6 Agenda for action
Those living in poverty have little political voice. As a result, the infectious diseases they endure lie low on a long list of public health priorities – despite causing immense suffering and limiting prosperity. As clear from Chapters 1–4, we lack full understanding of the diseases and the populations they affect. There are only a few treatments and limited prevention and control strategies, while most of those affected by these diseases are difficult to reach in order to provide remedies. Policy-makers, funders and researchers all need to take urgent action to change this state of affairs. To help them in their task we present in this chapter five high-level options for action which, if implemented appropriately, we believe will help break the vicious cycle of infectious disease and poverty and so save lives, reduce misery and be of economic benefit to disease endemic countries.

IN CHAPTER 6:

- A new development indicator based on the prevalence of infectious diseases of poverty
- A “One Health, One World” strategy in relation to research for infectious diseases of poverty
- Research ownership with enabling policies by disease endemic countries
- An innovation platform to foster a culture of innovation to benefit public health
- An online global platform to inform on strategies, policies and funding commitments

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Setting the scene for action

A common theme underpins all the chapters of this report: that infectious disease and poverty are linked in a vicious cycle, and that breaking this cycle will lead to socioeconomic returns that will be felt in villages as well as by national, regional and global communities. This cycle clearly needs to be broken, and in this report we focus on how this might be done by addressing the problem of infectious disease¹.

Tackling infectious disease needs continued and increased investment in health. Such investment should be valued as an investment in human capital in much the same way that investment in education is valued. Fortunately, this now seems to be happening and health is back on the global agenda. The last two decades have seen increased political will to meet global health challenges, and investment in disease control programmes (particularly for infectious diseases of poverty such as malaria) has received a tremendous boost through initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (the Global Fund) and the activities of the Bill & Melinda Gates Foundation.

Improvements in health depend on a vibrant research enterprise through which new knowledge is translated into technologies and services that really work. This means that investment in health needs to be accompanied by investment (in terms of funds, manpower and infrastructure) in health research. Research at all stages (from the laboratory to delivery in the community) and in various disciplines (ranging from agriculture to sociology) also provides the body of evidence that helps policy-makers to develop rational, cost-effective and sustainable health policies. In effect, research is the engine that drives both technical advances and health policies forward. We believe that concerted research efforts from the global community (particularly from policy-makers, funders and researchers) could quadruple the dividend of investment in both research and control and lead to a greater impact on global health, especially among poor populations.

A strategic approach to the funding and support of research and to the generation and use of research outputs is urgently needed if research is to fulfil its promise to reduce the suffering caused by infectious disease. The first step in such an approach is to identify high-level actions on which policy-makers, funders and researchers should focus when developing their health research related strategies. These actions must convey credible promises that millions of lives will be saved.

With this need for high-level actions in mind, we have reviewed and evaluated a myriad² of valid actions for infectious diseases of poverty research. Recognizing that limited resources and urgent needs make it imperative that actions are pragmatic and assure much more than a “reasonable” return on investment, we have used our collective experience, published literature (including consideration of geopolitical and socioeconomic factors discussed in earlier chapters),


² Possible actions were reviewed and evaluated through The Global Think Tank on Research Priorities for Infectious Diseases of Poverty, a multidisciplinary group of experts from across the globe, created and convened by TDR in 2009. The Think Tank was divided into 10 reference groups, each of which produced a report that served as the technical basis for this Global Report. Research priorities outlined in the reference group reports served as the basis for discussion between Think Tank members and authors of this report and stakeholders.
as well as findings from the TDR Think Tank and regional and national stakeholder consultations, to propose five high level options for action for research on infectious diseases of poverty. These options for actions are listed in Box 6.1.

These actions should be viewed as high-level priorities, all of which are necessary to change the landscape of infectious diseases of poverty – although the order of implementation may depend on individual stakeholder resources and timeframes. Some of the concepts behind the proposed actions are not totally new and, in these instances, our options for action build on ideas that have already been raised among the global community. Here they are shaped to be specific to infectious diseases of poverty and to be more ambitious with regard to outcome and anticipated impact on these diseases.

Collectively, these five options for actions address the ten reasons for research outlined in Chapter 1 of this report. If implemented by the combined efforts of policy-makers, funders and researchers (together with other stakeholders), these high-level actions should sustain the achievements of the Millennium Development Goals (MDGs) beyond 2015 and ensure that research results are better positioned to make a real difference to human health. Most importantly, they should help break the vicious cycle between infectious disease and poverty. We therefore believe that implementing these five actions will change the research agenda and ensure that, in years to come, lives are saved, suffering is reduced and the socioeconomic burden of infectious diseases of poverty on disease endemic countries and communities is substantially decreased.

**Box 6.1. Options for Action on Research for Infectious Diseases of Poverty**

1. Create and use a new **index of infectious diseases of poverty** to serve as a surrogate marker of national socioeconomic development.

