

Innovation, Sustainability, Development: A New

MANIFESTO



Science and Technology for Health: Towards Universal Access in a Changing World

Gerald Bloom

Health





About the paper

Most anti-colonial movements in the second half of the 20th Century promised to provide universal access to health services. The Alma Ata Declaration of 1978 presented a consensus view of how governments could deliver on this promise. During the next thirty years, people experienced dramatic health improvements in some countries or districts, but they continued to suffer high levels of avoidable disease and early death in many others. The existence of effective health care technologies combined with the reality that hundreds of millions of people still do not have access to effective health services has led in recent years to national and international political pressure for action and significant funding to address this reality. This paper argues that effective strategies for increasing access to the benefits of health-related science and technology cannot just be viewed as technical challenges but must be grounded in the profound changes in political economy of the last thirty years. These include demographic shifts and changes to national and global economic arrangements, channels of knowledge flow, the organisation of politics and governance and the understanding of how innovations arise and are spread. Failure to take this into account could reduce the impact of these investments or even lead to unintended adverse consequences.

About the author

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About the Manifesto project

In 1970 a radical document called The Sussex Manifesto helped shape modern thinking on science and technology for development. Forty years on, we live in a highly globalised, interconnected and yet privatised world. We have witnessed unprecedented advances in science and technology, the rise of Asia and ever-shifting patterns of inequality. What kind of science and technology for development Manifesto is needed for today's world? The STEPS Centre is creating a new manifesto with one of the authors of the original, Professor Geoff Oldham. Seeking to bring cutting-edge ideas and some Southern perspectives to current policy, the New Manifesto will recommend new ways of linking science and innovation to development for a more sustainable, equitable and resilient future.

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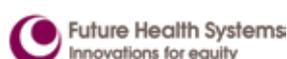
About the STEPS Centre

The STEPS Centre (Social, Technological and Environmental Pathways to Sustainability) is an interdisciplinary global research and policy engagement hub that unites development studies with science and technology studies. Based at the Institute of Development Studies and SPRU Science and Technology Policy Research at the University of Sussex, with partners in Africa, Asia and Latin America, we are funded by the Economic and Social Research Council.

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INTRODUCTION

This paper is a contribution to the preparation by the STEPS Centre of a *Sussex Manifesto* on the inter-relationship between science, technology and development. The present manifesto follows a previous one published in 1970 and explores the implications of the changes which have subsequently occurred for its conclusions and recommendations. The manifesto frames its analysis and policy implications in terms of *directionality* - the factors that influence the types of technology that are developed and widely adopted; *distribution* - the influence of the technologies on the division of benefits between population groups; and *diversity* - the degree to which technologies adapt to different contexts. The paper on health is one of several background documents that draw on experiences and ideas from different sectors.

The development of effective medical care has long been considered an important benefit of scientific knowledge and associated technologies. This perception was reflected in the promise by almost every anti-colonial and revolutionary movement of the second half of the 20th Century to increase access to health services substantially. More recently it has been reflected in major international programmes aimed at reducing the burden of avoidable illness and premature death. This paper describes the changing understandings over the last three decades of how the benefits of medical knowledge and specialised health care technologies can be spread rapidly. It begins with the Alma Ata Declaration, which was signed several years after the publication of the first *Sussex Manifesto*. It then describes the many demographic, technological and social changes that have altered our understandings about how knowledge is generated and translated into technologies that provide widespread benefits. The paper's aim is to explore how the themes of the present manifesto are reflected in the health sector.

THE ALMA ATA DECLARATION: A POST-COLONIAL AND POST-REVOLUTIONARY CONSENSUS

In 1978, several years after the publication of the *Sussex Manifesto*, the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) convened a major meeting on health policy, which resulted in the so-called 'Alma-Ata Declaration' (WHO 1978). The site of the event in a 'developing' republic of the now former Soviet Union symbolised its role in bridging perspectives across the Cold War divide. The declaration outlined the implications for the health sector of the widely held belief that the state could lead the creation of a modern economy capable of spreading the benefits of science and technology rapidly.

The principal focus of the Alma Ata Declaration was how to achieve 'health for all' in the context of high levels of illness and premature death amongst the poor, despite the availability of knowledge and inexpensive technologies to address many of these problems. It highlighted the inter-relationship between sickness and poverty and the potential importance of measures to ensure that people have access to adequate nutrition, decent housing, clean water and medical care free at the point of delivery. This was a re-statement, from the point of view of health, of the importance of meeting 'basic needs' (ILO 1977).¹

¹ The recent report by the WHO Commission on the Social Determinants of Health (WHO 2008a) similarly emphasizes the many factors that influence health outcomes.

