

Author's Commentary: The Outstanding HIV/AIDS Papers

Heidi Williams
 Economics Dept.
 Harvard University
 Littauer Center
 Cambridge, MA 02138
 heidi.l.williams.03@alum.dartmouth.org

Introduction

According to estimates by the World Bank, more than one billion individuals worldwide live on less than \$1 per day. Internationally, countries have prioritized improving the lives of the world's poor through mechanisms such as the United Nations Millennium Development Goals—which seek, by 2015, to halve extreme poverty, halt the spread of HIV / AIDS, provide universal primary education, and achieve a number of other goals. Within the United States, President George W. Bush has supported “a new compact for global development” through institutions such as the recently-created Millennium Challenge Corporation.

Yet despite billions of dollars having been spent on attempts to improve the lives of the world's poor, we lack a consensus on how to allocate foreign aid most effectively. Such decisions inherently involve trade-offs: for any given level of financial resources, more funding devoted to building schools implies less funding devoted to programs aimed at reducing government corruption. In addition, foreign aid donors often must choose among diverse potential programs without any solid evidence on the relative effectiveness of such programs.

Such decisions are complex even within a more narrow focus. In funding health programs, for example, at the planning stage decisions must often be made based on unreliable data and assumptions that are difficult, if not impossible, to verify. For example, is the development of a malaria vaccine even scientifically feasible? What is the optimal pattern of introduction and use of second-line treatments for multi-drug resistant tuberculosis? Prospective

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tively weighing the expected costs and benefits of alternative programs necessarily involves a complex set of assumptions, calculations, and estimations. Even once programs have been implemented, we often fail to conduct rigorous evaluations—thus resulting in missed opportunities to learn which programs are most effective.

The Contest Question

The main goal of this year's interdisciplinary modeling problem was to encourage teams to grapple with some of these issues within the relatively more narrow context of addressing HIV/AIDS. As the HIV/AIDS epidemic enters its 25th year, both the number of infections and the number of deaths due to the disease continue to rise. Despite enormous efforts on a number of fronts, we remain uncertain on how best to allocate resources to fight this epidemic.

In this year's problem, teams were asked to advise the United Nations on how to manage the resources available for addressing HIV/AIDS. Their job was to model several scenarios of interest and to then use their models to recommend the optimal allocation of financial resources.

We first asked teams to consider what trends could be expected in HIV/AIDS morbidity and mortality in the absence of any additional interventions. This is a complex problem that encouraged teams to analyze a variety of historical demographic and health data on fertility, population, age distribution, life expectancy, and disease burden.

In practice, HIV/AIDS funding could be focused on a wide range of interventions. Prevention-focused interventions include voluntary counseling and testing programs, school-based AIDS education, and distributing medicines to prevent mother-to-child transmission of the virus. Care interventions can include treating the virus as well as treating other opportunistic infections. For this work, we asked teams to focus on modeling only two potential interventions: provision of antiretroviral (ARV) drug treatments, and provision of a hypothetical HIV/AIDS preventive vaccine.

Evaluating the potential impacts of these two interventions required the teams to decide on realistic assumptions in order to generate estimates of the costs and benefits of each intervention. What year might a preventive HIV/AIDS vaccine become available? Should children or adults be targeted for vaccination, and what vaccine coverage rates could be expected for either group? What delivery costs should be assumed for the drug therapy and vaccine? Would there be epidemiological externalities from vaccination that should be taken into account? The teams were also asked to re-analyze their scenarios in light of the potential emergence of drug-resistant strains of HIV/AIDS.

A major focus of this year's problem was for teams to analyze these issues in the context of realistic political and economic constraints. For example, teams

were encouraged to base their models on the level of foreign aid resources that they realistically expected to be available. The teams were also asked to interpret the results of their models in light of such political and economic constraints—in part through drafting a white paper to the United Nations which provided their team’s recommendations on the optimal allocation of resources as well as their recommendations for how best to coordinate donor involvement for HIV / AIDS.

References

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About the Author



Heidi Williams received her A.B. in mathematics from Dartmouth College, where her studies and research were focused on number theory and cryptography. She also received an M.Sc. in development economics from the University of Oxford, supported by a Rhodes scholarship. Heidi is currently a Ph.D. student in economics at Harvard University, where her research is focused in development, health, and public economics.

For the past several years, Heidi has worked with the Center for Global Development (a nonprofit think tank in Washington, DC) and in collaboration with Harvard economist Professor Michael Kremer and other academics to contribute to public policy efforts aimed at speeding the development of (and increasing access to) vaccines for diseases (such as malaria) that are concentrated in low-income countries. For more information, see www.cgdev.org/vaccine .