2. Implement a “One Health, One World” strategy in relation to research for infectious diseases of poverty.

3. Actively promote **research ownership** with enabling policies by disease endemic countries.

4. Create an **innovation platform** to foster a culture of innovation to benefit public health.

5. Create an **online global platform of research resources** to inform on strategies, policies and funding commitments.

These five options for action are described in further detail in this chapter, along with an outline of the context and reasoning for each.
The call to action

**OPTION 1: CREATE AND USE A NEW INDEX OF INFECTIOUS DISEASES OF POVERTY TO SERVE AS A SURROGATE MARKER OF NATIONAL SOCIOECONOMIC DEVELOPMENT**

The prevalence and incidence of infectious diseases of poverty should form the basis for the development of indicators to use as “barometers” of health and development; these will help guide investment in research and disease control and help countries to monitor their own state of development.

An index of infectious diseases of poverty, based on the prevalence and incidence of infectious diseases, can act as a barometer of health and development. Such an index, updated at regular intervals, can be used by countries to assess and monitor their progress in the control of infectious diseases of poverty. Its outputs can also generate major interest from the media, other stakeholders and the general public that in turn persuades policy-makers, funders and researchers to invest in improving health in order to attain socioeconomic prosperity.

The context for action

Throughout this report, information has been gathered from a wide range of sources to highlight the complex interrelationships between infectious disease and poverty. However, this has been a laborious task. At present, there is no simple, easily understood composite index or rating system on the status of the control and elimination of infectious diseases of poverty – even though such diseases are one of the most important factors limiting a country’s economic development and keep communities in poverty (7). An index can focus national and global attention, and can define and clarify key health issues. It can be used to identify areas where investments need to be increased, which control activities need to be put in place, or where research efforts need to be enhanced. It can also be used to measure the success of policies or investments for the reduction of poverty.

Recently, there has been renewed interest in multidimensional approaches to assessing poverty, and statistical data and indicators have already proven to be essential in gaining political commitment and moulding some global health initiatives. For instance, the Multidimensional Poverty Index (MPI)\(^3,4\) is used effectively by the United Nations Development Programme (UNDP) as a means to provide annual assessments of country progress and ranking on agreed international human development indicators. Interestingly, MPI includes two health indicators: child mortality and nutrition. These two indicators bear a close relationship with the infectious diseases of poverty described in this report, since most childhood deaths in poor settings are caused by infectious diseases and parasitic diseases are a widespread cause of malnutrition.

Use of such an index highlights the potential value of an index on infectious diseases of poverty. As well as being of practical benefit, an infectious diseases of poverty index can also raise the profile of these diseases and – by generating major interest among development organizations, other stakeholders and the media – it can serve as ammunition with which to encourage decision-makers at national level to focus on these diseases.

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3 The UNDP adopted the MPI in 2010 as a replacement for the Human Poverty Index that had been used since 1997. The MPI measures “the percentage of the population that is multidimensionally poor, adjusted by the intensity of the deprivations” (http://hdr.undp.org/en/statistics/mpi, accessed 22 February 2012).

This is particularly important as infectious diseases of poverty lost much of their visibility during the first ten years’ implementation of the MDGs. An infectious diseases of poverty index could also influence the MDGs in their next iteration (e.g. through identification of target diseases among target populations), and so influence future global action.

**Action to be taken**

The index of infectious diseases of poverty would need to be openly available in an interactive, user-friendly format, drawing together datasets that already exist as part of national, regional and global statistics and coupling these with new information on the success of interventions obtained with support from health systems research, discussed in Chapter 3.

Indicators used for the index would need to be researched and developed through intersectoral collaboration with multidisciplinary teams who have experience in this area (see later). The lack of health information systems in many low and middle-income countries may pose a challenge to implementation of this action, therefore it would be important to develop indicators that do not need new monitoring/data collecting systems so as to avoid putting additional strain on countries with already stretched resources.

Indicators would need to be agreed on and their monitoring sustained if they are to be used to report on progress, strengths, limitations and weaknesses in terms of the control of infectious diseases of poverty within and across countries. Depending on which indicators are developed, the index could be modelled so that progress on research and its contributions to disease control could also be easily assessed and visualized. Different statistical data would need to be selected for each indicator. These would be used and shared, to highlight both positive achievements and negative outcomes of activities and initiatives in all countries in relation to infectious diseases of poverty.

The index could become a dedicated part of an openly available repository and be provided in conjunction with appropriate protocols and templates to allow direct uploading of country data. Importantly, the data should be routinely collected within specific, regular time frames to allow evaluation of the long-term effectiveness of health and development initiatives, interventions, strategies and policies. Data could be presented using interactive graphics (infographics) to provide a visual output – for example, relating disease to economic development, or highlighting efforts on control in relation to disease incidence or prevalence. Users such as policy-makers could also download the data contained within the index and create bespoke maps, graphs and charts for national, regional and global policy development.