The Declaration is best known for establishing the principles and philosophy of comprehensive primary health care (PHC) for spreading the benefits of modern health care technology through a functioning set of linkages from local health centres dealing with prevention and basic curative care to hospitals. This approach drew on different experiences and traditions including (i) some colonial health services, which organised low cost preventive services and basic curative care, relying on paramedical personnel; (ii) the American experience of large-scale public health campaigns to control yellow fever, malaria and other diseases; (iii) anti-colonial political movements in many African and Asian countries, which built a political consensus in favour of expanding access to health services and (iv) revolutionary movements and post-revolutionary regimes,, which mobilised populations in public health campaigns and rapidly expanded access to basic health services. The following paragraphs address the Alma Ata Declaration in terms of *directionality, distribution and diversity*.

DIRECTIONALITY

The Declaration established access for all to PHC as the agreed aim of international health development, thereby indicating a uniform direction for health policy, at least in theory. This was a sharp shift from the health sector development strategies of many post-colonial countries in the 1960s and 1970s, which had focused on building referral hospitals and establishing medical schools. With the Alma-Ata Declaration, the pattern of donor funding and, to some extent, public sector investment shifted towards community-based services. Typical health development strategies included construction of a network of health clinics and community hospitals, training and deployment of paramedical personnel, creation of a capacity to procure and distribute a relatively small number of essential drugs and the establishment of public health programmes. There was an emphasis on prevention, particularly maternal and child health services. One innovative aspect of health development strategies in many countries was the training and deployment of community health workers, who were expected to lead public health activities and/or provide basic health care at community level. In practice, the direction of health system development diverged greatly between countries depending largely on the degree to which the government prioritised meeting the needs of the majority of the population and resisted efforts by the rich and powerful to influence health system development (Farmer 2005). Nonetheless, many countries succeeded in establishing a basic functioning PHC infrastructure.

DISTRIBUTION

Following the Alma-Ata Declaration, PHC strategies emphasised the need to expand access to basic health services and shift the allocation of public and donor resources in favour of the poor. There were notable examples of expansion of access to health services and improvements in health. These included post-colonial regimes in Malaysia, Sri Lanka and Kerala State, India, and command economies in China, Vietnam and Cuba. These successes contributed greatly to the international influence of the primary health care strategy (Halstead, Walsh and Warren 1985). In many other countries the allocation of government development and recurrent finance did not reflect the priority ostensibly given to PHC and inequalities in access to health-related resources widened.

DIVERSITY

The Alma Ata Declaration accepted a variety of approaches for increasing access to health services, emphasising the importance of public participation in health activities and acknowledging the potential role of traditional health care practices and practitioners. Nonetheless, it emphasised government's responsibility for organising and financing health systems. The translation into practice of the broad principles of PHC largely took the form of government investment programmes and a rapid expansion of public sector health services managed (at least in theory) as command and control organisations. Community participation was mostly limited to the creation of local health committees to provide voluntary inputs to public health programmes or, less commonly, to act as guardians of accountability.

As in other sectors, the consensus strategies for health system development were strongly influenced by the predominant belief that the state could, and should, lead the creation of a modern economy. This belief drew on the successful rebuilding of Western Europe with support from the Marshall Plan, the rapid post-revolutionary reconstruction and development of a number of command economies and the success of a number of populist regimes in spreading the benefits of development. The Alma Ata Declaration identified the key elements of a state-led strategy for achieving rapid expansion in prevention and treatment of the common health problems, largely framed in terms of overcoming severe shortages of physical infrastructure, equipment, trained personnel and drugs and other consumable items. The creation of expert knowledge and new equipment and pharmaceuticals were mainly seen to take place outside developing countries. The role of health system leaders in these countries was largely to select the most appropriate technologies and make them widely available through a state organised health service. There were exceptions to this view of the flow of innovation. Many health services included innovations in the mix of personnel² and the role of community organisation. Some low cost interventions, such as the use of oral rehydration solution to treat diarrhoea, were developed and tested in low income countries. In some countries traditional health practitioners were seen to be a source of health-related knowledge. China integrated them into its government health system and promoted effective treatment methods such as acupuncture and certain drugs. In most other countries, such as India, traditional systems operated in parallel to the government health system, playing a variable role in official policies and development strategies.

