Governing Global Antimicrobial Resistance: 6 Key Lessons From the Paris Climate Agreement

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Antimicrobial resistance (AMR) is among the most urgent global health challenges of our time. AMR can develop with each use of an antimicrobial, regardless of the setting. The ongoing use of the same antimicrobials across sectors and the ability of microbes to transfer among people, animals, food, and environments; spread across borders through global trade and travel; and bring entire economies to a halt means that every antimicrobial consumed has global implications. Some microbes have already developed resistance to all known antimicrobials, meaning previously curable diseases have become untreatable. If immediate action is not taken, the effectiveness of these vital medicines will continue to diminish, further undermining modern medicine’s ability to treat infectious diseases and perform essential medical procedures.1

The global spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and its variants that cause COVID-19 has sparked new discussions on the need for an international pandemic treaty,2 presenting a unique opportunity to reflect on AMR as one pathway through which new cross-border global health threats emerge. Similar to zoonoses such as COVID-19, AMR can lead to untreatable infectious diseases in humans with the potential to become deadly pandemics. AMR diminishes the global common pool of antimicrobial effectiveness—a nonexcludable but rivalrous resource—meaning that maintaining the viability of antimicrobial therapy is a global common-pool resource challenge.3

Overcoming this challenge will require global mechanisms to coordinate interests and investments, limit free riding, and steer cooperation toward preserving the common pool. This aspect of AMR enables us to draw lessons from other common-pool resource challenges, such as climate change, in building collective action to target the pathways by which AMR may emerge, maximize the antimicrobial commons for everyone’s benefit, and avoid further descending into this tragedy-of-the-commons scenario.

Building global collective action while accommodating varying national
circumstances is a monumental but, in our view, achievable task. The 2015 Paris Agreement under the United Nations Framework Convention on Climate Change, for example, successfully mobilized substantial collective action to protect a shared global common-pool resource similar enough to antimicrobial effectiveness that it can provide lessons for advancing global action in this area. While countries struggle to meet their specific climate targets, the Paris Agreement has stimulated global cooperation by engaging countries in an ongoing effort to mitigate greenhouse gas emissions and adapt to the impacts of climate change. AMR lacks an equivalent global vehicle for building cooperation and would benefit from a Paris Agreement–style coordinating structure. The Paris Agreement offers 6 key lessons relevant to managing the global antimicrobial commons (Table 1).

### 6 KEY LESSONS FOR AMR

First, AMR needs a unifying global target to mobilize political attention and benchmark global progress. For the Paris Agreement, the world united behind the politically memorable, albeit scientifically ambiguous goal of keeping global average temperatures below 1.5°C above preindustrial levels or at least well below 2°C. For AMR, the world still needs to develop, agree to, and unite behind a quantifiable goal that resonates with nonexperts.

Second, effectively mitigating the threat posed by AMR requires a recognition of how embedded social structures and incentives drive antimicrobial use across sectors. AMR efforts over many decades have largely focused on the behavior of individual health care providers and patients, emphasizing education and personal choice as the dominant strategies to reduce global antimicrobial use. These strategies, which are reminiscent of climate change mitigation strategies that offload the responsibility for action from governments to individuals, are now acknowledged as insufficient. Antimicrobials have become such widely used tools that they are effectively invisible infrastructure underpinning our health and food systems and paper over shortcomings in basic hygiene, equality, and labor systems. Individuals are therefore ill-placed to address AMR through more informed decision-making. Instead, addressing AMR requires a commitment to social and economic transformation similar to the one in the Paris Agreement’s call to action.

Third, escalating commitments through national AMR action plans, which outline each country’s AMR goals and planned actions, will likely increase the effectiveness of global AMR efforts. Ongoing international monitoring of national AMR action plans by the World Health Organization provides a key starting point, but more extensive and ambitious global legal commitment mechanisms are imperative. In their nationally determined contributions under the Paris Agreement, countries are legally required to specify their level of ambition, regularly monitor progress to that goal, and ratchet up their commitments every five years. Escalating national commitments over time makes it easier for countries to commit to action early, shape future policy directions, and signal their willingness to cooperate. Although not perfect, this model could increase the level of ambition in current AMR commitments.

Fourth, a permanent multistakeholder forum on AMR similar to the Paris Agreement’s annual Conference of the Parties to the United Nations Framework Convention on Climate Change could be highly effective in shaping consensus and action over a short time horizon. A high-profile AMR forum composed of countries and nongovernmental organizations would ensure ongoing and inclusive dialogue to build a culture of accountability, trust, and good faith among relevant actors. Crafting an inclusive process will be essential for shaping equitable goals and actions, especially because attempting to govern AMR globally requires confronting questions about universal representations of the global public and its objectives. Striking this forum, therefore, represents an important first step to ensure that future initiatives proceed fairly.

Fifth, like the Intergovernmental Panel on Climate Change guiding the Paris Agreement, ongoing AMR action would be best informed by a regular and independent stock-taking to evaluate existing measures and advise on evidence-informed adjustments. This endeavor must (1) recognize that different ways of knowing constitute the global knowledge base, (2) ensure that using evidence to inform adjustments that work does not detract from the inherently political questions of works for what purpose and for whose benefit, and (3) come with a commitment to equitable evidence generation and prioritization. Striking a panel to assess the global knowledge base on these terms will ensure that global, regional, and national goals and policies are continually informed by the best available evidence and are in line with leading practices.