Achievement of this action would require concerted effort from all health and development stakeholders. The methodology used to develop such an index and the individual indicators would need to be transparent, sustainable and validated – with a focus on collating and elaborating information that is currently available, identifying gaps and defining how to ensure adherence to agreed strategies and policies. We envisage that there would be three phases of development, as illustrated in Fig. 6.1.

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5 Other than the “big three” (HIV/AIDS, TB and malaria), infectious diseases were hidden in the “other diseases” category of MDG6. The mid-term review of the MDGs led to the addition of new indicators for MDG6 however none of the original or revised indicators is specific for infectious diseases of poverty.

6 In her opening remarks at the Forum on Delivering Results for Women and Children held in Canada in November 2011, Dr Margaret Chan, Director-General of the World Health Organization stated that “At present, some 85 countries, representing 65% of the world's population, do not have reliable cause-of-death statistics. This means that causes of death are neither known nor recorded, and health programmes are left to base their strategies on crude and imprecise estimates” (http://www.who.int/dg/speeches/2011/women_children_21_11/en/index.html, accessed 22 February 2012).
Phase one: Establishment of a framework of indicators for the index, based on a series of commissioned reviews and other research.

Partners (such as the George Institute for International Health, Google.org and the UNDP) who have experience in developing indicators and interactive reporting tools – as well as expertise in measurement, data availability, statistics and infectious diseases of poverty – need to be actively engaged in the development of this barometer of health and development if it is to be a success. Partners would need to identify relevant indicators through commissioned in-depth literature reviews and consultation with relevant parties. Possible indicators that could be considered for use in the composite index are outlined in Box 6.2.

Phase two: Identification of institutions and other stakeholders, and provision of funding to support development, piloting and small scale validation, in partnership with relevant stakeholders.

Regional institutions with experience in health statistics and data collection programmes (such as WHO’s health systems observatories) should be fully engaged at this stage. Efforts should also be made to obtain low and middle-income countries’ active participation in collecting and collating data for the index in order to promote ownership, foster utilization of data and ensure that the index is developed in a way that will be of most use to these countries. Data collation is a costly exercise. Funding agencies would need to adopt this project and provide a framework for the funding of any activities needed to develop the index on a small scale, generate the data and monitor and evaluate their potential usefulness and validity.

Phase three: Development of a stakeholders’ platform to review, agree and recommend a strategy and framework for scale-up and implementation of the index.

International agencies including WHO, UNDP, the World Bank and the European Union could provide the forum via which stakeholders would provide input into the index and decide on how the index might be funded, scaled-up, implemented and utilized. Updating of the index at agreed, periodic time points might also need to be coordinated and overseen by an international agency that has the ability to instill stakeholder confidence in the indicators and the index itself (such as a United Nations’ agency). Such an agency would, in effect, serve as an advocate for the index.

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7 The George Institute for International Health conducts the G-FINDER project (with funding from the Bill & Melinda Gates Foundation) which focuses on the global funding of innovation for neglected diseases. Data from surveys is presented in yearly G-FINDER reports (https://studies.thegeorgeinstitute.org/g-finder/, accessed 22 February 2012).

8 Google.org is the philanthropic arm of Google. It “develops technologies to help address global challenges and supports innovative partners through grants, investments and in-kind resources.” (http://www.google.org/, accessed 22 February 2012).

**BOX 6.2. POSSIBLE INDICATORS* FOR FORMING THE BASIS OF THE INFECTIOUS DISEASES OF POVERTY INDEX, LISTED TOGETHER WITH SOME EXAMPLES OF RELATED STATISTICAL DATA THAT WOULD NEED TO BE COLLECTED**

**Burden of disease.** Measures impact of disease at local, national and global levels.
Data might include:
1. yearly prevalence, incidence, disability-adjusted life-year (DALY) and mortality rates for infectious diseases of poverty,
2. geographical distribution and demographics associated with the infectious diseases of poverty,
3. impact of disease on afflicted individuals and families – including financial costs (e.g. for treatment, or in terms of lost productivity).

**Health system strength and public health infrastructure** Measures ability of the health system to predict, prevent and deal with disease outbreaks and to deliver effective interventions.
Data might include:
4. per capita expenditure on health;
5. percentage of the population that is actively vaccinated (e.g. with vaccines under the Expanded Programme on Immunization [EPI]);
6. access to a health care provider or health care facility;
7. number of public health laboratories per 10 000 head of population;
8. number of trained health workers per 10 000 head of population (in both rural and urban settings);
9. number of public health veterinary laboratories per 100 000 domestic animals (this is important given the need to address zoonoses and several emergent infections).