Subsequent debates about health system development have been largely predicated on this understanding about the source of new knowledge and technologies and about the predominant role of state organisations in making the benefits of them available to the population. There have been variations in the implications for government policies and strategies. The World Health Assembly agreed a target of achieving 'Health for All by 2000', envisaging government health systems, which organised and financed a full mix of services for all. Other agencies advocated 'selective primary health care', focusing on a limited number of programmes, with a largely unspoken implication that people would not have access to other services or would purchase them from private practitioners (Walsh and Warren 1979). For example, the 1993 World Development Report (World Bank 1993) emphasised the need to select the most cost-effective services to be financed and organised by government. That report

² The reliance on paramedical personnel with shorter periods of training was influenced by the experience of the Soviet Union with the training of so-called *feldshers* (preventive and primary health care professionals) and of colonial health services, who trained medical assistants and health assistants to provide services to the 'natives'.

suggested that governments introduce charges for some services to compensate for shortfalls in public finance, launching a debate which has continued to the present (Alliance for Health Policy and Systems Research 2004). That document, too, focused largely on ways to incorporate imported expert knowledge, drugs and equipment into government-run health services. Later still the emphasis shifted to the achievement of a small number of health-related Millennium Development Goals and the potential benefits of scaling up interventions which had been shown to be effective and cost effective. Despite the heated debates and strong competition for policy leadership between different UN and bilateral agencies, there has been a shared understanding about the major sources of innovation and the key role of government in delivering basic health services. Meanwhile, many countries experienced a rapid growth in markets for health-related goods and services (Mackintosh and Koivusalo 2005; Bloom et al 2009).

During the 1980s analysts of health systems in the advanced market economies became increasingly interested in the working of health markets in response to growing concerns about rising costs of health care and to a broader shift in views about the role and capacity of government. This contributed to highly publicised reforms, which attempted to introduce aspects of markets into publicly financed health services. The writings on health and health policy in low and middle income countries began to import this language. Two World Bank publications (Akin et al 1987 & World Bank 1993) were particularly influential in suggesting that certain services were more efficiently provided through markets and arguing that public services should focus on increasing access to only a bundle of cost-effective services. Subsequently, there was a growing interest in the role of NGOs in the provision of health services, in the role of markets in organising the provision of services the government could, or would not fund, and in the potential role of user charges as a means of rationing access to services. Highly organised health systems began to experiment with changing the ownership and governance of hospitals, contracting out some services, providing public funding to not-for-profit hospitals and so forth. The recognition that the government was no longer the sole provider and funder of health services contributed to the gradual emergence of the concept of 'stewardship' to describe a new role of government as overall guide to the development of the health system (Saltman and Ferroussier-Davis 2000).

Through out this time, there was a rumbling competition amongst UN and bilateral donors, which supported different views about the relative roles of public and private sectors in the provision of health services and the generation of appropriate innovations. At times this surfaced as a competition between 'American' and 'European' visions of the future health systems of developing countries. American agencies had a greater preference for working with private actors, whilst Europeans tended to favour so-called sector-wide approaches and budgetary support programmes which transferred funds to government budgets. The former Soviet Union and Cuba also supported certain countries promoting a vision of a state run health system. The underlying assumption was that 'America', 'Europe' and 'Communism' provided competing visions of the future health systems for the rest of the world. This vision of a future that mostly resembled the past has, to a large extent, been overtaken by a sequence of events which have shaken the credibility of each of these visions.

THE CHANGING REALITY

The various Manifesto background papers highlight many changes in global development. These include: the divergent development experiences of different countries; the shift in the relative balance between states and markets; the emergence of China, India and other countries as

centres of innovation; the rise of new information and communications technologies; the emergence of increasingly powerful NGOs and citizen groups as development actors; and the shift in the role of development aid from a time-limited investment in physical and human capital to longer-term commitments to co-finance services for the poor and the adaptation to an ecologically sustainable development path. These changes and others have strongly affected health and health systems. The present economic and financial crises associated with the end of an American-led vision of the economic and political future is making many of these changes more manifest in policy debates. The so-called 'Washington Consensus' on the relative roles of states and markets is no longer the dominant way to frame either the new challenges, or the policy options for addressing them.

Since the Alma-Ata Declaration, health and the health systems of many countries have changed radically, mirroring their divergent development experiences. There are wide differences in health status and access to health services associated with parallel differences in economic and social development (Bloom et al 2007). It is now much more difficult to make general statements about such different contexts, although one can identify a number of major trends. The 2008 World Health Report, which returns to primary health care thirty years after the Alma-Ata Declaration, identifies several of these trends (WHO 2008b).

