



## Government-Controlled Pharmaceutical Research and Development: A Recipe for Disaster

By Richard Tren and Roger Bate

*The proposed research and development (R&D) treaty being discussed at the World Health Assembly during the week of May 22 could end up harming those it aims to assist. Public-private partnerships, which are already delivering drugs and treatments and showing promise in vaccine development, offer a far better model to address diseases. Greater state and bureaucratic control of R&D will not deliver results, especially given the need to deploy unique private-sector testing and development facilities. A range of market-friendly proposals to encourage research is likely to deliver practical solutions.*

In recent years, increasing attention has been given to the problem of developing medicines for so-called neglected diseases or diseases of poverty.<sup>1</sup> An apparent lack of research into these diseases has prompted a range of potential solutions. Kenya and Brazil have suggested one approach, which they will offer as a draft resolution at the fifty-ninth World Health Assembly (WHA) in May 2006. The resolution demands “new policy rules to stimulate essential research and development in health, especially for the most neglected diseases.”<sup>2</sup>

The resolution calls for WHA member states to prioritize research and development “according to the needs of patients” and to establish “a framework for defining global health priorities in supporting essential medical research and development based on the principle of equitable sharing of the costs of research and development by all those who benefit from it and incentives to invest in useful research and development in the areas of patients’ need and public interest.”<sup>3</sup>

This resolution dovetails neatly with activist proposals for global R&D, such as the Medical Research and Development Treaty (MRDT),

which has been widely promoted and seeks to expand public expenditure on drug development, weaken intellectual property rights, and increase flexibility in issuing compulsory licenses to manufacture generic versions of medicines.<sup>4</sup> While such ideas may prove politically popular within the WHO, the R&D treaty is likely to be unworkable and impractical.

Many of the diseases identified as “neglected” have practical treatment and control solutions, which are already undertaken by governments, UN bodies, and public-private partnerships working cooperatively with government health departments.<sup>5</sup> The Special Programme for Research and Training in Tropical Diseases (TDR),<sup>6</sup> for example, was spun out of the WHO in 1975. By working with UN bodies, national governments in disease-affected countries, industry, and academia, TDR has supported thousands of R&D projects, trained over 1,033 scientists in developing countries, and—as of 2003—delivered seventeen new drugs for tropical diseases.<sup>7</sup> It expects an additional eight new drugs to be ready by 2010. However, despite supporting a secretariat for the TDR, which is also based in Geneva, the WHO has offered only modest support: less than \$35 million over thirty years, a slightly higher average than its current annual contribution of about \$1 million.<sup>8</sup> The WHO has

---

Richard Tren (rtren@fightingmalaria.org) is the director of Africa Fighting Malaria. Roger Bate (rbate@aei.org) is a resident fellow at AEI.

had ample opportunity over the years to contribute more to R&D efforts, but it has shown little enthusiasm.

## The Incidence of Neglected Diseases

According to the WHO's 2002 *World Health Report*, tropical diseases (including trypanosomiasis, chagas disease, shistosomiasis, leishmaniasis, lymphatic filariasis, and onchocerciasis) account for only 0.2 percent of total global mortality.<sup>9</sup> However, patients are often affected by more than one disease, and these "polyparasitized" patients are much more vulnerable to infection from malaria, HIV, and tuberculosis. Work has continued on treating what are often referred to as "other diseases," which afflict far fewer people than malaria, HIV, and tuberculosis.<sup>10</sup>

According to TDR, there are only three neglected diseases for which no control strategy or treatment exist, namely African trypanosomiasis, dengue, and leishmaniasis.<sup>11</sup> (Although leishmaniasis can be treated, there are problems with resistance to older drugs.<sup>12</sup>) Control strategies with proven treatment and prevention interventions exist for malaria, shistosomiasis, and tuberculosis, even though these diseases persist and in some cases are increasing in incidence. Control strategies exist for chagas disease, leprosy, lymphatic filariasis, and onchocerciasis, and their rate of infection is falling.<sup>13</sup>

