

Appendix B

Exploring alternative, collaborative models of innovation for medicines and vaccines¹

There has been increasing debate over the appropriateness of the intellectual property (IP) system for the promotion of pharmaceutical innovation and access to medicines. Some have argued that the reason poor countries have difficulty accessing medicines is not related to the IP system, but due to deficient health infrastructures and precarious local sanitation systems in the developing world (International Federation of Pharmaceuticals Manufacturers & Associations [IFPMA] 2004, p. 49). Others have qualified that a differentiation in local infrastructures does not detract from the fact that global structures, including the international IP system, actively shape those local variants and inequities.² Among those who think that the IP system is flawed, whether in its design or implementation, there are increasing discussions about finding new and better models of innovation and medical progress. In a recent report by the International Expert Group on Biotechnology, Innovation and Intellectual Property entitled *Toward a New Era of Intellectual Property: From Confrontation to Negotiation* ('IEGBIIP Report 2008'), a distinction is made between so-called 'Old IP' and an evolving 'New IP' era. The former refers to the way the IP system has been interpreted traditionally, mainly using principles of competition and profit-making as the basis for innovation. The core finding of the report is:

[P]olicy-makers and business leaders must give shape to a new era of intellectual property (IP) to stimulate innovation and broaden access to discoveries. The current system, 'Old IP', rests on the belief that if some IP is good, more must be better. But such thinking has proved counterproductive to industry, which in health fields has seen declining levels of innovation despite increasing stakes in IP. The era of Old IP has also proved counterproductive to the world's poor who await advances in health and agriculture long available to the global elite.

According to the IEGBIIP Report, the actors involved in research and development (R&D) need a shift in paradigm towards a 'New IP' model based on the concept of sharing knowledge rather than hoarding knowledge – a model where IP is viewed as a 'servant to ... values such as equity and fairness' (ibid., p. 14). This emphasis that IP should be evaluated as a means towards attaining social justice and improving human well-being, rather than simply as an end in itself, echoes the human development paradigm discussed in Chapter 1 of this book. The 'New IP' model also reflects cultural factors in the innovation process, along with collective processes as a route towards equitable reforms. Innovation is seen as a social and communal phenomenon, a product of actors collaborating rather than working in isolation. The IEGBIIP Report offers numerous examples of this collaborative approach, including many public-private partnerships (PPPs).³ From the Public Interest Intellectual Property Advisors (PIIPA) literature review for this book, other examples of alternative, collaborative models for pharmaceutical innovation have been identified. Some models are briefly described here along with challenges or obstacles. Most of the models seek to direct funding to treatments for diseases where traditional market incentives have been insufficient, or explore different means of financing and rewarding research efforts.

1. Public-private partnerships (PPPs) and non-profit pharmaceutical companies

Some public-private partnerships (PPPs) have been created specifically to develop pharmaceutical products, while others focus on distribution. A multitude of PPPs, such as the International AIDS Vaccine Initiative (IAVI), the Medicines for Malaria Venture (MMV) and the TB Alliance, involve non-profit and corporate entities joining forces to tackle specific diseases – using a portfolio management approach and outsourcing the development of the product to an external body, usually a drug company. Another PPP model involves engaging non-profit pharmaceutical companies for the development of the product. This model is exemplified by OneWorld Health. The latter carries out R&D activities that are said to be led ‘not by the large anticipated revenues of a product, rather by global health needs’ (Hale, Woo & Lipton 2005). Yet, its organizational structure and efficiency models are said to be the same as those in the for-profit companies (ibid.). The company develops drugs based on chemical compounds donated by for-profit companies, in many cases because they promise little or no monetary return (ibid.). An example is the donation by Celera Genomics to OneWorld Health of a licence for the compound K-777 for the development of a treatment for Chagas disease, a life-threatening disease caused by parasites (Strosberg et al. 2007). OneWorld Health is currently working on the development of this treatment (see Chapter 2).

The challenges that a non-profit pharmaceutical company faces cannot be disregarded. Besides having to produce low-cost medicines at low production costs while ensuring high medical quality, a non-profit pharmaceutical company may have little room to decide where to invest in R&D and may be constrained by the donation decisions of external for-profit companies. Philanthropic and other financial backing for such companies is very important. As with other pharmaceutical companies, a non-profit pharmaceutical company faces the challenge of recouping the high costs of pharmaceutical development (particularly the costs of clinical trials after research has identified likely targets). Moreover, no matter how many products the non-profit company is able to produce, the challenge of having a reliable health care system on the ground that is capable of distributing the drugs to patients still remains.