During this time most countries have experienced big population increases and a changing demographic profile, with many more people over the age of sixty. There has been rapid urbanisation. The ageing of the population, economic growth, changes in types of work and lifestyles, the relative success of efforts to reduce childhood mortality and, in many cases, a reduction in the proportion of people living below the poverty line have been associated with a dramatic rise in the burden of chronic, non-communicable diseases. Some countries are experiencing a 'double burden' of the infectious diseases of poverty and a growing prevalence of chronic illness. Other countries have been much less successful in reducing poverty and they continue to experience health problems associated with chronic poverty, lack of access to clean water, poor sanitation and inadequate housing. Some have experienced a serious fall in life expectancy associated with the spread of HIV. Others, in the former Soviet Union, have experienced increased mortality from non-communicable diseases (Bloom et al 2007). These changes strongly influence the demand for innovations in technology and the organisation of health systems.

A second change is a direct consequence of the major investments in health sector development. Very few localities are far from a health facility or someone offering medical advice, treatment and a wide variety of drugs. In many countries there has been a dramatic spread of market relationships, leading to the emergence of pluralistic health systems with a wide variety of providers of health services and drugs in terms of training, legal status and ownership (Bloom and Standing 2001). The spread of markets has been associated in a number of countries with economic and political crises, chronic underfunding of the public health system and a blurring of the boundaries between public and private sector, with health workers combining government employment with a variety of market-like activities. In the ex-command economies of Europe and the former Soviet Union, it has been associated with severe resource constraints in the public sector and the rise in economic inequalities. In many Asian countries it has been associated with rapid economic growth and a rise in demand for health-related goods and services that has outstripped the rise in public funding of government services. In most cases the spread of markets has been much faster than the creation of institutional arrangements to encourage them to perform well. This has led to major problems with effectiveness, safety, cost and access to competent services by the poor. Whereas thirty years

ago the major challenge was an absolute scarcity of buildings, personnel and equipment, many people, particularly in urban areas, now have access to a bewildering variety of providers of services and health-related products. Their main challenges concern the choice of appropriate goods and services and their high cost. At the same time, many people still do not have access to health-related goods and services as a result of severe poverty, remote location or endemic conflict.

A third change has been the creation of many channels for the spread of health-related knowledge. It is no longer plausible to perceive government services and information provision as the principal sources of health-related knowledge. This knowledge is now spread through schools, health worker (and community health worker) training programmes, informal markets, the electronic and print media, mobile telephones and the internet. There are now many creators of content for these media, including government agencies, newspapers and television production companies, private corporations, advertising agencies, advocacy groups and an increasing variety of providers of internet content. People have access to a lot of information, including informalised knowledge through an increasing array of purveyors of market-based goods and services. However, they need to assess the accuracy of information and the motives of its providers. This information can sometimes raise expectations about the capabilities of modern medicine and at other times, it can lead to fears and anxieties.

A fourth change has been in the types of organisation involved in the health sector, which now include different kinds of private company (national and international producers of equipment and pharmaceutical products, branded hospital chains and so forth), not-for-profit organisations, associations of health workers and health-related businesses, citizen groups and disease-specific advocacy groups. National governments have a limited capacity to determine the direction of development of the health system and they increasingly rely on different types of partnership with other actors.

A fifth change has been in the role of international organisations, bilateral aid agencies and large foundations as sources of health finance in low income countries. These institutions now provide financial transfers through disease-specific programmes, budgetary support for government health systems and substantial investments in new technologies and new health system interventions. These have had a major impact on national policy directions, leading to concerns that they may distort priority setting by national governments.

These changes have taken place at local, national, regional and global levels. The previous vision of a simple chain of transmission of innovation from specialised centres in a few developed countries to government-led health systems, solely through some adaptations of technology and delivery systems to local contexts, no longer provides a convincing vision of a much more complex reality. It also does not reflect the importance of decisions by actors at every level in influencing the pathways of development of health systems. The remainder of this paper discusses some approaches that have emerged for expanding access to the benefits of health care technologies and the degree to which they take into account the changed reality and new thinking about the interaction between science, technology and development.