Finally, an enduring international legal agreement could institutionalize
these actions with a long-term vision and generate progress on AMR by charting a clear path forward, distributing responsibilities, and creating a sustainable system that makes countries active participants throughout the process. Treaties are appropriate for certain kinds of challenges only—hence, they are rare in global health. However, the escalating, transnational, and enduring AMR crisis means a strong international legal framework is required to hold actors accountable and link strategies across sectors, countries, and time.  

Whether through a standalone agreement or within a new pandemic treaty, an international agreement on AMR could align incentives that switch the focus of AMR efforts toward prevention and preparedness and coordinate investments to generate social and economic transformation, especially because countries are unlikely to undertake these initiatives on their own. Such an agreement must unite human health, animal, agricultural, and environmental sectors through a “One Health” approach to maximize the global antimicrobial commons for everyone’s benefit and simultaneously improve infection prevention measures while promoting access, conservation, and innovation for antimicrobials, alternative therapies, and diagnostic technologies.  

Coordinating a One Health approach that appropriately engages ministries of health, environment, agriculture, development, and finance

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### TABLE 1— Comparing the Paris Climate Agreement With Existing Global AMR Efforts

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<th>Essential Elements</th>
<th>Paris Climate Agreement</th>
<th>Current Global AMR Efforts</th>
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<tr>
<td>1. Collective global goal</td>
<td>Keep global temperature rise below 1.5°C above preindustrial levels or at least well below 2°C</td>
<td>No consensus on what a collective global goal could look like</td>
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<td>2. A focus on social and economic transformation</td>
<td>Implementation of the Paris Agreement requires social and economic transformation to decarbonize national economies.</td>
<td>AMR discourse has historically emphasized individual behavior instead of social and economic transformation.</td>
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<td>3. Nationally determined contributions pledged, reviewed, and ratcheted every 5 years</td>
<td>All parties must communicate their nationally determined contributions every 5 years and, during revisions, aim for maximally ambitious goals. Nationally determined contributions are reviewed to ensure the distribution of responsibilities is fair and that countries are ambitious in their goals. All parties must regularly provide information on activities and outcomes using methods that are articulated by the Intergovernmental Panel on Climate Change.</td>
<td>All WHO member states committed to having national action plans for AMR. Even though this commitment is not legally binding, more than 100 countries have published plans, and many are under development. However, there are no specified review, intensification, or accountability mechanisms, and little financial, technical, and infrastructural support is provided for achieving necessary policies. WHO, FAO, and OIE conduct self-assessment surveys on national AMR activities, but there is no regular reporting or standard methodology for reporting outcomes.</td>
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<td>4. Annual multistakeholder forum</td>
<td>The annual Conference of the Parties to the UNFCCC serves as a multistakeholder meeting place for advancing the Paris Agreement.</td>
<td>AMR is normally discussed every 3 years at the World Health Assembly, but there is no formal or regular meeting focused on AMR and no permanent forum for multistakeholder discussions on AMR across sectors.</td>
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<td>5. Global scientific stock taking every 5 years</td>
<td>Requirement to assess the best available science every 5 years; this stock-taking exercise will help ensure that the Paris Agreement’s ongoing efforts are in line with scientific best practices.</td>
<td>No relevant comparison</td>
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<td>6. International legal framework</td>
<td>The Paris Agreement is a legally binding instrument of the UNFCCC. The UNFCCC provides a broader legal framework for the Paris Agreement.</td>
<td>No international legal framework, although the constituting instruments of the WHO, FAO, OIE, or UN could serve as the broader legal framework for a legally binding AMR agreement</td>
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Note. AMR = antimicrobial resistance; FAO = Food and Agriculture Organization of the United Nations; OIE = World Organization for Animal Health; UN = United Nations; UNFCCC = United Nations Framework Convention on Climate Change; WHO = World Health Organization.

Source. Rogers Van Katwyk et al.  

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requires new legal mechanisms beyond those available through the World Health Organization, the Food and Agriculture Organization of the United Nations, the World Organization for Animal Health, and the United Nations Environment Program, which are limited to the area-specific mandates of each institution.

**TOWARD AN INTERNATIONAL TREATY**

Although a universal agreement involving all countries is desirable from the outset, an effective treaty can emerge from a small group of countries willing to act immediately, as long as it is designed to incentivize and allow other countries to join later. It only took 20 countries to launch negotiations for the 1985 Vienna Convention for the Protection of the Ozone Layer, which later delivered the 1987 Montreal Protocol—the first universally ratified and possibly the most effective agreement in the history of the United Nations. For AMR, we would only need a few global leaders to decide that bold action is needed to protect the countless lives threatened by AMR. Although some countries, such as those within the G20, may be better positioned than others to take this initiative, the COVID-19 pandemic has shown that our expectations for global health leadership can rapidly change. An AMR treaty—or provisions on AMR within the proposed pandemic treaty—could emerge from any group of countries ready to act quickly. With the future of antimicrobial effectiveness hanging in the balance, we cannot afford to wait any longer.

We have known about AMR for as long as we have had effective antimicrobials. Without swift collective action now, though, AMR may undo one of humanity’s greatest discoveries. This outcome would make AMR the epitome of the global tragedy of the commons. To avoid such a catastrophe, world leaders must take ambitious action—similar to the steps they took when setting up the Paris Agreement—to protect antimicrobials as a precious shared resource and prevent this looming emergency. These insights could be immediately relevant for informing emerging discussions on a potential international treaty on pandemics, which must also address AMR to be comprehensive.

**REFERENCES**