**Government commitment.** Measures the willingness of governments to tackle infectious diseases of poverty.
Data might include:
10. existence of a national research policy that specifically mentions infectious diseases and poverty;
11. investment in research for infectious diseases of poverty, including in research and development (R&D) and implementation research;
12. presence of a pandemic preparedness plan.

**Socioeconomic factors** Measures social determinants of health.
Data might include:
13. access to water and sanitation (rural, urban and total);
14. deaths due to nutritional deficiencies (lack of nutrition leads to an immunocompromised population that is more susceptible to infectious disease);
15. social impacts of infectious diseases of poverty such as:
   - stigma associated with disease affecting employment, marriage and education opportunities;
   - community acceptance and uptake of new disease control strategies;
   - mental health issues associated with disease.

* These are only illustrative suggestions. The final set of indicators and associated statistical measures will need to be selected by experts and agreed upon through the three phases of index development described on page 152.
What would success look like?

The index could be used to quickly monitor and evaluate trends in relation to infectious diseases of poverty and the impacts of interventions. A regularly updated index that could be disaggregated according to local, national or regional criteria would allow policy-makers in disease endemic countries to monitor and evaluate their own efforts in tackling infectious diseases. Funders could use the index to prioritize areas of research so that funding is geared according to need. This could lead to more effective use of funds and possibly the creation of novel funding mechanisms (such as the funding set aside for operational research by the Global Fund). Finally, use of such an index could ensure that funds are allocated according to both needs and achievements.

Progress against infectious diseases of poverty at national level could then be rewarded with increasing investments.

Successful adoption of this particular option for action would be measured by evaluating national and international acceptance of the index, and monitoring its influence in guiding policies, investment and research. The responses of policy-makers, funders, researchers and other partners (especially those in disease endemic countries) could also be monitored in terms of provision of support for areas shown to lack progress to date.

OPTION 2: IMPLEMENT A “ONE HEALTH, ONE WORLD” STRATEGY IN RELATION TO RESEARCH FOR INFECTIOUS DISEASES OF POVERTY

We propose that the global health community implements and expands on the strategy of “One World-One Health” (discussed in Chapter 2) to “One Health, One World” so that human health can benefit from efforts in other disciplines (e.g. agriculture and animal health) and with other goals (e.g. poverty reduction). These efforts can contribute to the full continuum of research for infectious diseases of poverty, beyond “bench to bedside” all the way through to policy change and delivery to the community. Engaging all health and development stakeholders in this strategy should lead to more rapid development of tools and strategies for the control and management of infectious diseases of poverty, and their more effective and sustainable deployment and use. Overall, it will improve the nature of research and will result in a more holistic approach to addressing health and development issues.

Context for action

Environmental and social changes can have wide-ranging effects on patterns and types of infectious disease, particularly on zoonotic disease (see Chapter 2). Urbanization and migration patterns have changed water use, caused deforestation and made agricultural practices more intensive. Ongoing environmental degradation may lead to loss of biodiversity, enabling pathogen emergence and loss of potential natural products that could be developed into treat-

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10 The Global Fund encourages the inclusion of operational research in the HIV/AIDS, TB and malaria control programmes it supports with a view also to tackling obstacles to scale-up. Programmes are recommended to spend between 5% and 10% of their grant budget on monitoring and evaluation, which could include spending on relevant operational research (http://www.theglobalfund.org/en/me/documents/operationalresearch/, accessed 22 February 2012).
ments for disease. Increasing resistance to drugs among microorganisms (such as Tuberculosis bacilli and malaria parasites) and increasing resistance to insecticides among vectors (such as malaria-transmitting mosquitoes) have increased the urgency to find new and improved drugs and vector control tools. Meanwhile, explosive human population growth, coupled with environmental change, has put greater numbers of people in close contact with wild and domestic animals, altering the ecological balance between pathogens and their human and animal hosts. While some diseases have almost been eliminated, others are emerging or re-emerging (4). Since 1970, 32 diseases never previously reported in humans have emerged. Disease outbreaks can be catastrophic for poorer economies, particularly when much of the population is totally dependent on livestock for their livelihoods – consider, for instance, the devastation resulting from the Nipah virus outbreak in Malaysian pig farms and the avian flu pandemic of 2009 (see Chapter 2).

Environment and climate change are not the only fields with relevance to disease control efforts and research for health. Despite being medically diverse, infectious diseases of poverty share common features such as prevalence in rural settings, in urban slums or in conflict zones that allow them to cluster and frequently overlap. This means that efforts on poverty reduction and new technologies in environment management would also be useful for the control of infectious diseases of poverty.

Under the proposed “One Health, One World” strategy, researchers from diverse fields such as agriculture, climate, environment and poverty reduction would work together with researchers for health, so that better tools and strategies can be developed to address their combined needs.