BUILDING INNOVATION CAPABILITIES IN HEALTH

During the past decade there has been growing concern at international level about the failure of many countries to achieve their health-related MDGs. This has led to financial commitments

by the governments of high income countries and by several foundations to support improvements in access to health services. There has also been a growing interest in investing in appropriate innovations. The Global Forum for Health Research has organised several meetings of Health Ministers to discuss strategies for overcoming the '90/10 gap' describing the present allocation of health research funds in which ninety percent of global funding for health-related research focuses on the health problems of ten percent of the global population (Global Forum for Health Research 2003). A number of initiatives have been launched to address this problem.

The paper by Martin Bell (2009) argues for a greater recognition that innovation takes place both in specialised research centres and in organisations at every level of the value chain, in the form of minor modifications to a new technology. The paper provides a useful framework for discussing health-related innovations; however Bell's innovation systems framework needs to be extended to take into account the dual functions of the health sector as a producer and distributor of specialised goods and a provider and organiser of services. One can identify a variety of types of health-related innovation including (i) basic science aimed at generating new knowledge about humans, the development of diseases and potential mechanisms to alter disease processes, (ii) research and development aimed at developing new kinds of equipment and pharmaceutical products, (iii) the design of interventions, which apply expert knowledge and new drugs and equipment to a specific health problem, (iv) ways to draw on local knowledge of effective ways to prevent, live with and treat disease, (v) the development of organisations and institutional arrangements to make the benefits of expert knowledge widely available in different contexts, (vi) broader studies of the interactions between humans and their environment (social, economic and ecological), and the impact on human health, and (vii) the creation of new ways to make expert knowledge available to individuals and mass populations.

Bell's characterisation of mainstream approaches for supporting innovation as focusing almost exclusively on specialised research and development organisations reflects the dominant pattern of investment in health-related innovation. Investments have tended to focus on science-based research and development and the development of well-designed interventions for potential scale-up in multiple contexts. There has been much less investment in building 'down-stream' innovation capabilities. The language of 'scaling-up' implies a major distinction between innovation and diffusion. Although there have been efforts to strengthen management of hospitals and specific disease programmes they have focused only to a limited extent on the need to innovate or learn from good and bad local practices. There has been even less investment in learning from innovations by private providers of medical care and drugs, particularly those working outside a regulatory framework. In many countries, much downstream activity takes place outside a regulatory framework and is largely ignored by policy-makers.

Bell's rejection of the contrast between the 'rapid impact of research and development-based innovation and scaling up' and the 'slow impact of investments in capabilities to incorporate small adaptations at all levels' is pertinent to the health sector. The search for measurable and rapid impact has led to a preponderance of investment in potentially major new technologies and in innovations which could be replicated rapidly. This has also reflected the dominance of the clinical sciences and the tendency to look for a 'medical fix' in response to complex problems. There has been much less investment in the many actors who play an important role in the provision of health-related goods and services to poor people. Bell's argument about the need to combine the importation of technologies with support for building local capabilities to incorporate small adaptations is highly salient to the health sector. It suggests that investment in only one element of the chain in order to translate new scientific knowledge into widespread

access to an effective technology will have limited impact and may lead to unanticipated consequences.

A large proportion of health-related investments by governments and foundations has been on the development of new equipment, pharmaceuticals, vaccines and 'cost-effective interventions', which local health systems could import. This has led to support for a variety of centres of excellence, mostly public sector research institutions and large private companies. There has been much less investment in small-scale researchers and innovators in low and middle income countries (Light 2009).³ The need to invest in the design and management of these innovations has fostered the creation of new international agencies such as GAVI and the Global Fund for HIV and AIDS, Tuberculosis and Malaria and new centres for global health, funded largely by the Gates Foundation in the United States.

There has also been a significant investment in the creation of centres of excellence in health system analysis in a number of countries. One interesting model is the World Bank Institute, which established centres of excellence in health economics, with several regional flagship courses. There are similar networks of centres of excellence in clinical epidemiology and demographic surveillance sites, which collect systematic information on health and health seeking behaviour. A recent initiative by the Gates Foundation has twinned American and African public health research and training institutes with the aim of building the capacity of the latter. One can see interesting parallels between these initiatives of the Gates Foundation and those of the early 20th Century, when the Carnegie Foundation and others made major investments in science-based medical schools in the United States (Starr 1982) and the Rockefeller Foundation invested in building the capacity for public health research and interventions in the Americas. In contrast, there has been much less investment in building the capacity of local actors in low and middle income countries, including government health systems and private actors, to learn from their own experience and draw on this learning to support the creation of appropriate institutional arrangements for good performance.