In its 2006–07 budget report, TDR reports that after funding for research during the 1990s decreased, "the Programme experienced a marked growth in resources at the start of the Strategy 2000–2005."<sup>14</sup> For 2006–07, the approved budget for TDR's programs is approximately \$100 million, up from approximately \$50 million in 1998–99. Since 2001, the TDR's proportion of private and foundation donations has increased from 6 percent in 2001 to 35 percent in 2005. The proportion of donations from national governments has declined from 76 percent in 2001 to 56 percent in 2005.<sup>15</sup>

## Disease Control Is More than Treatment

Having a narrow focus on the medicines used to treat patients with tropical diseases often ignores the existing interventions that can halt the spread of such diseases. For instance, indoor residual spraying with insecticides (to kill or create a barrier with insect disease vectors) is known to be a highly effective method of malaria

control, as well as a means of controlling dengue fever (especially important given there are no existing medicines to treat the disease). Other methods of controlling the organisms that transmit disease can be used against these diseases as well as against leishmaniasis and African trypanosomiasis, but international funders largely ignore these interventions.

A more integrated approach to disease control in poor countries could provide existing, cheap, and often donated medical interventions to those who need them.

For example, a recent paper by Peter J. Hotez et al. explains that countries could adopt a "pro-poor strategy to integrate programs for either the control or the elimination of seven neglected tropical diseases—ascariasis, trichuriasis, hookworm, lymphatic filariasis, onchocerciasis, shistosomiasis and trachoma—using existing drugs."<sup>16</sup> Hotez et al. also point out that "such integrated control or elimination could be achieved with four drugs—ivermectin, albendazole, azithromycin and

praziquantel—of which the first three mentioned are currently donated by Merck and Company, GlaxoSmithKline, and Pfizer, respectively, while praziquantel is available at relatively low cost."

## The Dangers of the WHA R&D Framework

While it is well known to health professionals that interventions and medicines exist for many of the so-called neglected diseases, it is not widely acknowledged among policymakers. Difficulties implementing remedies and control strategies are primarily caused by extreme poverty and a lack of health infrastructure rather than by a lack of private or public research into new health-care interventions. The R&D framework that will be discussed at the WHA meeting is being promoted by countries such as Kenya, which is failing to use existing preventions and treatments to combat disease among its people. A lack of political will and often a lack of budgetary commitment from disease-endemic countries, and the pursuit of ill-conceived disease control plans from the WHO and other UN organizations (such as Roll Back Malaria and 3 by 5, the WHO's plan to treat 3 million people with antiretroviral therapy by 2005<sup>17</sup>), have contributed to the ongoing burden of preventable and curable illnesses.

However, growing public health problems such as HIV/AIDS require ongoing and often urgent investment.

---

The WHO has had ample opportunity over the years to contribute more to R&D efforts, but it has shown little enthusiasm.

---

As drug resistance to first-line antiretroviral drugs grows, secondary treatments will be required and will continue to come from the private sector, which has the knowledge and resources to carry out the necessary and increasingly expensive research. It is not clear that a global R&D framework, reliant on increased public funds and control, will result in new readily accessible medicines.

Kenya and Brazil’s resolution calls for the “equitable sharing of costs by all those who benefit from it,”<sup>18</sup> but it is vague as to how the costs would be shared. One proposal that is likely to have influenced the Kenya-Brazil resolution—the MRDT—anticipates countries contributing financially to medical R&D based on their gross domestic product or per-capita income, with the poorest nations contributing nothing.<sup>19</sup>

The activist MRDT proposal, however, envisages equal voting rights, with one vote per country, regardless of the level of funding contributed.<sup>20</sup> Countries will be expected to fund research from public funds, tax credits, philanthropic sources, the private sector, the nonprofit sector, and innovation prizes.<sup>21</sup>

According to the MRDT, countries which purchase medical products could have their expenditure considered as a contribution to R&D inasmuch as it creates an incentive for investment.<sup>22</sup> The MRDT is vague, as is Kenya and Brazil’s proposal, on how, where, and by whom the research will be undertaken. The MRDT acknowledges the “diversity of management approaches to support QMRD [Qualified Medical Research and Development] including direct funding of profit or non-profit research projects, market transactions . . . payment of royalties to patent owners, tax credits, innovation prizes, investments in competitive research.”<sup>23</sup> While this flexibility may be commendable, the important point is that the actual research will be directed and prioritized by a complex bureaucracy. There are numerous limitations and potential problems with this approach.

