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### Editorials

# Infotech and biotech: learning the lessons

Richard G.A. Feachem<sup>1</sup>

The development of the World Wide Web has arguably had a profound influence on many facets of life in almost every country over the past decade. The pace of innovation, in both hardware and software, has not slackened and equally momentous changes can be anticipated in the coming decade. The manner in which this has been achieved is remarkable. Governments, especially that of the USA, invested in basic research in both public laboratories and at public and private universities. Private companies, both small and large, took the fruits of this research and translated them into products. These products diffused rapidly around the globe and within just a few years became of benefit to people of all countries, and not only to the rich and powerful in a few.

Aspects of this process are noteworthy. First, there has been no World Information Technology Organization to guide and direct the development and diffusion of information technology (IT) — thank goodness! Second, there has been minimal governmental regulation and interference in the commercialization of IT. Third, unlike the steam engine, electricity, and the telephone, the new IT has spread throughout the world with extreme rapidity and is theoretically available to those who are literate almost everywhere. Fourth, one developing country, India, has played a leading role in furthering these technologies and in their commercialization. This can be seen both in the prominence of Indian engineers and business people in Silicon Valley in California, USA, and in the home-grown IT industry that is now so buoyant in Bangalore, Hyderabad, and elsewhere in India.

Biotechnology, like IT, is growing rapidly and brings with it the promise of important new tools for the treatment and prevention of disease. The beneficiaries of this biotechnology revolution are largely citizens of wealthy countries and, to some extent, the middle classes in middle-income and large low-income

countries. The poor are not benefiting and, with current arrangements and incentives, will not benefit. The digital divide may not be such a concern, but the biotechnology divide certainly is.

To try to fix this problem and to bring the fruits of biotechnology to all who can benefit from them, public–private partnerships (PPPs) have become a popular model. The theme section of this issue of the *Bulletin* focuses on PPPs for drugs and vaccines and on incentives for private-sector engagement in diseases of the poor. I am an acknowledged fan of these new PPPs and am closely associated with their most successful example — namely the International AIDS Vaccine Initiative (IAVI). However, I see some limitations in the current arrangements and some lessons to be drawn from the IT experience.

First, it would be a mistake to try to over-manage the process. Progress will not come from carefully orchestrated and coordinated central planning by an international agency. Progress will come from diversity, from risk taking, and from numerous points of energy and initiative. To paraphrase Mao Tse-tung “Let a hundred technologies bloom; let a hundred initiatives contend”. Second, we must accept failure. Some PPPs will achieve little and should be terminated; some brave private ventures will go bankrupt. We should regard a certain amount of failure as a sign that we are probably doing the right thing and are on the right track.

Third, but most importantly, we must pay attention to the incentives. For the private sector to engage seriously in the development and marketing of drugs and vaccines for neglected diseases of the poor, the incentives must be aligned. This requires government action in rich and poor countries to create both “push” and “pull” mechanisms (see Webber & Kremer, pp. 735–741). It also requires the gradual development of a self-sustaining market. There is no fundamental reason why the diseases of two-thirds of the world’s population should be of such little commercial interest to the pharmaceutical and biotechnology industry. If individuals and governments

purchased rationally, the market would be large, characterized by high volumes and low margins. Admittedly, governments of very poor countries simply cannot afford to purchase rationally on behalf of their populations and so in these cases, large and sustained international assistance is required. Such assistance is becoming increasingly available through the actions of the Global Alliance on Vaccines and Immunization (GAVI) and the new Global Fund.

The last lesson from IT is to watch out for the rise of biotechnology and research-based pharmaceutical industries in a few key developing countries. This rise will be rapid, partly because circumstances are now favourable and partly because of compliance with TRIPS (trade-related aspects of intellectual property rights). It is plausible that by 2010, the centre of gravity of innovation in drugs and vaccines will have moved noticeably towards developing countries. This can only bring benefit to the world, although as Kettler & Modi point out (pp. 742–747), it is not a foregone conclusion that industries in poor countries will focus on diseases of the poor. New incentive mechanisms will be as necessary for them as they are for companies in rich countries.

It is clearly a priority to apply fully and effectively existing technology to control and treat the major diseases of the developing world. We are far from doing this at the present time. It is equally a priority to harness the biomedical and biotechnology revolution to develop new drugs and vaccines. Today we lack adequate drugs and vaccines for tuberculosis, malaria, and HIV/AIDS: three of the globe’s biggest killers. To develop these new technologies and products will require action by governments and the private sector; either alone will be insufficient. Governments’ role should be in investing in basic research and creating an incentive environment which will attract private investment. There are encouraging signs of this type of action in both Europe and the USA. Much more is needed, however, and it is needed urgently. ■

<sup>1</sup> Editor-in-Chief.