There are initiatives where R&D involves compounds derived from plant genetic resources and associated traditional medicinal knowledge (TMK). As noted in the IEGBIIP Report, Artemisinin is a traditional herbal remedy in Chinese medicine that has been proven as a treatment for malaria, particularly in combination with other drugs. A research team at the University of California, Berkeley (UC Berkeley), which is at the forefront of some PPP efforts, has developed a process to extract this compound. This work was done in conjunction with a small biotechnology company, Amyris Biotechnologies (IEGBIIP 2008, p. 31). Backed by a \$42.6 million grant from the Bill & Melinda Gates Foundation, the Institute for OneWorld Health entered into a non-profit partnership with UC Berkeley and Amyris Biotechnologies. Under the arrangement, Amyris is committed to taking ‘no profit from the sales of this product to the developing world’ (ibid.). UC Berkeley is also involved in a project for development of a new AIDS and cancer drug, Prostatin, derived from indigenous uses of the mamala tree in Samoa (ibid.; see Chapter 4, Box 4.5). Such collaborative projects involve particular considerations relating to the important inputs of custodians of TMK, the need to obtain their free, prior and informed consent (FPIC), as well as regulations under the Convention on Biological Diversity on

access and benefit-sharing for genetic resources and associated traditional knowledge (see Chapter 4, Box. 4.2).

2. Medical R&D treaty and prize funds

In February of 2005, a group of medical researchers, non-governmental organizations (NGOs), parliamentarians, government officials, and other stakeholders submitted a letter to the WHO asking that it evaluate a proposal for a new global treaty to support medical R&D.⁴ The model of the so-called Medical Research and Development Treaty requires signatory countries to commit to spending a proportion of their gross domestic product (GDP) on medical R&D, more specifically on Qualified Medical Research and Development (QMRD), which includes basic biomedical research, development of pharmaceutical products, medical evaluations and the protection of traditional medical knowledge (ibid.). The treaty is based on the concept of R&D innovation as a shared responsibility (which seems to resonate with the ‘New IP’ model mentioned earlier). It is built on the model of the ‘prize fund’, under which a specific amount of money is awarded to the first firm that can meet a specified medical target (Faunce & Nasu 2008).

The logic behind prize funds is that the current system of financing R&D is flawed – prices of drugs are too high and the money is being invested on marketing campaigns for ‘unimportant’ pharmaceutical products rather than on products that are needed to save lives in the poorest countries of the world (Love & Hubbard 2007). Within this framework, governments need to create incentives to develop drugs for neglected diseases instead of simply for diseases that can yield high profits. As Love and Hubbard explain in their paper ‘The Big Idea: Prizes to Stimulate R&D for New Medicines’:

Reforming the way we pay for R&D on new medicines involves a simple but powerful idea. Rather than give drug developers the exclusive rights to sell products, the government would award innovators money: large monetary ‘prizes’ tied to the actual impact of the invention on improvements in health care outcomes that successful products actually deliver.

(Ibid., p. 2)

In their conclusion, Love and Hubbard explain how the use of a prize model can ‘reward successful R&D projects, while permitting marginal cost pricing of products and avoiding the trap of overly bureaucratic and centralized decision-making’ by separating the rewards for successful R&D investment from the sales of products (ibid., p. 35). Along with ensuring adequate funding for prizes, some challenges facing prize funds include clearly defining the medical target before the research has started and specifying the corresponding fair amount of funding the researcher would receive.

3. Advanced market commitments

Advanced market commitments (AMCs), also called ‘advanced purchase commitments’, are undertakings made by an international body to make a supplementary payment to any firm which is able to produce and sell a ‘qualifying vaccine’ at a fixed price. Under this framework, a vaccine is ‘qualified’ if it meets certain criteria of efficacy and safety that have been determined

in advance. This model is explained in depth by Kremer and Glennerster (2004). Advanced market commitments are a refined version of prizes. Instead of granting prizes based on a specific technical target, AMCs grant awards when the pharmaceutical product is sold. In other words, AMCs reward commercial success, not just technical efficacy (Hollis 2007). In February 2007, a pilot AMC was launched to target pneumococcal disease, a major cause of pneumonia and meningitis. Various developed country governments⁵ along with the Bill & Melinda Gates Foundation pledged \$1.5 billion to provide incentives for the development of a new vaccine that promises to prevent up to an estimated 5.8 million childhood deaths by 2030.⁶