In the meantime, there have been significant advances in agriculture and animal health. These fields have benefitted from some novel interventions. The “One Health, One World” strategy would also encourage researchers to share ideas, information and research practices through collaborative efforts; human health could thus benefit from advances in these other fields. For instance, savings in time spent on the discovery and development of potential drug candidates could be achieved if compound databases developed and used for animal health or for agriculture were shared collaboratively among researchers. Such collaboration has already proven to be useful: currently the antiparasitic drug ivermectin, originally developed for veterinary use, is used widely to treat onchocerciasis (river blindness) and lymphatic filariasis.

A compendium of research that can benefit communities should therefore not be limited to studies on infectious agents and human health. It should encompass results from both an environmental and a socioeconomic outlook that includes the links between climate, agriculture, natural resources, the environment and health, as well as new developments that change the milieu for emerging diseases (discussed in Chapter 2).

Action to be taken

For this option to be effective, governments of disease endemic countries must develop intersectoral frameworks that encourage cooperation and foster active collaboration across various ministries. These should improve regional capacity to share information and resources without additional bureaucracy. For example, disease endemic countries could set up a “national health commission” coordinating a number of government departments such as agriculture, health, science and technology, environment protection and finance. Funders, international organizations, nongovernmental organizations, philanthropists and the private sector need to broaden their perspectives to support multidisciplinary research programmes and to actively encourage intersectoral collaboration. It is important that educators and researchers also respond by developing cross-disciplinary research teams and incorporating research and training models into their work to encourage interdisciplinary thinking and sharing of intellectual property. At the same time, civil society needs to cam-
campaign and advocate for “One Health, One World” and, where appropriate, champion community-based strategies. New knowledge and technologies from newly configured multidisciplinary teams of researchers must be widely disseminated and shared as suggested in Option 4 (on innovation). The new paradigm mandates a massive culture change and the coordinated use of resources (human and financial) from different sectors.

What will success look like?
As mentioned earlier, the adaptation and successful distribution of ivermectin for elimination of blindness caused by onchocerciasis is a good example of the output and potential benefits of an expanded scope and multidisciplinary approach to research for health. Uptake of the “One Health, One World” strategy should lead to an increase in collaborative research as well as increased interaction between government departments and other stakeholders. It should also lead to improved collaboration and partnership and more sustainable ways to tackle the problem of infectious diseases of poverty. Effective implementation of this option should ultimately lead to development of better interventions at a faster pace.

Success of this option and uptake of the “One Health, One World” strategy will be measured by the development of common strategies and effective use of resources, a more collaborative and effective workforce, increased anticipatory decision-making and enhanced understanding of salutogenic factors.

**OPTION 3: ACTIVELY PROMOTE RESEARCH OWNERSHIP WITH ENABLING POLICIES BY DISEASE ENDEMIC COUNTRIES**

Ownership, active engagement and investment in the research enterprise for control of infectious diseases of poverty must be strengthened with effective policies if countries where infectious diseases are endemic are to reap the full benefits of advances in research for health.

All of the infectious diseases of poverty discussed in this report place a significant burden on countries with limited resources. These countries therefore need to play a central role in the development of research priorities – to strengthen their own role in leading research, to learn from one another and to improve the way in which policies related to health research are developed and taken up. Crucially, countries also need to increase their own investment in research.

**Context for action**
The first observation on disease outbreaks and its impact is often made at country level. It is these countries that have to find resources to obtain and deliver new drugs and vaccines and incorporate new intervention strategies into their health care systems, and it is these countries that have to monitor disease presence and oversee its control within their borders. However, limited resources limit their ability to do so, and often solutions to their problems only come when recognized at global level.

It is therefore essential that disease endemic countries establish clear research priorities so that research efforts and resources are directed towards their specific needs. To date, the research agenda and implementation strategies for infectious diseases of poverty have
largely been driven by international agencies. This must change. Disease endemic countries must guide and have ownership of research efforts into infectious diseases of poverty, so that their needs are met and implementation strategies are more applicable and sustainable.

As well as setting a research agenda that is directed towards their needs, countries themselves need to spearhead research if they are to benefit fully from research for health. However, most disease endemic countries are unable to mount a research enterprise or even to access full research information produced by others. Often new tools and strategies derived through research have not been deployed or scaled-up within countries, despite their availability and proven effectiveness. This may happen if there has been inadequate research on delivery, use and community acceptance of research outcomes. New tools and strategies need to be socially accepted, cost effective and easily implemented in the local context. Early engagement and ownership of the research agenda could foster this.

Researchers cannot work without a supportive, enabling policy framework. Moreover, national researchers have few incentives to address the most critical health research priorities without policies that support access to national and international resources. Over the last few years there have been encouraging signs that disease endemic countries can play a more central role in both setting and implementing the research agenda. Several disease endemic countries (such as BRICS11 countries: Brazil, China, India and South Africa) have taken the lead in research and have demonstrated that strategic policies which allow them to build their own research enterprise lead not only to the development of interventions that suit the country’s own requirements, but also to increased economic development. Despite such successful examples of research ownership, many low-income countries are still not benefiting as they should from the impacts of such advances in research.