## Bureaucratic Troubles of the Kenya-Brazil Resolution

First, the Kenya-Brazil resolution would require patent-holders to forgo some or all of their intellectual property rights internationally.<sup>24</sup> Given the value of these rights, it is unlikely that patent-holders and their respective

governments will agree to this. Indeed, we have spoken with a few trade negotiators—representing both rich and poor countries at the World Trade Organization—who were split on whether it was a sensible notion, but agreed that it was unlikely to be undertaken. This proposal would force middle-income countries that conduct research,

such as India, to forgo their rights. R&D in India has increased markedly since it began complying with the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS),<sup>25</sup> and it seems unlikely that the Indian government will forgo its benefits to domestic researchers.<sup>26</sup> This leaves few countries willing to contribute to a global R&D fund and even fewer willing to hand over their intellectual property rights to other countries.

Second, the R&D framework would require a complex bureaucracy of committees and councils to direct and ostensibly control medical R&D priorities and funding. The fourth discussion draft of the MRDT proposes an overarching Assembly for Medical Research and Development, which would appoint a Council on Medical Innovation (CMI) and a permanent secretariat which would run the day-to-day operations of the council. The CMI would, in turn, appoint a Committee on Priority Medical Research and Development, a Committee on Open Public Goods, a Committee on Technology Transfer, a Committee on Exceptionally Productive and Useful Projects, and a Committee on Open Access Research.

It is not clear that this additional bureaucracy would deliver anything useful, and it would certainly incur substantial costs. Indeed, the WHO-driven Commission on Intellectual Property Rights Innovation and Public Health (CIPRH) recently issued a report, the aim of which was to analyze intellectual property arrangements, identify any harm they cause, and address how to improve innovation in public health. A problem with the CIPRH report is that it was instituted at a previous WHA by the ministers of health in attendance. Their natural favoritism toward the public sector over the private sector biases their recommendations toward creating a larger role for government than is warranted.<sup>27</sup>

Third, it is not clear that increased state funding of R&D is desirable. Evidence suggests that increased public funding of R&D displaces private funding of R&D. Essentially all money spent by governments or the UN is derived from industry and taxpayers, and when

---

Difficulties implementing remedies and control strategies are primarily caused by extreme poverty and a lack of health infrastructure.

---

governments spend other people's money on R&D for medicines or other scientific research, the total amount available for research actually declines.<sup>28</sup>

One might make the case that private funding of research on poor-country diseases is low, in any event. However, given the low overall incidence of the neglected diseases and the increasing incidence of typically developed-country diseases (like hypertension and diabetes) in developing countries, the effect of increased public spending on private R&D spending is very pertinent, rarely investigated, and often ignored by governments when negative findings emerge.

Fourth, the proposed Kenya-Brazil resolution calls for more "needs-driven research," which assumes that the private sector is incapable of responding to patients' needs. The small market for drugs to treat diseases of poverty certainly does not attract large amounts of private funding; however, the many public-private partnerships and some entirely privately funded research programs demonstrate that the market does indeed respond. The more compelling question is whether or not stronger state involvement in R&D is in any way better suited to discover the "needs" of patients. State or intergovernmental bodies often rely on an often extremely long chain of command and communication that eventually decides what people need—whether they want it or not.