One difficulty with AMCs is in identifying the technical requirements of product eligibility (Hollis 2007). Since these have to be defined before research begins, it is not easy to capture all contingencies (ibid.). To tackle the limitations of AMCs, comprehensive advanced market commitments (CAMCs) have been proposed whereby a desired health effect is established and a payment is made to the patentee over a period of years for innovative drugs or vaccines based on a measured health effect. This means that an estimate has to be given on the effectiveness of the product to be developed (ibid.). Studying such schemes, Pogge (2005, pp. 182–209) and Hollis (2007) have proposed a model whereby the benefits reached through research and the appropriate award are measured in proportion to so-called ‘quality-adjusted life years’ (QALYs). According to Pogge, what is needed is a reward mechanism for pharmaceutical innovation based on global health impact, rather than on profits from sales, under which a condition for the reward is that companies make the products available to the global market at the lowest feasible costs. In fact, what Pogge has in mind is a ‘Global Health Impact Fund’, a ‘generalized commitment, whereby any medicine that works gets rewarded on the basis of its global health impact’.⁷ The company participating in this scheme would have to agree to sell the product at cost; the reward would be based on the product’s quality (i.e. how much it helps the people who need it) and on the quantity sold and used (i.e. how many people who obtain the medicine actually take it according to the correct regime).⁸ In other words, Pogge proposes a reward that is proportional to the health impact of the medicine. This scheme would be complementary to the current patent system and voluntary for the pharmaceutical company. However, the firm accepting payments under this format must freely license its patent rights (Hollis 2007).

4. Patent pools

Patent pools are being studied and piloted to fill the market gap for neglected diseases. They enhance innovation in areas of high therapeutic need by enabling patent holders to earn royalties from licensing and gain facilitated access to the inventions of others. The NGO Médecins Sans Frontières (MSF) has defined patent pools in the following way:⁹

A patent pool is a mechanism whereby a number of patents held by different entities, such as companies, universities or research institutes, are made available to others for production or further development – for example of paediatric formulations or fixed-dose formulations. The patent holders receive royalties that are paid by those who use the patents. The pool manages the licences, the negotiations with patent holders and the receipt and payment of royalties.¹⁰

The idea of using patent pools to address neglected diseases has been proposed in various contexts including the 2006 Commission on Intellectual Property Rights, Innovation and Public Health (CIPIH) Report:

Patent pools of upstream technologies may be useful in some circumstances to promote innovation relevant to developing countries. WHO and WIPO should consider playing a bigger role in promoting such arrangements, particularly to address diseases that disproportionately affect developing countries.

(Ibid., p. 53)

The WHO Intergovernmental Working Group of Public Health, Innovation and Intellectual Property (IGWG) included this proposal as an instrument to increase access to medicines in poor countries (Knowledge Ecology International [KEI] 2007). KEI and MSF have been among the most active non-profit organizations pushing this model forward. In 2006, MSF and Essential Inventions (now part of KEI) submitted a proposal to the international drug purchase facility, UNITAID, for creation of a patent pool for patented medical technologies to develop generic combinations of antiretroviral drugs relevant to the treatment of HIV/AIDS. In December 2009, UNITAID's Executive Board decided to establish a patent pool for AIDS medicines.¹¹ The pool, scheduled to start operating in mid-2010, aims to 'make newer medicines available in patient-adapted form, at lower prices, for low- and middle-income countries'.¹² UNITAID has undertaken to provide start-up funds for the patent pool.¹³ It has had consultations with such companies as Gilead, Tibotec, Merck and Sequoia for their participation in the patent pool.

5. Open source medicine

Although open source licensing is most common in computer software engineering, where it has proved effective, a number of open source initiatives have started in the medical field in the last decade. Open source medicine is based on the idea that sharing medical information and international collaboration among scientists will advance medical research and ultimately help patients all over the world suffering from neglected diseases (see the vision described in Maurer, Rai & Sali 2004). India's Council of Scientific and Industrial Research, for example, is currently working on creating a medium to accelerate the development of new drugs for infectious diseases for the developing world. It is called Open Source Drug Discovery (OSDD) and consists of an interactive open source platform listing current design challenges to developing drugs for the treatment of drug-resistant tuberculosis, malaria and HIV. The OSDD concept is to collaboratively aggregate the biological and genetic information available to scientists in order to use it to hasten the discovery of drugs. Scientists contributing research to the platform can receive monetary and non-monetary rewards through a system of credit accrument. According to the founders of OSDD, the need for better drugs to combat neglected diseases in the developing world will ultimately drive the platform and make this model effective.¹⁴

Another example of open source medicine is CAMBIA, a non-profit institution that aims to create new technologies for innovation in health, food security and natural resource management for the developing world by using different platforms, including its open access database called 'Patent Lens', which provides updated information on patents filed worldwide. More importantly, CAMBIA provides 'BiOS (Biological Open Source) agreements';¹⁵ these are

licencing agreements whereby the licensee cannot appropriate the technological improvements of the research product, but is required to share these improvements with others who agree to the same terms of the BIOS agreement. Licensees cannot prevent the dissemination of the technology or the advancement of the product by others who receive and refine the product under the same agreement. The end result is that ‘the original developer of the technology benefits, and so does anyone that improves it, because improvements can be tested and implemented rapidly’.¹⁶