NEGLECTED DISEASES, NEW PROGRAMMES AND THE DIRECTION OF RESEARCH

There have been major investments in health-related innovations over the past decade. This section outlines some of the successes and some of the problems which are emerging because of the partial nature of the strategies for building innovation capabilities.

There has been a lot of investment in strategies for translating existing technologies for the treatment of tuberculosis and HIV/AIDS, and for immunising children against infectious disease, into organisational arrangements to provide very wide access to these technologies. These programmes have been designed along bureaucratic lines with a direct line of command from the top to individual implementers and users. The aim has been to ensure the provision of a replicable intervention, such as the delivery of a vaccine or the provision of specific course drug treatment. There are persistent debates about the impact of these programmes, but there is little doubt that they have increased access to services.

³ Light (2009) describes how the design of advanced market commitments, led by the Gates Foundation, to encourage research and development of new vaccines has tended to reinforce existing international property arrangements and favour the R&D departments of large pharmaceutical firms rather than smaller biotechnology companies.

A number of questions have also been raised about the applicability of this approach, where many health-related transactions take place in unorganised markets. For example, there are serious questions about the feasibility (in terms of resources and personnel) of the plans to extend current models for organising the treatment of HIV and AIDS to provide universal access. Van Damme et al (2008) suggest that more attention should be paid to the development of solutions that take resource and human constraints and local contexts into account. There are questions about possible risks of unintended consequences. For example, the introduction of expensive drugs into environments with largely unregulated markets could lead to a considerable amount of leakage, with deleterious consequences for equity of access and the emergence of drug resistant organisms. There are growing problems with bacteria and viruses that are resistant to standard therapies. There are also issues around local understandings of the intervention and how that influences the behaviour of users and providers of services. For example, competing narratives about the true purpose of the polio eradication programme in Northern Nigeria seriously disrupted its implementation (Yahya 2006). These examples highlight the need to complement investment in R&D with measures to adapt interventions to local contexts.

The recent experience with artemisinin illustrates the strengths and weaknesses of current strategies for supporting health-related innovation. The Artemisia plant is a traditional Chinese remedy for malaria. Interest in it grew as the malaria parasite developed resistance to the available anti-malarial products. This led to investment in the cultivation of artemisia plants and production of the pharmaceutical product, artemisinin. A number of countries now recommend that people take artemisinin as a drug of choice, when they have the symptoms of malaria and international experts recommend that it be combined with another anti-malarial drug to reduce the risk of the emergence of malaria parasites resistant to artemisinin (WHO 2006). Artemisinin, on its own, and as artemisinin combination therapy (ACT) are now widely available. They are significantly more expensive than the older products, to which resistance is now widespread.

The Roll Back Malaria initiative advocates the purchase of large amounts of ACT to be supplied free of charge or at a highly subsidised price (WHO 2006). However, most countries have not achieved anywhere near universal access to subsidised ACT. In many countries, people buy anti-malarial medications from drug stores or informal drug sellers, which function largely outside the national malaria programme; a recent study in Nigeria found that people purchased drugs from patent medicine vendors or treated themselves in more than half the cases (Oladepo et al 2007). It also found that the shops mostly stocked the cheaper products to which a substantial proportion of malaria parasites are resistant. The study found several reasons for the persistent use of products that were becoming obsolete. One was that government did not target its messages about malaria treatment to these drug sellers. Another was popular distrust of the reasons for the sudden decision by government to recommend that people purchase a much more expensive product. At that time, donor programmes to supply subsidised ACT were just getting underway.

The situation is similar in Cambodia, where people have had access to artemisinin for years. Studies have found that a significant proportion of anti-malarial drugs in that country are fake or sub-standard (Dondorp et al 2004). There has been growing evidence of the emergence of organisms resistant to artemisinin in Cambodia (Dondorp et al 2009). In June 2009, the Gates Foundation announced that it had made a grant of twenty million dollars to a worldwide anti-malarial resistance network, to avert the major consequences of the spread of resistance to

artemisinin.⁴ This experience illustrates the need to frame health-related innovation systems widely to reflect the many factors which influence the outcome of an investment decision. In the case of malaria, this may include the ecology of the interaction between malaria parasites and different drugs, the organisation of wholesale and retail markets for different anti-malarial products and the understandings of providers and users about how to use alternative products and about their responsibilities for preventing the emergence of resistance. The design of an innovation strategy needs to address each factor that is likely to influence the short and longer term outcome.