Governments have little direct feedback from end users, which additionally distorts research decisions in favor of the politically influential. This is as true for diseases whose incidence is underestimated as for those whose incidence is overestimated.<sup>29</sup>

Decisions about public health interventions are often political rather than scientific. For example, the South African government opposed the provision of antiretroviral therapy to people living with AIDS both on cost and logistical grounds and because South African president Thabo Mbeki has questioned the link between HIV and AIDS. In response, AIDS activist groups in South Africa fought a long and acrimonious legal battle to force the South African government to provide antiretroviral treatment to those who required it. This experience demonstrates that governments frequently cannot be trusted to act in the best interests of their

population's health. Concurrently, it is important to note that long before the government of South Africa rolled out antiretrovirals in the state sector, several private companies did so for employees and in some cases for their employees' dependants as well.<sup>30</sup>

Last, it is not just governments that are unable to respond to patients' needs. It was only after considerable pressure from malaria scientists and some activist groups that the multilateral agencies—including the WHO and the Global Fund to Fight AIDS, TB and Malaria—halted and reversed policies of providing ineffective malaria treatments to poor countries.<sup>31</sup> Leading donor agencies such as the United States Agency for International Development were initially reluctant to provide new highly effective artemisinin-based combination therapies (ACTs) to malarial countries, and in at least one case actively frustrated the roll out of ACTs.

Within the past month, similar allegations were made against the World Bank in *The Lancet Online*.<sup>32</sup> The bank was purchasing the antimalarial drug chloroquine in India even when it was failing, and widely known to be failing, in up to half of all cases.

## Public-Private Solutions for Health-Care Research

An alternative to increased state or intergovernmental agency control and funding of R&D is the creation of the right set of incentives to encourage private-sector investment in these areas.

In partial response to the call to deal with neglected diseases and the burden of other diseases worldwide, public-private partnerships (PPPs) have proliferated recently. According to the Initiative on Public-Private Partnerships for Health, ninety-two PPPs have been formed since 1974 to deal with various diseases, including tuberculosis and HIV/AIDS, as well as other health concerns, including reproductive health, guinea worm, diarrhea, and vitamin A deficiency.<sup>33</sup> Many PPPs are proving to be highly productive, and new medicines and control strategies are emerging. For instance, the Medicines for Malaria Venture is currently partnering with the private and public sectors in seven active drug discovery projects.<sup>34</sup>

---

There is scant evidence to suggest that greater state or intergovernmental agency control of the R&D process and limitations to intellectual property will either deliver the medicines required or respond to patients' needs.

---

TDR reports, “the increase in public-private partnerships has enabled TDR to transition several of its projects to new initiatives and focus more on the transitioning of products into optimal use through appropriate post-regulatory evaluation and implementation research.”<sup>35</sup>

Another proposal would be to extend orphan drug legislation to tropical diseases, thus speeding up clinical trial procedures and other regulatory hurdles, as well as lowering costs. As the regulatory review process accounts for a substantial component of the overall cost of developing new medicines, any attempt to reduce these costs will probably be welcomed by the pharmaceutical industry.

Restricted additional market exclusivity can be given in return for investment in drugs to treat diseases that have limited incidence in developing countries. Specifically, consideration could be given to extending the patents on valuable Western drugs in exchange for giving up the patent on poor-country disease medicines.<sup>36</sup> Tax credits can be offered to private investors that research medicines, diagnostics, and new technologies for diseases of poverty.

A variety of proposals have been made to create “pull mechanisms,” which are designed to create a sufficient market to encourage research into diseases of poverty. One such proposal, known as advance market commitments, would guarantee a market for the developers of a successful medicine developed for a drug for which there is a limited commercial market.<sup>37</sup>

Of course, all of these proposals—including pull mechanisms, market exclusivity, and certain PPPs—regardless of how urgent the need, hand power in varying degrees to bureaucracies that are unlikely to relinquish such power in the future when it may not be needed. The history of committees and bureaucracies picking winners is so replete with failure that venturing down this path is extremely risky.

## A Better Approach

Practical solutions to most poor-country health problems exist, yet the political will and financial resources to implement them may be lacking on both sides of the donor-recipient equation. For a few diseases, increased research into new medicines and diagnostics is essential and urgent. However, much of this research and the mechanisms to sustain it are already in place.