Notes

- ¹ Contributed by Claudia Trezza and Tzen Wong. See reference section for Chapter 2 for full references to this Appendix.
- ² Pogge T. 2008, ‘Human Rights: The Second 60 Years’, paper presented at the United Nations University (UNU) lecture series ‘Emerging Thinking on Global Issues’, New York, 11 December 2008.
- ³ The Human Genome Project is cited as an example that reflects the ‘New IP’ paradigm shift. The Project is an international collaboration of public research centres that sequenced the entire human genome and provided the information publicly.
- ⁴ See ‘Letter to Ask World Health Organization to Evaluate New Treaty Framework for Medical Research and Development’, delivered to WHO on 24 February 2005, available at: <http://www.cptech.org/workingdrafts/rndsignonletter.html> (accessed 30 April 2010).
- ⁵ These include Italy, the UK, Canada, Russia and Norway.
- ⁶ See GAVI Alliance, ‘Advance Market Commitments’, available at: http://www.gavialliance.org/vision/policies/in_financing/amcs/index.php (accessed 15 February 2009).
- ⁷ Interview with T. Pogge, ‘Episode 1: Thomas Pogge on Pharmaceutical Innovation’, *Public Ethics Radio*, 22 August 2008, available at: <http://publicethicsradio.org/2008/08/22/episode-1-thomas-pogge-on-pharmaceutical-innovation/> (accessed 30 April 2010).
- ⁸ Ibid.
- ⁹ Médecins Sans Frontières (MSF) 2008, ‘MSF Welcomes UNITAID Patent Pool Endorsement’, press release, 9 July 2008, Geneva, available at: <http://www.msfacecess.org/media-room/press-releases/msf-welcomes-unitaid-patent-pool-endorsement/> (accessed 15 September 2009).
- ¹⁰ According to another definition: ‘A patent pool is a portfolio of assets consisting of the entire set of patents (and, if desired, know-how, dossiers and other intellectual assets) held by various actors (companies, universities, government institutions) related to a particular technology that are made available on a non-exclusive basis to a group of (in our case) manufacturers and distributors of medications. The pool is operated through the auspices of a licensing agency which holds licences to the patents (and other intellectual assets) for sub-license to manufacturers and distributors’. See the UNITAID website, ‘Eighth Board Meeting’, Geneva, 2–3 July 2008, available at: <http://www.unitaid.eu/en/Eighth-Board-Meeting-Geneva-2-3-July-2008.html> (accessed 15 December 2009).
- ¹¹ UNITAID Executive Board, Res. No. 5: Patent Pool Implementation Plan (15 December 2009), 11th session, UN Doc. UNITAID/EB211/2009/R5, available at: http://www.unitaid.eu/images/EB11/05%20_eb11%20res.5%20implementation%20of%20patent%20pool.pdf (accessed 16 March 2010); see also UNITAID Executive Board, Special Session on Patent Pool Res. No. 1: Patent Pool Implementation Plan (15 February 2010), 11th session, UN Doc. UNITAID/EB11/SSPP/2010/R1, available at: http://www.unitaid.eu/images/EB11/EB11_SSPP_Resolution1_signed.pdf (accessed 16 March 2010).
- ¹² See UNITAID 2009, ‘UNITAID Executive Board Approves Breakthrough Plan to Make AIDS Treatment More Widely Available at Lower Cost’, press release, 14 December 2009, Geneva, available at: <http://www.unitaid.eu/en/20091215237/News/UNITAID-APPROVES-PATENT-POOL.html> (accessed 30 April 2010).

-
- ¹³ Ibid. According to UNITAID, ‘The Patent Pool will allow generic companies to make lower cost versions of widely patented new medicines by creating a common space for patent holders to license their technology in exchange for royalties. This will spur competition and further bring down the price of vital new and effective medicines, giving hope to millions of patients’ (ibid.).
- ¹⁴ Singh, S. 2008, ‘India Takes an Open Source Approach to Drug Discovery’, *Cell*, vol. 133, no. 2, pp. 201–203.
- ¹⁵ See BIOS, ‘What Characterises a BIOS-Compliant Agreement?’, available at: <http://www.bios.net/daisy/bios/mta/bios-mta-faqs.html> (accessed 10 February 2010).
- ¹⁶ See BIOS, ‘Do Open Source Agreements Work?’, available at: <http://www.bios.net/daisy/bios/2533.html> (accessed 15 January 2009).