the idea of antimicrobial footprint reductions can be found – one which does not unduly jeopardize individuals' health and which promotes reductions that are truly effective. Do we have *moral obligations* to reduce our antimicrobial footprint? Why would anyone have such an obligation? The question is a serious one: by themselves, none of our individual antimicrobial footprint reductions would make a difference to local, or regional, let alone global antimicrobial efficacy. I call this the *impotence objection*, or the *no-effect-view*. The issue is a familiar one: can we be morally obligated to make a contribution to resolving a collective action problem when our individual contributions make no discernible difference? The view that we cannot be obligated to perform an action if it makes no discernible positive difference to a morally desirable outcome seems to be entailed by standard individualist act-consequentialism. The discussion of obligations to contribute to collective endeavours even where our individual actions make no perceptible difference is ongoing (Parfit 1984; Cullity 1995; Kagan 2011; Nefsky 2011; Schwenkenbecher 2014; Spiekermann 2014; Pinkert 2015).

I will not rehearse all positions here, nor even the main ones, but instead focus on two solutions that appear particularly interesting and suitable to the kind of problem we are faced with and which move outside the standard act-consequentialist framework: the argument from unfairness and the argument from collective harm (for a

different argument based on solidarity, see chapter by Holm and Ploug "Solidarity and Antimicrobial Resistance"). Most importantly, these solutions avoid the problem of impotence or imperceptible effects by locating the wrongness of failing to contribute somewhere other than in the effects of one's individual actions.

## 23.4 The Argument from Unfairness

The first of these arguments is about fairness: Under certain conditions, it is unfair not to contribute to schemes that we benefit from, regardless of the immediate effect of our free-riding, that is, regardless of whether or not we undermine the scheme or make people worse off by defecting. According to Garrett Cullity's *Principle of Fairness* (Cullity 1995), if a person receives benefits from a scheme that satisfies the following conditions, it is unfair of her not to meet the requirements the scheme makes on those enjoying its benefits:

(i) The practice of participation in the scheme represents a net benefit for her;
(ii) Similarly, this practice does not make most others worse off either;
(iii) She is not raising a legitimate moral objection to the scheme. (p. 18f, paraphrased)

According to Cullity, the free-rider's unfairness lies in giving herself *objectionably preferential treatment* in such cases. The benefits she seeks to gain from free-riding "only exist because others who seek them take it upon themselves to contribute toward their production". In other words, her choice to free-ride is motivated by the benefits that others provide, while she grants herself the privilege of enjoying those benefits without providing them (1995: 22–23).

In a later paper, Cullity specifies that unfair actions are failures of *appropriate impartiality* (Cullity 2008). Judgments about fairness and unfairness concern actions for which one particular way of being impartial is morally required (2008: 3). "Unfairness requires not just that the impartiality you fail to display would have been appropriate, but that it is the appropriate way of doing what ought to be done, as it ought to be done." (2008: 5). Cullity gives the following general description of what is common to unfair actions:

"Not Φ-ing is unfair when:

(i) something ought, all things considered, to be done;
(ii) doing it as it ought to be done requires a form of impartiality;
(iii) Φ-ing is the appropriate form for that impartiality to take; and
(iv) the failure of appropriate impartiality can contribute to a non-instrumental explanation of the failure to do what ought to be done." (ibid.)

According to Cullity, then, what matters for assessing the wrongness of free-riding is not only whether there is an action that ought to be performed (or an outcome to be produced or a scheme to be implemented) but that there is a specific way in which this ought to be done, which requires people to apply some kind of impartial rule, rather than look to their own advantage. Doing "what ought to be done as

it ought to be done" (ibid.) requires that individuals do not exempt themselves from contributing. That is, out of the two imperatives that bind agents in such cases – the imperative to produce the collective good and the imperative of distributive (or procedural) justice – the free-rider violates the latter even where she cannot be said to clearly violate the former (because she does not jeopardize the collective outcome with her defection alone).

How does this relate to our specific problem of antimicrobial footprint reductions? Let us assume that Cullity is correct in claiming that the above features characterise unfair actions. Is failing to reduce one's antimicrobial footprint unfair? In order for that to be true, it would have to be the case that reducing or limiting antimicrobial resistance is something that all-things-considered ought to be done. Such a claim implies that it can be done at an acceptable overall cost. I think we can safely assume that both are the case.