Finally, disease endemic countries need to increase their financial support for research if they are to truly have research ownership so that research can help them to address their own health needs. In 2008, many countries demonstrated their commitment to research by pledging to allocate 2% of their health budgets to national health research programmes. However, very few countries have achieved this as yet.

**Action to be taken**

It is clear that countries need to play a leading role in developing national research and health priorities in the context of their needs and the global resources available to them. Developing their own research agenda and participating in global agenda setting (e.g. through participation in national and global think tanks and consultations – such as the think tank and consultation process involved in the production of this report and related reference group reports) is a crucial part of such activity. Governments, funders, international organizations, nongovernmental organizations and other stakeholders need to actively encourage and support such input.

Researchers in disease endemic countries need to increase research and their research leadership in the development and implementation of tools and strategies relevant for their needs and applicable in their disease settings. This means that research capacity and infrastructure needs to improve and that countries need better access to international funds and training and development schemes. Researchers also need to participate actively across the whole spectrum of research, from bench to field. As outlined in Option 2 (on “One Health, One World”), work in cross-sectoral teams would enable them to learn from, and work together with, other disciplines. Mechanisms through which researchers in different countries can learn from one another (e.g. the BRICS countries) also need to be established – possibly through regional partnerships, new networks, online forums, exchange programmes and collaborations.

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11 There are five BRICS countries – Brazil, the Russian Federation, India, China and South Africa.
Countries need to demonstrate their commitment to health research by creating an “enabling environment” with policies that allow them to fund research and, in turn, use research outputs to underpin other policies. This would require early engagement of policy-makers with research entrepreneurship. Disease endemic countries also need to learn from BRICS’ country examples when developing their own research policies, and need to increase the investment that they make into research at all stages of the research continuum.

To facilitate ownership of health research entrepreneurship by disease endemic countries as outlined above, all stakeholders need to engage in long-term partnerships with universities; public health and research institutes; and health care systems in low and middle-income countries. Funders also play a part in promoting research ownership by disease endemic countries. They need to provide a framework that will allow leading research institutions and policy-makers in disease endemic countries to acquire expertise and capacity for priority setting, policy formulation and monitoring and evaluation of the effectiveness of actions.

Targeted action by new international initiatives might help smaller, low-income economies with limited past success in applying for international research funding to gain access to resources. As an example, the creation of ESSENCE is a welcome addition in the field. Similar groups with a greater geographical coverage could expand their activities to provide services focusing on smaller countries.

They could also work with investigators in these countries to help design protocols, organize peer reviews and identify relevant partners and funding sources (especially around priorities identified by the countries and regions). Such expanded engagement with stakeholders will enhance ownership of research by smaller disease endemic countries while strengthening partnerships with funders. Some funds might be placed in a special pool to develop the capacity of low-income countries to conduct research in partnership with others. Global funder communities could develop a framework to match levels of any increased investment by disease endemic countries in research that supports policy formulation. Funder communities could also provide assistance to researchers in order to access innovative funding mechanisms (such as the funds specifically earmarked by the Global Fund).

Thus, under this option for action, disease endemic countries should:

- develop research priorities congruent with the burden of infectious diseases of poverty in their own populations;
- increase their own research activity and improve research leadership;
- develop regional partnerships to build research infrastructure, human resources and research capacity;
- create policies and develop plans to guide national and international investments towards the identified research priorities;
- aim to increase their national support for research and translation of research to strategies for health.

Disease endemic countries also need to design policies to make health systems research more prominent, so that both attention and funds flow into this important research area. Health systems research provides an insight into the relationship between health systems, population health outcomes and the social and economic determinants of health. Such research is essential to guide global, regional and country approaches on how to overcome the tension between the disease control programmes (which are often viewed as working in silos) and health. Research outcomes could provide a synergistic approach, enhancing the control programmes while also increasing access to health care.

12 ESSENCE is a group of global funders of research that aims to harmonize and improve the effectiveness of their activities, focusing on research and capacity strengthening in Africa (http://apps.who.int/tdr/svc/partnerships/initiatives/essence, accessed 22 February 2012).
What will success look like?

Establishment and implementation of research policies tailored to suit their own needs would make up somewhat for the voice that disease endemic countries have not yet had. These countries would have a stronger role in setting their own research agendas as well as a stronger say in global agenda-setting. There would be a disease endemic country-owned research agenda responsive to relevant locally identified public health priorities, and there would be a sustained commitment by all stakeholders to build local research capacity – including human, management and governance capacity as well as infrastructure. As this broader perspective on research ownership is adopted, funding for research would no longer be narrowly targeted; there would be investment all along the continuum of research.

