Center for Global Development

When Medicines Fail

A GLOBAL PUSH TO FIGHT DRUG RESISTANCE

Drug Resistance: Creating an R&D Marketplace to Speed Innovation

A PUBLIC HEALTH TIME BOMB

In an interconnected world, drug resistance increasingly threatens global health, placing a heavy burden on health systems, particularly in developing countries. Drug resistance has drastically increased the costs of fighting tuberculosis and malaria, slowed gains against childhood dysentery and pneumonia, and imperiled efforts to effectively treat people living with HIV/AIDS. Significant investment in drug research and development is undermined as therapies lose efficacy. In some cases, resistance appears almost as quickly as new drugs are appearing on the market. And if the first treatment doesn't work, alternatives are almost always more costly, harder to use, cause worse side effects, and require greater medical oversight. The problem demands an urgent and systematic global response.

TAKING ACTION AGAINST RESISTANCE

The Center for Global Development's Drug Resistance Working Group was convened in late 2007 to identify practical and feasible ways that governments, the global health community, private funders, multilateral organizations, NGOs, and other actors at the global level can prevent or contain the emergence of drug resistance in developing countries. The group highlighted the threats posed by this growing global crisis and outlined concrete steps that the international community can take to halt and even turn the tide on resistance.

PROBLEM: LACK OF NEW DRUGS AND TOOLS TO PROTECT DRUG EFFICACY

Infectious disease research and development—particularly for drugs and vaccines—has declined in productivity in recent decades. A combination of challenging science, fewer large pharmaceutical companies making investments in anti-infective research, and better market opportunities for chronic diseases mean that approvals of new drugs for infectious diseases are rare. Tragically, this has been mirrored by the decline in efficacy of what were once highly effective treatments. For some diseases, pipelines are so thin that old and partially effective treatments are all we have. For example, there has been no new first-line TB drug for almost 50 years, and this has given the microbe ample time to evolve resistant strains. Penicillin was once considered a surefire wonder drug. Yet now it 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 some regions.

Until recently, there was little attention paid to developing tools for disease prevention and diagnosis. Rapid diagnostics that test for more than one disease and drug susceptibility are simply not available, yet such technologies could play a critical role in helping us to use drugs more wisely and prolong their efficacy. Some new attention is being paid to these technologies—largely from the non-profit world—but it is not sufficient to fully meet R&D needs and is heavily oriented towards HIV/AIDS, tuberculosis, and malaria.

Most researchers in infectious diseases lack adequate support to advance their ideas, discoveries, and innovations. This is particularly true of those focusing on narrow fields, such as resistance-fighting technology. And, where researchers' work has application across diseases, they may be overlooked by disease-specific initiatives and funding programs. As a result, opportunities for joint problem-solving are missed, potentially valuable research is invisible to global health donors and investors, and innovations may linger in research labs for many years before being handed off to commercial developers, if this happens at all.

SOLUTION: CATALYZE RESEARCH AND INNOVATION TO SPEED THE DEVELOPMENT OF RESISTANCE-FIGHTING TECHNOLOGIES

The creation of a Web-based marketplace to serve as a locus of activity for resistance-related research and innovation across diseases would provide a significant boost to those seeking scientific solutions to drug resistance. The proposed marketplace would connect researchers with one another, lower the

barriers to collaboration and provide technical assistance to forge partnerships among researchers, pharmaceutical companies, venture capitalists, foundations, and public funders.

The marketplace would couple an innovation showcase with a brokerage facility, which would facilitate technology transfer by providing legal and financial advice and support to those entering into research partnerships, and assist marketplace users to access additional funds, such as those available from the U.S. National Institutes of Health, the Wellcome Trust in the United Kingdom, or private investors.

A key feature of the marketplace is its flexibility. It would encompass resistance-related research on technologies with relevance to established and emerging pharmaceutical markets as well as the most neglected diseases and populations, and promote knowledge exchange across disease communities. It would combine well with 'pull' incentives, such as prizes, and with 'push' incentives, such as large government research grants. And by clustering scientists working in related fields, it could demonstrate where critical mass exists to spin-off technology- or disease-specific product development partnerships.

A broad range of existing Web-based research platforms provides useful lessons and models. iBridge and the Massachusetts Technology Portal are platforms that allow academic researchers to showcase their innovations. The for-profit, membership-based Collaborative Drug Discovery allows researchers to store and selectively share research. The Open Source Drug Discovery initiative provides a platform for collaborative research focused on neglected diseases: its Connect2Decode project recently facilitated the mapping of the TB genome by 400 students online in four months. Lessons from these initiatives suggest that showcasing innovative research works best when combined with technical and communications support, and that collaboration can be highly productive, particularly when it is well-facilitated and has a clear goal. The drug resistance marketplace would reflect this good practice.

RELATED RESOURCES

- iBridge Network – www.ibridgenetwork.org
- Open Source Drug Discovery – www.osdd.net
- Collaborative Drug Discovery – www.collaborativedrug.com

FOR MORE INFORMATION OR TO READ THE FULL REPORT, PLEASE VISIT www.WhenMedicinesFail.org or e-mail drug_resistance@cgdev.org.

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