

We are rapidly losing our ability to cure an alarming number of the most serious and common diseases of the developing world because of an invisible adversary: drug resistance. Resistance is inevitable—but careless practices in drug supply and use are hastening it unnecessarily. Without an immediate global effort to safeguard lasting treatment effectiveness, drug resistance will quickly become a widespread threat—claiming lives, raising the cost of curing patients, and making future generations increasingly vulnerable to deadly diseases that were easily cured in the past.

The Center for Global Development's Drug Resistance Working Group urges pharmaceutical companies, governments, donors, global health institutions, health providers, and patients to collectively and immediately tackle this global health threat by implementing four key recommendations:

1. Collect and share drug resistance information across disease networks.
2. Secure the drug supply chain to ensure quality products and practices.
3. Strengthen national drug regulatory authorities in developing countries.
4. Catalyze research and innovation to speed the development of resistance-fighting technologies.

A Global-Scale Failure with Dire Consequences

Drug resistance is on the rise worldwide, with grave economic and health consequences. Drug-resistant microbes are hindering the fight against childhood dysentery and pneumonia, increasing the costs of fighting tuberculosis (TB) and malaria, and undermining HIV/AIDS treatment. Sometimes resistance develops almost as quickly as drugs come to market. Alternative drugs are almost always far more costly and harder to use, have worse side effects, and require more medical oversight. For example, curing one patient of extensively drug-resistant TB costs as much as curing 200 patients of non-resistant TB.

Drug resistance is not limited to developing countries. In the United States, methicillin-resistant *Staphylococcus aureus* (MRSA) now accounts for more than half of hospital staph infections, up from just 2 percent in 1974, and causes more deaths each year than HIV/AIDS. Because drug-resistant microbes pass easily across borders, this is a global problem requiring global solutions.

Critical and Achievable Steps to Fight Drug Resistance

While some governments and health institutions have begun to address drug resistance, efforts are sporadic, fragmented, and usually focused on just one disease or country at a time. The Center for Global Development's Drug Resistance Working Group's recommendations are a first step in addressing the common market and institutional failures that drive resistance across all diseases. They target four critical areas: surveillance and laboratory capacity; the integrity of the drug supply chain; regulatory capacity; and the technology pipeline. Each has merit individually. Taken together, they constitute a unified, multifaceted approach to identify, contain, and respond to resistance, with both public and private sector involvement.

1. Improve surveillance by collecting and sharing resistance information across networks of laboratories

Efforts to tackle drug resistance are complicated by lack of knowledge about where resistance lurks and how it spreads. Lack of information fuels a cycle of neglect: insufficient awareness makes drug resistance a low priority for donors and governments, but we cannot obtain the evidence required to combat drug resistance without focused attention and resources. New knowledge can both guide policymaking and inform patient diagnosis and care.

Global health donors and technical agencies must work with developing country governments to improve laboratories, link surveillance across diseases, and share relevant information with policymakers and global health donors. Three specific actions can improve the drug resistance knowledge base:

1. Produce a biennial Global Drug Resistance Report.
2. Create a Web-based resource center to aggregate and share resistance data.
3. Disseminate clear guidelines from the World Health Organization on when and how to report the emergence or transmission of drug-resistant forms of diseases.

2. Secure the drug supply chain to ensure quality products and practices

Each step along the pharmaceutical supply chain presents the potential for breaches that contribute to drug resistance. Drug resistance will be slowed only by tightening the *entire*

supply chain, requiring and monitoring quality through both distribution and packaging standards and certification for those who prescribe and dispense drugs.

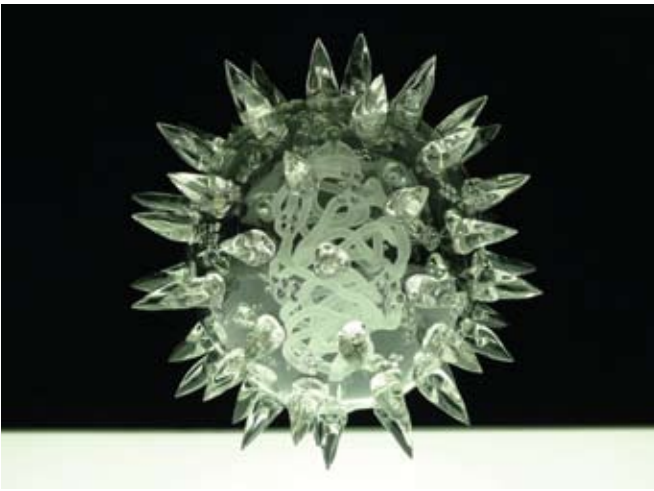
Pharmaceutical companies and technical agencies should work through the International Organization for Standardization (ISO) to create protocols and standards to protect the quality of drugs after the manufacturing stage. Donor organizations and national governments buying medicines should deal only with companies that offer quality assurance by providing ISO certification. Downstream, medicine providers should form national and global partnerships to collect, evaluate, and implement best practices in prescribing and dispensing drugs. Donors and governments should allocate funds to pilot new programs, replicate successful ones, and implement country-specific interventions to protect drug quality.