Success of this option would be measured by an increased number of countries with research policies that have legal/financial support; increased delivery and uptake of relevant research results; increased access to effective tools and strategies; closer links between research and the provision of health services; and greatly strengthened, synergistic health and research systems leading to improved health.
OPTION 4: CREATE AN INNOVATION PLATFORM TO FOSTER A CULTURE OF INNOVATION TO BENEFIT PUBLIC HEALTH

A culture of innovation must be developed within countries burdened by infectious diseases of poverty; this culture should support and promote the social, legal, political and regulatory environment that promotes innovation in public health systems.

Innovation is not only about problem identification followed by solution, discovery and delivery. There must be a paradigm shift in the social, legal, political and regulatory environment to view innovation more broadly and create a new culture of innovation in public health. Strategies and incentives that promote indigenous participation in both technological innovation and in change due to social innovation must take an approach that is systems based and which fosters a spirit of entrepreneurship. Access to information is a prerequisite to advancing this objective. A new, open innovation platform – where information and resources can be shared and the full potential of new technologies can be realized beyond initial intended use – would provide the backbone for this. Such a multidisciplinary, cross-cutting platform would support synergy between programmes and sectors at local and regional levels and would help sustain the “One Health, One World” strategy outlined earlier as Option 2 and ownership as outlined in Option 3.

Context for action

A culture of innovation in disease endemic countries is of paramount importance if health inequalities are to be addressed and poor populations are to benefit from scientific advances. Yet innovation tends to be viewed solely as the development of a new drug, diagnostic, pesticide or vaccine. To have a real impact on health, innovation needs to be viewed more broadly – for instance, it should include social innovation and encompass new delivery mechanisms, such as the community-directed treatment and interventions mentioned in Chapter 4. Disparate research capacities also need to be brought together to consolidate research and expand innovation (also see Option 2 on “One Health, One World”), while silos of traditional research and funding programmes need be demolished. This shift in culture needs to be supported by an appropriate social, legal, political and regulatory environment that facilitates unbridled access to information.

Disease endemic countries need to embrace and participate in this innovation culture. They specifically need to play a more central role and be recognized for their contributions, and they need to change how they collaborate and share technologies to promote long-term health outcomes. Yet, to date, most disease endemic countries have not devoted efforts towards developing innovative approaches and new technologies, and most product development partnerships (PDPs) have been concentrated in high-income countries, with only a handful of centres of research excellence actually based in disease endemic countries. This means there is low engagement between innovators/researchers and disease endemic country policy-makers, resulting in a mismatch between efforts and needs. Option 3 already highlights the need for country ownership of research, yet disease endemic countries lose much of their best research talent because of the brain drain whereby researchers are tempted to work in other countries with a more vibrant research culture. The problem needs to be addressed.
If new multidisciplinary science is to save lives in poor populations, there needs to be considerable transformation in the innovation arena, leading to a new model for how knowledge is accessed, shared and used.

Action to be taken

Sustainable innovation must allow local participation in the innovation process and support the sharing of its end products.

The following three steps should be seen as priorities.

1. A new paradigm of an “open innovation culture”, with a broader definition of innovation, should be encouraged, particularly in disease endemic countries. This environment should be created mainly through the collaboration of research and development agencies, industry and academia – both “north” and “south” – with disease endemic countries. The definition of innovation should be broadened and supported by the social, legal, political and regulatory environment. Enabling policies and mechanisms (i.e. harmonization of science, technology and innovation policies, intellectual property management, sustained financial commitment, incentives for intersectoral cooperations) are crucial to support research and development through to significant innovations, and to attract partnerships with the private sector and help to reduce the investment risk for all stakeholders.

2. The research, development and implementation capacity of disease endemic countries should be strengthened, with appropriate roadmaps for innovative development and use of tools. Home grown capacity for scientific research and technological know-how should be built up with the support of a strong health research and development policy, in parallel with an improved research infrastructure and enhanced budget. International donors and other funders would need to assist this process through active collaboration. To address the brain drain, countries should also examine how they can encourage scientists in the diaspora to return home to enhance the country’s research enterprise. Countries would need to develop schemes to allow this – for instance, grants could be given to returning scientists and their universities to establish centres of excellence over a given number of years. Such centres could form the nucleus for networks such as those outlined in Chapter 4. A number of the BRIC countries (Brazil, Russia, India and China, see Chapter 4) provide models of how to foster technological innovation; they could act as partners for smaller countries.