But what about doing it *as it ought to be done*? Is reducing our individual antimicrobial footprint the method by which we ought to combat anti-microbial resistance? Cullity rejects the idea that whenever a group ought to collectively act or produce a good, individual group members ought to be doing something to produce that good: "That would have odd implications for collective actions to which no one is contributing" (2008: 11). He thinks that it is not unfair if I do not unilaterally pursue a goal if there is no collectively agreed method for pursuing it (ibid.). Defecting (or exempting yourself from contributing to a collective good) is only unfair if there is such a method.

According to Cullity, a collectively agreed method for addressing a collective action problem is in place where the required course of action was decided in a fair procedure. He makes two qualifications though: first, that sometimes decisions produced by fair procedures can be bad and therefore need not to be respected. Second, that we may sometimes be obligated to respect the outcomes of procedures that though not perfectly fair are good enough. Unfortunately, Cullity does not specify what it means for a procedure to be good enough.

It is not possible here to have a detailed discussion on fair (or good enough) procedures for deciding on the production of collective goods. Regulation and legislation – where they result from legitimate democratic procedures – should arguably count as such. What is crucial for Cullity's procedural condition is the underlying rationale: that in order for a collective scheme to have legitimacy, in the sense that it gives individual agents binding reasons for playing their role therein, such a scheme must have been produced in the right way. If that is the case, then we as individual agents can be bound by rules (including laws) that are not of our own making and that we would in fact not have chosen ourselves. But these clarifications do not help with our current enquiry, since our focus is precisely on actions that are not called for by regulation and legislation, but on voluntary individual behavioural change that might be necessary while regulation and legislation fall short of reining in the problem.

This is the point where the fairness argument in favour of reducing our antimicrobial footprint crumbles, I believe. It is quite unclear what kind of method or procedure would count as fair where aggregate individual behavioural changes to reduce our use of antimicrobials are concerned. Would it be enough for such changes

to have been recommended by an authoritative, politically neutral global body such as the WHO or other expert panels? According to WHO, its *Global Strategy for Containment of Antimicrobial Resistance* report is the result of expert consultation, workshops and consensus meetings. It is doubtful that this is the kind of procedure Cullity had in mind. Moreover, even though the panel has made recommendations for individual behaviour change, it has not in fact proposed an outright 'scheme' for individual participation with clearly defined roles and contributory actions. For both of these reasons, it does not constitute the kind of collective agreement that gives potentially binding reasons to individual agents. In sum, the argument put forward by Cullity cannot support the idea that individuals ought to take on a share in reducing antimicrobial resistance as a matter of fairness.

A different and more promising approach might be built on an argument that antibiotic overuse or misuse is a way of wronging others in that it harms those who suffer its consequences. This argument relies on a notion of 'collective' harm – a relatively new concept that is increasingly gaining traction.

## 23.5 The Collective Harm Argument

According to Elizabeth Cripps (2011), individual agents can be collectively responsible for harm brought about by their aggregate individual actions in some cases:

> a person becomes one of a group collectively responsible for harm once her contribution exceeds the amount such that, were everyone contributing only to that level, there would be no harm (p. 181)

In order for a person to be thus responsible for harm, certain conditions have to be met:

1. "individuals acted in ways which, in aggregate, caused harm, and which they were aware (or could reasonably be expected to have foreseen) would, in aggregate, cause harm (although each only intentionally performed his own act);
2. they were all aware (or could reasonably expected to have foreseen) that there were enough others similarly placed (and so similarly motivated to act) for the combined actions to bring about the harm; and
3. the harm was collectively avoidable: by acting otherwise (which they could reasonably have done), the individuals making up the putative group could between them have avoided the harm." (pp. 174f)

The crucial point to be noted is that in order to be *weakly collective responsible* (as Cripps puts it) for harm, individuals need to *know* (or be in a position to foresee) two things: (i) that if enough other people did what they do it will cause harm, and (ii) that there are enough other people doing what they do.