RESPONDING TO THE SPREAD OF HEALTH-RELATED MARKETS

One of the most dramatic changes in global health systems has been the rapid spread of health-related markets. They have tended to be rather chaotic and poorly regulated. A significant proportion of health-related transactions now take place outside an organised environment (Bloom et al 2009). One of the major challenges for the next few years will be to establish appropriate institutional arrangements to influence the performance of these markets. This raises important questions about where new types of organisation and institutional arrangement arise.

The advanced market economies have spawned a number of organizational models for bringing order to health-related markets. These include chains of retail pharmacies or hospitals, and franchises for a variety of health-related products. These models are diffusing through the expansion of organizations to other countries and by replication of these models by local entrepreneurs. Several donor programmes have attempted to adapt these models to meet the needs of the poor, but there is little evidence about the degree to which these programmes have been successful in altering health market systems substantially (Champion et al 2009). However, the recent growth in retail pharmacy chains in a number of countries and the increasing importance of trans-national hospital chains suggest they may expand rapidly in the future.

The rapid economic growth of China, India, Brazil and other countries is creating new international centres for technological innovation (Mashelkar 2005; Leadbeater & Wilsdon 2007). The demand for health-related goods and services is rising rapidly in these countries. Prahalad (2005) argues that the rapid integration of many people, with relatively low incomes, into national markets is likely to create a demand for inexpensive ways to meet their needs. Kaplinsky (2008) and Leach and Scoones (2006) emphasise that low cost innovations are more likely to emerge near to the markets. Several analysts suggest that these innovations may disrupt existing institutions. Light (2004) draws a parallel between the impact on relationships between market actors of a major social and economic change, such as the rapid spread of markets, and the emergence of a so-called 'disruptive technology', such as the internet. Both put a premium on entrepreneurship and the development of informal relationships to support innovative business models. Light describes the emergence in transitional economies of hybrid organisations that are neither public nor private and suggests that they could rapidly establish new market niches and ultimately alter the governance of existing value chains. Clarke et al (2009) emphasise the potential importance of 'under-the-radar' innovations in response to the rapidly rising demand for low cost goods and services. The combination of rapid rises in demand

⁴ WHO press release, February 2009, available at: www.who.int/mediacentre/news/releases/2009/malaria_drug_resistance_20090225/en/index.html, accessed 10 September 2009

for new types of goods and services with the growing capacity for innovation in a number of countries suggests the likely emergence of quite different types of organization that reflect current technologies, the economic and social context and the regulatory environment in these countries. If these companies can build a reputation for providing trustworthy services at an affordable price, they could expand very rapidly to become important actors in the global health economy and disrupt existing value chain governance arrangements.

Social entrepreneurs are playing a growing role in health-related markets.⁵ In some cases, their focus has been on establishing new niches, which ultimately could be filled by other market-oriented organizations; in other cases, the focus is on raising money to finance services that reach the poor. One example of the work of a social entrepreneur is the design and production of low cost eyeglasses for people with age-related vision problems and the development of systems to distribute them. Scojo, a social enterprise, has led the latter in India and a number of other countries. It has established its own distribution network in some cases but elsewhere it has linked to organizations that already have a local distribution network. In Bangladesh, for example, it is working with BRAC, a very large NGO with a major health programme. BRAC has trained many village health volunteers, who, amongst other things, have played an important role in the implementation of directly observable therapy for tuberculosis. A recent review of BRAC's experience with female community health volunteers has emphasized the importance of BRAC's good reputation in motivating them, but it identified the need to ensure they can also earn some money and maintain a livelihood in a context where there are increasingly other opportunities for them to earn a living (Standing & Chowdhury 2008). Distribution of low cost eyeglasses would serve both a growing need in rural populations and provide income for its health volunteers. Scojo, on the other hand stands to benefit from the established network and BRAC's good reputation.

The boundary between social entrepreneurship and responses to commercial opportunities can shift. For example, banking through mobile telephones has evolved from being an act of social entrepreneurship to a major business opportunity. The same applies to micro-credit. A recent assessment of micro-credit confirms its success in achieving growth in access by people previously excluded from the organised economy (Greeley 2006). It has substantially improved the performance of credit markets by using innovative approaches for identifying good credit risks, appropriate to the institutional context of many low-income countries. Successful schemes are linking to commercial financial organizations. This in turn may create new ways of delivering insurance based health protection. It is possible that a similar process is emerging in the health sector, where social entrepreneurs are investing in the development of innovative approaches for responding to major unmet demands for services. If they are successful, they may pave the way for commercial organisations to move into the newly created market niches and for government and new kinds of social organisations to respond to the needs of the very poor.

