

## Gates Foundation picks 14 grand challenges for global disease research

The Bill and Melinda Gates Foundation announced the first 14 targets of a US\$ 200 million programme on global disease research, on 17 October. The “Grand Challenges in Global Health” initiative, launched by Bill Gates at the World Economic Forum in Davos, Switzerland, in January 2003, is intended to encourage innovations in science and technology in order to remove some of the obstacles to more rapid progress against the burden of disease carried by the developing world.

The mostly biomedical list was created with advice from 1048 scientists in 75 countries and following the deliberations of a 20-member, 13-country Scientific Board. Ten of the 14 challenges concern infectious diseases, including six — nearly half the total — relating to vaccines.

“Our goal was twofold,” said Richard Klausner, Executive Director of the Global Health Program of the Gates Foundation. “Firstly, to use the whole concept of grand challenges to force ourselves to articulate the world’s health problems and to stimulate excitement to work on problems that will have an impact on the world’s poor. Secondly, to solve those problems and fund those solutions.”

He also explained that “grand challenges are not the same as grand problems. We need to distinguish between the two. AIDS is a problem but it is not a grand challenge. Finding an AIDS vaccine is not even a grand challenge. But solving the bottleneck that prevents the creation of an AIDS vaccination *is* a grand challenge. It’s about finding critical pathways through the problems. Many proposed problems did not make it onto the Grand Challenges list because they could not be turned into critical pathways.”

Board member, Professor Roy Anderson, an epidemiologist at Imperial College, London, welcomed the focus on vaccines. “The lack of vaccines is the stumbling block for most major international health problems. And the paucity

of our immunological understanding is really quite gross in some areas, especially for the antigenically varying organisms.”

The list also includes two substantial health assessment issues: to “develop technologies that permit quantitative assessment of population health status” and to “develop technologies that allow assessment of individuals for multiple conditions or pathogens at point-of-care.”

One of the key problems for governments is to know what their populations are suffering from, so that they can rank diseases for intervention, said Anderson. “Only a quarter of the world has effective disease surveillance and recording systems. In China, India, Indonesia and much of sub-Saharan Africa we have very limited knowledge of what’s going on. We must try to improve that information base.”

However, some experts believe health systems research should have had higher priority among the Grand Challenges. Dr André de Francisco, a Geneva-based public health specialist, said that “health systems research is fundamental ... we need it to complement any useful tools that may arise.”

According to Anderson, however, health research has already been addressed in the other areas of the Gates Foundation’s activities. For example Gates’ malaria, TB, filariasis and schistosomiasis programmes “are much more oriented towards implementation — in other words — how to deliver to poor regions of the world what we already know how to do well,” he said.

Francisco also raised concerns that only two of the Grand Challenges relate to chronic ailments. “Infectious diseases are a major part of the public health burden but there’s a lot to understand about cardiovascular disease, mental disorders, and cancer, some of which can be detected early and prevented. As countries are developing, these are increasing, including obesity,” he said.

However, in an article in *Science* (2003;302:398-9) members of the Board said that “the Scientific Board recognizes and discussed at length the problems increasingly posed by chronic noncommunicable disorders and the importance of underlying living conditions, particularly access to clean water and adequate food, in large parts

### The 14 Grand Challenges in Global Health:

#### Improve childhood vaccines:

1. Create effective single-dose vaccines that can be used soon after birth.
2. Prepare vaccines that do not require refrigeration.
3. Develop needle-free delivery systems for vaccines.

#### Create new vaccines:

4. Devise reliable tests in model systems to evaluate live attenuated vaccines.
5. Solve how to design antigens for effective, protective immunity.
6. Learn which immunological responses provide protective immunity.

#### Control insects that transmit agents of disease:

7. Develop a genetic strategy to deplete or incapacitate a disease-transmitting insect population.
8. Develop a chemical strategy to deplete or incapacitate a disease-transmitting insect population.

#### Improve nutrition to promote health:

9. Create a full range of optimal, bioavailable nutrients in a single staple plant species.

#### Improve drug treatment of infectious diseases:

10. Discover drugs and delivery systems that minimize the likelihood of drug resistant micro-organisms.

#### Cure latent and chronic infections:

11. Create therapies that can cure latent infections.
12. Create immunological methods that can cure chronic infections.

#### Measure disease and health status accurately and economically in developing countries:

13. Develop technologies that permit quantitative assessment of population health status.
14. Develop technologies that allow assessment of individuals for multiple conditions or pathogens at point-of-care.

of the developing world. The board intends to pursue these issues by convening workshops on such topics and considering additional grand challenges in subsequent years.”

The US\$ 200 million fund will be managed and administrated by the Foundation for the National Institutes of Health (FNIH). Final decisions on which proposals are selected for grants will be made by the independent Scientific Board operating according to its own separate peer review and scientific process.

The Gates Foundation has just raised its original donation to US\$ 250 million. This extra US\$ 50 million will not be given to the Foundation for the National Institutes of Health but will directly fund or partly fund proposals selected from those already approved by the Board. “This is to act as a model for other potential funders who can chose to fund specific projects directly rather than donate money to FNIH,” explained Klausner.

Requests for proposals for research costing up to US\$ 20 million over five years have been issued globally, and individual researchers, research institutions, networks of institutions — and

even whole countries — can apply. Potential researchers must first submit a letter of intent, the deadline for which is 9 January 2004. The first awards are expected in October 2004. ■

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