Whether or not a large enough number of people are in this position vis-à-vis antimicrobial resistance is an empirical question. However, I suspect that these epistemic conditions are not met when it comes to our antimicrobial footprint. The problem of antimicrobial resistance has much less presence in the media and public

discourse than the problem of climate change and carbon footprint reductions, for instance.

Cripps' criteria are clearly modelled on Derek Parfit's (1984) conditions for collectively doing wrong or harming others. He, too, relies on an epistemic condition that is – currently – unlikely to be met where antimicrobial resistance is concerned:

> (C12) When (1) the outcome would be worse if people suffered more, and (2) each of the members of some group could act in a certain way, and (3) they would cause other people to suffer if *enough* of them act in this way, and (4) they would cause these people to suffer *most* if they *all* act in this way, and (5) each of them both **knows** these facts and **believes** that enough of them will act in this way, then (6) each of them would be acting wrongly if he acted in this way. (p. 81, my emphasis in bold)

According to both Cripps and Parfit, then, we only act wrongly if we know about the effects of our own antimicrobial overuse or misuse and we are aware that enough others are engaged in this practice. Consequently, public awareness campaigns would make it the case that Cripps' and Parfit's conditions are met. Public knowledge – which obtains where most people know some proposition to be true and most people know that most people know – would turn harmless actions into harm. But still, on their accounts there is – currently – no harm or wrongdoing committed by many if not most of those who contribute to antimicrobial resistance. Also, for Cripps, weakly collective responsibility does not imply that any individual has direct duties to avert the (aggregate) harm. Instead such duties fall to the group, first and foremost. That is, even if we were collectively responsible for antimicrobial resistance we would not be required to individually reduce our antimicrobial footprint on her account.

Let me now turn to Judith Lichtenberg, who combines the unfairness argument and the argument from aggregate harm (2010): If we knowingly contribute to harms that "depend on the joint effects of many people's actions" (p. 568) we accept that if a sufficient number of other persons act in the same way, these harms will occur. She thinks that to do so is wrong because it means to act *unfairly*: "In the case of aggregate harms, doing the right thing involves an appeal to the unfairness of acting inconsistently with how one thinks others ought to act." (2010: 569). As I understand Lichtenberg, contributing to aggregate harms is not *intrinsically* wrong, but is wrong because it cannot be justified in rule-consequentialist terms or by way of universalizing. Similar to Cullity, she argues that the wrongness lies in exempting oneself from a rule that one should accept as morally optimal.

Note that Lichtenberg's account is more demanding than Cripps' and Parfit's because it does not have as strong a knowledge condition. For the wrongness of contributing it does not matter whether or not an individual agent knows that enough others will perform the same action and harm will be thus caused in aggregation. It suffices for the individual to know that collectively we should adopt a rule prohibiting such actions. This is a more demanding account because it seems to require us (*pro tanto*, at least) to individually refrain from doing what is collectively suboptimal. As I understand it, Lichtenberg's rule, if applied to antimicrobial footprint reductions, would imply that avoidable antimicrobial overuse and misuse are instances of harming, from which we (*pro tanto*) ought to abstain.

In response, one might argue that to demand – as Lichtenberg appears to do – that we individually do our part in a pattern that is collectively optimal is too strong a requirement. After all, sometimes it may be right to do what is collectively suboptimal if no one else does what is collectively optimal and our individual 'sacrifice' would be pointless. However, note that if Lichtenberg's proposal is safe from this objection as long as it is understood as generating pro tanto obligations to avoid contributing to collective harm, that is, obligations that can be overridden by other, more important obligations. If the collective defection rate is too high, my *pro tanto* obligations may simply fail to become all-out obligations. That is, if not enough others contribute, I may not have an all-things-considered obligation to avoid collective harm.

## 23.6 Conclusion

In this chapter I discussed arguments in favour of a moral obligation to reduce one's individual antimicrobial footprint. Despite the intuitive appeal of this idea, there exists no simple, straightforward defence of an obligation to change our individual behaviour. High levels of collective awareness and a genuine collective willingness to address the problem of anti-microbial resistance appear to be important preconditions for motivating (all-out) obligations for individuals to reduce their antimicrobial footprint. It is one of the most frustrating aspects of collective action problems that it is precisely the publicly known lack of commitment to resolving them which seems to sustain and justify a (further) lack of commitment for all those who could potentially resolve it.

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