3. Strengthen national drug regulatory authorities in developing countries

In developing countries, national drug regulatory authorities (NDRAs) face the daunting task of monitoring the flow of drugs within and across their borders. Severely constrained by limited resources, many NDRAs simply cannot monitor the circulation of drugs and have little capacity to enforce drug quality standards. With financial and technical assistance from global health donors, developing country governments should create new regional networks of national drug regulators, enhance existing ones to address drug quality, and develop shared incentives to protect drug efficacy. By building collaborative networks, NDRAs operating in a single region can more efficiently share information about poor-quality and counterfeit drugs, coordinate inspections and border controls, build internal capacity to accomplish more with existing resources, and align drug policies and treatment guidelines.

4. Catalyze research and innovation to speed the development of resistance-fighting technologies

Infectious disease research and development—particularly for drugs and diagnostics—has not kept up with needs. For some diseases, drug development pipelines are so thin that old and ineffective treatments are all we have. Tragically, this shortfall has been mirrored by the decline in efficacy of what were once highly effective treatments. Penicillin, for example, once considered a surefire wonder drug, now effectively treats only one-half to two-thirds of the strains of *S. pneumoniae* in many high-income and developing countries, and less than one-quarter in certain regions.



Untitled Future Mutation. Photograph by Luke Jerram.

The creation of a Web-based marketplace for resistance research and innovation across diseases would provide a significant boost to researchers seeking scientific solutions to drug resistance. The proposed marketplace would provide technical assistance, connect researchers with one another, and match good ideas with investors, while lowering costs of research collaboration and partnerships among pharmaceutical companies, venture capitalists, foundations, and public funders.

The Urgent Need for Global Action

We can no longer afford indifference to the spread of drug-resistant diseases. Containing and preventing resistance requires collaboration and leadership from all key stakeholders in global health—donors, philanthropic organizations, pharmaceutical companies, governments, the World Health Organization, distributors, prescribers, and patients.

Donors and philanthropic organizations must ensure that their laudable efforts to increase the developing world's access to drugs are accompanied by measures to protect the effectiveness of those drugs. With donor support,

the global health community can create truly effective surveillance systems, collaborative regional regulatory networks, and a Web-based marketplace for research and innovation.

Companies must give greater priority to resistance reduction in their research and development efforts. They must also lead in developing industry standards to ensure that drug quality is maintained throughout the supply chain.

Governments must provide regulation and oversight of drug distribution and use and support public health laboratory facilities and surveillance systems to detect and monitor drug efficacy.

Global health institutions must make drug resistance a high priority—across all treatable diseases—by providing financial and technical support to developing nations to meet and maintain standards. The World Health Organization must clearly articulate countries' responsibilities regarding resistance under the global health legal framework, and take an active role in coordinating surveillance of drug resistance globally.

Patients, prescribers, and dispensers must become better informed about the potentially catastrophic personal, social, and economic costs of drug resistance, and employ far greater diligence in appropriately using drugs.

The world has the means to slow the advance of drug resistance, but many actors must work together to bring these recommendations to fruition. For the sake of all people who seek effective health care, now and in the future, drug resistance must be addressed urgently and aggressively. As a global health emergency, it must become a global health priority.

More information on drug resistance and the Center for Global Development's Drug Resistance Working Group can be found at www.WhenMedicinesFail.org.

The **Center for Global Development** works to reduce global poverty and inequality through rigorous **research** and active engagement with the **policy** community to make the world a more prosperous, just, and safe place for us all. The policies and practices of the United States and other rich countries, the emerging powers, and international institutions and corporations have **significant impacts** on the developing world's poor people. We aim to improve these policies and practices through research and policy engagement to expand opportunities, reduce inequalities, and **improve lives** everywhere.

Suggested Readings

Nugent, R., E. Back, and A. Beith. 2010. *The Race Against Drug Resistance*. Center for Global Development. Available online at: www.WhenMedicinesFail.org.

Yadav, P. September 2009. *Countering Drug Resistance in the Developing World: An Assessment of Incentives across the Value Chain and Recommendations for Policy Interventions*. Center for Global Development, Working Paper 183. Available online at: www.cgdev.org/wp183.

WHO Report 2000: *Overcoming Antimicrobial Resistance*. World Health Organization. Available online at: www.who.int/infectious-disease-report/2000/index.html.

A list of drug resistance resources can be found at: www.WhenMedicinesFail.org/resources.