On the one hand, there is scant evidence to suggest that greater state or intergovernmental agency control of the R&D process and limitations to intellectual property

will either deliver the medicines required or respond to patients’ needs and the social costs of suffering from a disease. On the other hand, PPPs have a well-developed and successful framework, which has already produced valuable drugs for diseases of poverty and is showing promise in vaccine research.

The world’s poor and those in need of medicines would be better off if the WHO gave wholehearted support to multipartner initiatives that realize the value of market-friendly and private sector-driven initiatives to develop medicines. The need for new drugs and the burden of diseases such as HIV/AIDS and malaria is simply too serious to be left in the public sector’s hands.

---

*AEI research assistant Kathryn Boateng and Lorraine Mooney of Africa Fighting Malaria contributed to this article. AEI editorial assistant Nicole Passan worked with the authors to edit and produce this Health Policy Outlook.*

## Notes

1. Tuberculosis, malaria, African trypanosomiasis, dengue, leishmaniasis, schistosomiasis, chagas disease, leprosy, lymphatic filariasis, and onchocerciasis are often recognized as diseases of poverty. HIV/AIDS is frequently included as a health problem that requires increased research funding. Other tropical diseases that are considered “neglected” include hookworm infection, ascariasis, trichuriasis, trachoma, dracunculiasis, buruli ulcer, taeniasis, cysticercosis, and food-borne trematodiasis.

2. World Health Organization (WHO) executive board, “Global Framework on Essential Health Research and Development,” WHO EB117.R13, 117th session, agenda item 4.10, January 27, 2006, available at [www.who.int/gb/ebwha/pdf\\_files/EB117/B117\\_R13-en.pdf](http://www.who.int/gb/ebwha/pdf_files/EB117/B117_R13-en.pdf).

3. Ibid.

4. Tim Hubbard and James Love, “A New Trade Framework for Global Healthcare R&D,” *Public Library of Science Biology* 2, no. 2 (February 2004): 147–50, available at <http://biology.plosjournals.org>. See, Consumer Project on Technology, Medical Research and Development Treaty [hereinafter MRDT], discussion draft 4, February 7, 2005, available at [www.cptech.org/workingdrafts/rndtreaty4.pdf](http://www.cptech.org/workingdrafts/rndtreaty4.pdf).

5. Peter J. Hotez et al., “Incorporating a Rapid-Impact Package for Neglected Tropical Diseases with Programs for HIV/AIDS, Tuberculosis, and Malaria,” *Public Library of Science Medicine* 3, no. 5 (May 2006): e102, available at [www.plosmedicine.org](http://www.plosmedicine.org).

6. The Special Programme for Research and Training in Tropical Diseases is a joint program funded by UNICEF, UNDP, the World Bank, and the WHO.

7. According to TDR director Dr. Robert Ridley, Global Forum on Health Research, Mumbai, India, September 12–16, 2005, available at [www.who.int/tdr/mumbai.ppt](http://www.who.int/tdr/mumbai.ppt) (accessed May 1, 2005), the drugs developed by public-private partnerships with industry are: nifurtimox (Chagas disease), oxamniquine (schistosomiasis), praziquantel (schistosomiasis), benznidazole (Chagas disease), multidrug therapy (leprosy), albendazole (intestinal parasites and lymphatic filariasis), mefloquine (malaria), ivermectin (onchocerciasis), halofantrine (malaria), eflornithine (african trypanosomiasis), liposomal amphotericin B (leishmaniasis), artemether (malaria), artemether-lumefantrine (malaria), atovaquone+proguanil (malaria), artemotil/beta-artether (malaria), miltefosine (leishmaniasis), and chlorproguanil-dapsone (malaria).

8. The Netherlands gives more and other European countries give twice this amount. See TDR, “Financial Contributions to TDR,” available at [www.who.int/tdr/about/resources/contributions.htm](http://www.who.int/tdr/about/resources/contributions.htm).

