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How Should We Think About Clinicians' Individual Antibiotic Stewardship Duties?

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Abstract

The language of antibiotic stewardship is often used to capture the moral importance of individual prescribers doing their part to combat antibiotic resistance. “Stewardship” as an ethics concept borrows from collective action problems—those that cannot be solved by individuals only—like those discussed in the environmental ethics literature. This article suggests that hyper focus on stewardship, however, risks misunderstanding individual prescribers' reasons to limit antibiotic use.

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Stewardship as an Ethics Concept

The language of antibiotic stewardship can be helpful and powerful, as it frames the challenge of responding to the global rise in antibiotic resistance as a collective action problem in which the uncoordinated actions of millions or billions of people lead to a problem that can only be solved through coordination and working together. Thus, individual clinicians are called on to be good stewards of a precious resource, contributing to a larger, global effort in order to mitigate the collective harm that comes from overuse.¹ This framing plays off an analogy with other collective action problems—in particular, with the natural environment.² In response to massive, catastrophic threats like climate change, freshwater depletion, biodiversity loss, and so on, each of us individually is called upon to do our part in conserving our natural resources. Although none of us can solve such massive, structural threats on our own, each of us can do our part by being good stewards of natural resources.

Although there is something attractive about this framing, we will argue that it comes with costs. The responsibilities associated with stewardship are arguably not as strict as the responsibilities expected of prescribers. To see this perspective, consider whether each action you take that utilizes unnecessary fossil fuel seems like a violation of duty. If you drive when you could have biked, did you violate a duty? If you travel to see family, did you do something wrong? What about if you travel for an academic conference? Most people think that they are not strictly obligated to minimize their carbon footprints, even though it would be *good* to bike or reduce the amount of travel. All of us have

latitude when it comes to our small contributions to collective efforts that clinicians do not have in prescribing and using antibiotics. This constraint does not mean that stewardship as a concept is not helpful. It does mean that multiple normative frameworks should be explored for conceiving what it means to prescribe and use antibiotics responsibly.

Environmental Stewardship

Stewardship is an important concept in **environmental ethics**³ because environmental problems are so large and complex that the relevant harms tend not to be solvable by individuals. In a case in which a single company is pouring toxins into a river and making people downstream sick, we don't need to employ the idea that the company should be a good steward of the river; it simply shouldn't cause harm. Stewardship, then, is invoked when the river becomes toxic and makes people sick as a result of the uncoordinated dumping of many people's waste (no one of which dumpings is sufficient to cause harm). In such a case, the harm is caused by a collective, and so we need each individual to be a good steward and limit their dumping of waste into the river. This need for coordination explains why problems of collective action are best solved by governments or other institutions with the power to set and enforce policy. Yes, each individual *should* be a good steward; but individual stewardship efforts won't solve the problem. Policy will.

The environment provides many examples of harms caused by the collective actions of millions or billions of people, with climate change perhaps being the paradigmatic example. Due to the scale and complexity of climate change, no single individual causes the harms of climate disruption through their emissions.⁴ As a result, it seems the harm-producing mechanisms of climate change are insensitive to most individual choices.

Due to this insensitivity, both ethicists and the public have asked whether individuals really have a duty *not* to contribute to climate change in the absence of policy or regulation. If one's personal emissions don't meaningfully contribute to any harm, what could justify such a duty?⁵ Although many potential answers to this question have been offered, the first author on this paper (T.N.R.) has argued that the causal disconnect between individual action and collective harm entails that most individuals do not have a strict duty to reduce emissions, as duties are much too demanding a moral concept to be justified by our miniscule contributions to the problem.^{6,7} However, we certainly have good *reasons* not to contribute to the emission of greenhouse gases, and those reasons can be explained by what we might think of as "softer" moral concepts, such as virtue, integrity, standing in solidarity, and—most relevant to this paper—being a good steward.^{6,7}

In general, we all have good moral reasons to do our part to promote collective goods and avoid collective harms, even when our part is quite small. But having a *reason* is different from having a *duty*. It is clearly good to reduce one's carbon footprint, but individuals aren't ethically required to take every opportunity to do so. This is why we praise those who live modestly for environmental reasons but don't think our friends and family who take nonessential flights are bad people (though they would be if they dumped toxic waste into a river, directly making those downstream sick).

An Analogy to Antibiotics

One way to explore stewardship in the context of antibiotic resistance, then, is to ask whether and to what extent such resistance is really analogous to environmental

challenges like climate change. We focus on antibiotics and antibacterial resistance as a subset of antimicrobials and antimicrobial resistance here because of the contributions that both appropriate use and overuse of antibiotics make to emerging public health threats.⁸ We would have good reason to employ the concept of stewardship if and to the degree that antibiotic resistance is best described as a kind of collective action problem for which other moral concepts aren't comfortably applicable.

On the one hand, the analogy seems apt because (1) antibiotic resistance is a large, public health threat; (2) the prescribing of antibiotics contributes to this large, collective threat; but (3) no individual decision by a clinician not to prescribe antibiotics would solve the collective problem. Thus, it seems that we should collectively limit antibiotic use and that we can individualize that responsibility by asking clinicians to be good stewards of the collective antibiotic resource.⁹

On the other hand, however, there are features of antibiotic prescribing and consumption that are potentially different from the environmental case in morally relevant ways. Here, we will focus on the question of whether an individual prescribing action can make a meaningful difference to the harms of antibiotic resistance in a way that would make it disanalogous to the case of, say, climate change and individual emissions.