⁵ The term is usually used to refer to a focus on the creation of social value and a number of attributes of innovation, risk taking and a willingness to try something new (Peredo and McLean 2006; Weerawardena and Mort 2006). An alternative definition refers to organizations that 'borrow a mix of business, charity and social movement models to reconfigure solutions to community problems and deliver sustainable new social value' (Nicholls 2006:2)

CONSUMERS, CITIZENS, INFORMATION AND RIGHTS

There has been a dramatic increase over the past thirty years in the channels of flow of health-related information and in the number of providers of content for these channels. The spread of health-related markets has meant that people have had much more choice in how to deal with a health problem. They have also been relatively unprotected from unscrupulous practices. There is a growing recognition that people are active participants in their health care. Leonard et al (2009) demonstrate how rural people seek information on local health service providers and select those believed to perform well. Mackay (2008) argues that the tools of marketing and consumer research can be used to understand many decisions concerning health care. These tools are already used by commercial organizations.

The emergence of these markets has occurred more rapidly than the development of organisations and institutions to protect the rights of consumers. This is changing. There is a growing understanding in many countries that all citizens are entitled to access to safe and competent health services. This understanding has been manifested in a number of ways. Peters and Muraleedharan (2008) describe the increasing role of consumer advocacy groups in India. A number of countries have experienced a rise in the use of malpractice law. There is growing pressure on some governments to regulate the quality of drugs and the safety of food. However, the institutions for protecting these rights are quite under-developed in many countries.

There has also been a growth in a variety of advocacy and citizens groups aiming to influence health system performance. For example, a number of groups have been organised to alter government policies towards the treatment of people with HIV and AIDS (Nguyen 2005; Robins 2005). Citizen groups now play an important role in negotiating policy in some countries. Another change since the late 1970s has been the growth of large NGOs, which raise funds and attempt to influence national policies and the global health community.

NEW TECHNOLOGIES AND NEW POSSIBILITIES FOR THE SPREAD OF INNOVATIONS

This final section touches on the potential role of new technologies in creating possibilities for major changes in the organisation of health systems. There are signs that developments in information and communications technologies are beginning to disrupt existing arrangements for the governance of health and its value chains. Lucas (2009) highlights three major areas of potential impact.

The first is the use of mobile telephones and other communications media to provide access to expert advice for health service providers and the general public. Some innovations already provide a service for a large population. One example is the provision through major mobile telecoms providers in Bangladesh of health helplines that provide callers with access to quality assured advice from qualified doctors for a relatively modest call fee. Bangladesh has a high density of mobile phone access even though ownership levels remain limited. There is some evidence that informal providers also use the service to obtain expert advice to assist them in treating their patients.⁶

⁶ Personal communication to a workshop in Dhaka by SI Sikdar, Grameenphone Ltd, Dhaka, Bangladesh

The second is the use of information technology to strengthen the management of health services. This includes its use for basic accounting and billing, but also as a means of monitoring the quality of service and guideline diagnosis and treatment. One well documented example is a chain of clinics in South Africa, which used embedded algorithms to ensure that people received appropriate drugs for their diagnosis (Palmer et al 2003). Other examples include retail pharmacy chains and several franchising arrangements. Once expert systems, which guide the diagnosis and treatment of common conditions, are widely available they have a great potential for reducing the variability of treatment and could substantially improve the quality of services.

The third is the development of sources of expert knowledge, which individuals can access directly through the internet. This opens up major opportunities for people to manage their own disease and seek expert opinions on alternative treatments. Lucas (2009) emphasises the opportunities this could provide to firms wishing to influence behaviour in their commercial interest. He highlights the need for some kind of regulation of these proliferating sources of knowledge, advice and influence.

It is impossible to predict the speed with which these new ways of organising access to expert knowledge will spread and the degree to which they will be incorporated by either public health services or private actors. Investments over the past few decades have resulted in the creation of quite complex health systems in most countries. They have also spread knowledge of modern medicine and raised expectations of how sickness should be treated. New information and communications technologies are creating platforms for organising the provision of health services and the dissemination of expert knowledge. This is creating opportunities for the emergence of new kinds of organisation to meet the largely unmet demands of growing numbers of people in many countries in quite distinctive ways. The ownership, management and regulation of these expert knowledge systems and of the various sources of expert knowledge will strongly influence the future development of health technology and the organisations to make the benefits widely available. This local level innovation remains 'under the radar' yet is likely to determine the larger pathways of change in the health systems of the future.

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