9. WHO, *The World Health Report* (Geneva: WHO, 2002).

10. Peter J. Hotez et al., “Incorporating a Rapid-Impact Package for Neglected Tropical Diseases.”

11. Luigi Gradoni, Marina Gramiccia, and Aldo Scalone, “Visceral Leishmaniasis Treatment, Italy,” *Emerging Infectious Diseases* 9, no. 12 (December 2003), available at [www.cdc.gov/ncidod/EID/vol9no12/03-0178.htm](http://www.cdc.gov/ncidod/EID/vol9no12/03-0178.htm) (accessed May 3, 2006).

12. TDR’s categorization of “neglected diseases” implies there is either no overall control strategy, or denotes an increasing incidence of the disease.

13. WHO, *TDR Approved Programme Budget 2006–2007* (Geneva: WHO, 2005), available at [www.who.int/tdr/publications/publications/budget\\_06.htm](http://www.who.int/tdr/publications/publications/budget_06.htm).

14. Ibid.

15. Authors’ analysis of financial contributions to TDR. See TDR, “Financial Contributions to TDR.”

16. Peter J. Hotez et al., “Incorporating a Rapid-Impact Package for Neglected Tropical Diseases.”

17. Roll Back Malaria has been characterized as a failure. See *The Lancet* editorial, “Reversing the Failures of Roll Back Malaria,” *The Lancet* 365 (2005): 1439, available at [www.thelancet.com/journals/lancet/article/PIIS014067360566391X/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS014067360566391X/fulltext). The UN multipartner campaign to extend antiretroviral treatment to 3 million HIV patients by the end of 2005 unilaterally imposed treatment targets on disease-affected countries with little acknowledgement of existing programs or practical limitations of capacity. South Africa complained bitterly (see Roger Bate, “WHO AIDS Target: An Inevitable Failure,” *Health Policy Outlook* no. 3, 2006, available at [www.aei.org/publication23712](http://www.aei.org/publication23712)), and the campaign failed to ensure that even 1 million patients received sustainable treatment.

18. WHO executive board, “Global Framework on Essential Health Research and Development,” 3.

19. MRDT.

20. Ibid.

21. Ibid., 7.

22. This is a curious notion. Few people would consider that when the government of Uganda purchases Mercedes Benzes for its ministers and state employees, it is directly contributing to the research and development of new automobile technology, or that it is bearing any of the risks associated with investment in R&D. We rather believe it is simply purchasing products based on a host of criteria, preferences, and considerations. It is not clear that medicines should be treated differently from any other product.

23. MRDT, 7.

24. Discussion draft 41 of the MRDT notes includes the provision that a committee will be appointed to “adopt regulations that identify qualified open public good projects” (MRDT, 8). In addition, the MRDT proposes changes to patent laws which would limit patent rights for a time limited period (MRDT, 10).

25. The Agreement on Trade Related Aspects of Intellectual Property Rights, or TRIPS, is a World Trade Organization (WTO) agreement negotiated during the Uruguay Round (1986–94) that aims to harmonize the ways in which countries protect intellectual property rights and bring them under common international rules. For more information on TRIPS, see WTO, “TRIPS Material on the WTO Website,” available at [www.wto.org/english/tratop\\_e/trips\\_e/trips\\_e.htm](http://www.wto.org/english/tratop_e/trips_e/trips_e.htm).

26. For instance, according to WHO, *Report of the Commission on Intellectual Property Rights, Innovation and Public Health* (Geneva: WHO, 2006), “The evidence suggests that industry R&D increased very modestly from 1990 to 2000, rising from just over 1% of sales to about 2%, with total investment of \$73.6 million in 2000. Since 2000, there has been a very rapid increase in pharmaceutical R&D. By 2003/2004, the combined investment of 12 of the leading companies was estimated to be \$230 million annually representing nearly 8% of turnover.” See also Commission on Intellectual Property Rights, Innovation and Public Health, *Public Health, Innovation and Intellectual Property Rights* (Geneva: WHO, April 2006); Sudip Chaudhuri, *R&D for Development of New Drugs for Neglected Diseases: How Can India Contribute?* (Geneva: WHO Commission on Intellectual Property Rights Innovation and Public Health, March 31, 2005), available at [www.who.int/intellectualproperty/studies/S.%20Chaudhuri.pdf](http://www.who.int/intellectualproperty/studies/S.%20Chaudhuri.pdf).