Risk of harm to patients. In some cases, there is a direct causal pathway between prescribing antibiotics and risk of harm to the patient. Consuming antibiotics alters the composition of commensal bacteria—the bacteria that are a normal part of the human body—such as those that live in the digestive tract and on the surface of the skin. The antibiotic eliminates bacteria susceptible to it, leaving behind those with intrinsic antibiotic resistance to grow and thrive, including some commensal bacteria.¹⁰ This effect itself is often justifiable, given the medical need for the antibiotic. It does not always cause direct harm, is slowly reversible once the antibiotic prescription is complete, and is highly dependent on the type of antibiotic prescribed. However, it does mean there is often a window of time when a patient's commensal bacteria have a more antibiotic-resistant profile. Most infections occur when commensal bacteria travel to sites where they shouldn't be, like to the bladder or kidneys where they cause a urinary tract infection, or underneath the skin where they cause a soft tissue infection. If an infection is acquired during this window of a person's having more resistant commensal bacteria, the infection is more likely to be caused by resistant bacteria and require broader-spectrum antibiotics to treat it. This cycle of antibiotics and worsening resistance therefore starts anew and can occur repeatedly within a singular patient.

A common example of this self-reinforcing cycle of resistance is inflammation of the colon and diarrhea from *Clostridium difficile* infection (CDI), for which previous antibiotic exposure is a significant risk factor.¹¹ Patients with a history of CDI are at higher risk of CDI recurrence if they are continued on non-*Clostridium difficile* antibiotics after diagnosis of CDI or prescribed antibiotics in the future.¹²

Prescribing antibiotics also comes with a host of patient-related risks aside from alteration of the commensal bacteria. These range from adverse drug reactions, such as nausea and vomiting, to mistaking a rash after penicillin is prescribed for an allergic reaction rather than a manifestation of an original viral infection. The subsequent labeling of the patient as "penicillin-allergic" limits downstream antibiotic treatment options, with suboptimal regimens initiating and perpetuating the same cycle of

worsening bacterial resistance mentioned previously. As the second author (C.M) argues elsewhere in this issue, the risk of general antibiotic resistance for the individual patient, along with other risks that come with antibiotic use, should undergird the risk-benefit determination physicians use to decide when to prescribe antibiotics. And if the risk of prescribing is too high to justify for a particular patient, then choosing to prescribe in that case violates strict duties not to risk harm to a patient for insufficient benefit.

Risk of harm to others. Beyond risks to the individual patient receiving antibiotics, there are also causal pathways from the individual patient to particular, identifiable others. This is because commensal bacteria are **transmitted among close contacts**. If a patient's commensal bacteria are more resistant from either antibiotic use or recent hospitalization, those bacteria are likely going to spread to individuals within the same household or to individuals sharing hospital rooms or health care practitioners. This spread of antibiotic-resistant bacteria has been seen among patients with commensal methicillin-resistant *Staphylococcus aureus* (MRSA)¹³ and extended-spectrum beta-lactamase *Escherichia coli* (ESBL-E)¹⁴ following discharge from the hospital. Both MRSA and ESBL-E are increasingly causing infection among patients in the community who do not have recent hospital exposure, with the transmission among close contacts serving as an alternative explanation for why they have an antibiotic-resistant infection.^{15,16} Similarly, household members of patients with recent CDI or commensal *Clostridium difficile* are at higher risk of requiring hospitalization for CDI.^{17,18} These examples demonstrate that resistant bacteria that are part of the commensal bacterial profile of an individual patient can be transmitted to others and cause direct harm to third parties, and this transmission can be prevented to a certain degree by strict duties not to risk such harm unnecessarily.

Thus, there are more traditional justifications for cautious prescribing that go beyond just a reason to promote the collective good by imposing a strict duty to prescribe antibiotics responsibly; in particular, duties of nonmaleficence require clinicians not to cause harm to their patients and to particular others.

An Upshot for Bioethics

Antibiotic resistance is a pressing problem and demands a serious response. Although the idea of stewardship is clearly important—all clinicians have good reason to do their part to protect our collective antibiotic resource—it's also a relatively weak concept. While we should all be stewards of the environment, stewardship doesn't seem to translate into a strict duty not to, say, travel for a vacation, to see family, or for an academic conference. Such travel creates "luxury emissions," but those emissions do not directly cause meaningful harm, and travel is a valuable part of many people's lives. Thus, part of the challenge of environmental ethics is that it's unclear how demanding a responsibility it is to be a good steward.

In the context of antibiotic prescribing by clinicians, it seems plausible that something stronger is needed: clinicians are *obligated* to prescribe in a certain way. For instance, in cases in which an infection is overwhelmingly likely to be caused by a virus, it is *wrong* to prescribe an antibiotic to a patient just because, for instance, the patient demands it. While such a prescription would be a violation of stewardship, the environmental analogy suggests that stewardship cannot support the weight of justifying a duty. But we have argued that stewardship need not, as classical bioethical reasoning concerning a duty of nonmaleficence can do the work. And invoking third parties need not require thinking of clinicians as having a public health duty to "the community" in an abstract;

rather, they are simply required not to risk harm to a patient’s family, roommates, and other close contacts.

When it comes to antibiotic resistance, we should employ all of our bioethical tools to get a handle on the situation. It seems fairly well accepted that clinicians should be good stewards, and the health care system should continue to encourage that mindset. But if stewardship were the only justification for responsible antibiotic prescribing, we may have to admit that we’re in a place similar to that of climate change: we certainly need institutions to act (by creating policies and regulation that *will* solve the problem), and it’s clearly *good* for individuals to be stewards of a precious resource, but in the absence of **policy or regulation**, individuals don’t have a strict duty one way or the other. We have argued that this analogy does not seem to be correct in the case of antibiotics. While it’s certainly true that clinicians should see themselves as contributing to a collective effort, and thereby acting as stewards, the risk of direct harm to patients and third parties justifies a strict obligation to prescribe responsibly.

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