27. WHO’s Commission on Intellectual Property Rights, Innovation and Public Health (CIPRH), *Public Health, Innovation and Intellectual Property Rights* (Geneva: CIPRH and WHO,

April 2006). For a criticism and alternative commentary on intellectual property rights see International Policy Network, *Civil Society Report on Intellectual Property, Innovation and Health* (London: International Policy Network, 2006).

28. For a detailed examination of the way in which public funds displace private funds for scientific research, see Terence Kealey, *The Economic Laws of Scientific Research* (London: MacMillan Press Limited, 1996).

29. For instance, recent reports show that the prevalence of HIV/AIDS in East and West Africa was consistently overestimated by the UN-AIDS agency. See Craig Timberg, "How AIDS in Africa Was Overstated," *Washington Post*, April, 6, 2006. The implications are that resources that could be used for other diseases, such as malaria, were probably used for HIV/AIDS. It is therefore possible that funds were wasted and lives lost by concentrating resources on a disease that is politically important but not as prevalent as previously considered.

30. For instance, Anglo American PLC began providing AIDS treatment to employees in August 2002, approximately two years prior to the South African government's rollout of antiretroviral treatment. Africa Fighting Malaria receives funding from the Anglo American Chairman's Fund, the company's charitable arm.

31. In January 2006 the WHO issued updated malaria treatment guidelines for the first time in twenty years, after considerable public pressure. See Amir Attaran et al., "WHO, the Global Fund and Medical Malpractice in Malaria Treatment," *The Lancet* 363, no. 9404 (January 17, 2004): 237–40.

32. Amir Attaran et al., "The World Bank: False Financial and Statistical Accounts and Medical Malpractice in Malaria Treatment," *The Lancet Online*, April 25, 2006, available at

[www.thelancet.com/journals/lancet/article/PIIS0140673606685450/fulltext?isEOP=true](http://www.thelancet.com/journals/lancet/article/PIIS0140673606685450/fulltext?isEOP=true).

33. See Initiative for Public-Private Partnerships for Health (IPPPH), "Partnerships Database," available at [www.ippph.org/index.cfm?page=/ippph/partnerships](http://www.ippph.org/index.cfm?page=/ippph/partnerships).

34. See Medicines for Malaria Venture, "Curing Malaria Together," available at [www.mmv.org](http://www.mmv.org).

35. See TDR, *TDR Approved Programme Budget 2006–2007*.

36. This, of course, penalizes Western drug takers and potentially an entire class of disease sufferers if the most successful patent were chosen (cholesterol-reducing drugs, for example), but it outstrips all the other pull mechanisms in providing more certainty to the innovator, since innovators generally know the value of their patents better than outsiders and are the ones who need greater certainty to make risky investments in diseases of poverty.

37. There are some appealing aspects of these reward systems, but such systems could also easily reward only the developer that was fastest in delivering a completed medicine and not the developer that produced the best medicine. For a more complete criticism of AMCs, see Andrew Farlow, *The Science, Economics and Politics of Malaria Vaccine Policy* (Oxford: Department of Economics and Oriel College, University of Oxford, March 2006) available at [www.economics.ox.ac.uk/members/andrew.farlow/FarlowMalaria.pdf](http://www.economics.ox.ac.uk/members/andrew.farlow/FarlowMalaria.pdf). Revisions to the AMC proposals have dealt with these limitations by, among other things, including incentives for incremental improvements and removing committee decision-making on the value of products. For a full report on AMCs, see Center for Global Development, "Making Markets for Vaccines: Ideas to Action," available at [www.cgdev.org/section/initiatives/\\_active/vaccinedevelopment](http://www.cgdev.org/section/initiatives/_active/vaccinedevelopment).