3. An “open access innovation platform” should be created and adopted, comprising a repository of tools and enabling mechanisms that both respond to the needs of disease endemic countries and expedite the global community’s efforts to meet the challenges of diseases of poverty (see Fig. 6.2). Open access to research information and to raw data (with new concepts and information on intellectual property), must be promoted as part of this platform. Countries would need to develop mechanisms for joint ownership and sharing of intellectual property rights through fair and legal frameworks in order to develop this platform. Creation of such a new innovation platform would expand access to resources, enhance use of valuable assets beyond intended targets, and stimulate the search for novel

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discoveries and the development of new health interventions. The platform should facilitate in-depth understanding of the specific social contexts in which interventions will be delivered, and allow strong engagement with communities in these settings to ensure maximum and sustainable implementation and uptake.

Creation of a new culture of innovation and associated innovation platform is an ambitious, long-term goal. In the short term, efforts should focus on establishing a few centres of excellence and changing the legal and regulatory structures of countries to facilitate innovation, and on providing funding and incentives for innovators/risk takers.

**What will success look like?**

Implementation of this action will lead to a broader definition of innovation and more innovation-focused research, with disease endemic countries playing a more central role. Creation of an open innovation platform should improve access to and sharing of data and so speed up scientific discovery and production of interventions. A cross-cutting innovation platform will mean that technical advances will go hand in hand with social innovation so that new tools and strategies are rapidly scaled-up and delivered to those in need.

Progress towards a new culture of innovation can be measured by monitoring the development of innovative models of sharing information and delivering new technologies, and monitoring the sharing of intellectual property to help tackle infectious diseases of poverty.
OPTION 5: CREATE AN ONLINE GLOBAL PLATFORM OF RESEARCH RESOURCES TO INFORM ON STRATEGIES, POLICIES AND FUNDING COMMITMENTS

Periodic systematic analysis of the research resource landscape for infectious diseases of poverty should be performed to identify resource gaps and provide information to guide strategic planning.

An easily accessible, online global platform on resources for health research will enable policy-makers, funders and researchers to develop their own new priorities and strategies to support research for infectious diseases of poverty. Although it would not be confined to focusing on financial resources (see later), the electronic platform would have information on “who funds what?” together with where, when and how much funding is available. Used together with the research needs identified through use of the index of infectious diseases of poverty (outlined in Option 1) and the innovation platform (outlined in Option 4), the resources platform will help improve ownership by low and middle-income countries (described in Option 3) and allow better, more cohesive and effective support for research for infectious diseases of poverty. It will thus be of enormous benefit in the battle against these diseases.

Context for action

Currently there is no single, transparent and user-friendly tool widely available to policy-makers, funders and researchers to help them to devise new strategies, policies and mechanisms to support health research (particularly research for infectious diseases of poverty). There is a dearth of information on resources (financial and non-financial) for health research, meaning that gaps in funding and other resources, including manpower and infrastructure, have been hard to identify. As a result, certain areas of research have not been able to attract much needed resources e.g. funding for research on how to get new products (such as vaccines and drugs) to poor communities. Such underfunded areas of research can only be identified, and resource needs met, through a thorough mapping of resource and funding flows.

Policy-makers will continue to struggle to make the right decisions and investments until such information becomes easily available to them. They need access to information on who funds what; levels of financing; who is engaged in research and innovation; and on research outputs (as well as associated benefits to public health) so that they can make their decisions on how most effectively to address resource issues in relation to research needs.

Funders also need to know whether the full continuum of research is being funded, or if there are funding gaps that could be filled with new funding initiatives. They also need to recognize duplication of effort so that they can better direct their financial investment and reduce inefficient use of funds. While some efforts – such as the G-FINDER surveys and associated reports on funding for neglected diseases (8) – have been made to address this lack of information, the scope of such work has been limited. For instance, G-FINDER focuses on financial investment rather than other resources such as manpower, and does not cover areas such as implementation research and operational research (which are particularly important for low and middle-income countries). In Chapter 5 of this report, although we have broadened the scope of our analysis to include implementation research, we do not look at issues of manpower or infrastructure. Nevertheless, activities such as the work done for Chapter 5 and that carried out for the G-FINDER surveys will help guide the development of the global resource platform.
It is therefore clear that a central platform where all such information is available would be of great help to policy-makers and funders while they devise their strategies and policies. It would also be useful to researchers, who need to know who is funding what research and how to direct their research proposals so as to secure appropriate funds.

**Action to be taken**

An easily accessible, online global platform providing a database and detailed analysis of resources and financial investment in health research will be able to provide policy-makers, funders and researchers with information they need to guide their activities. Populated with information gathered from various sources – on manpower, funding, infrastructure, and strategies and policies for health research – alongside stakeholder profiles (see Figs. 6.3 and 6.4), the database and associated analysis would allow strategic engagement of decision-makers in low and middle-income countries. It would help to modify existing policies and to highlight both positive and negative examples of disease endemic country engagement with research. The platform could be used to advocate for support for research (e.g. by civil society) and to encourage the use of research results for policies for the control of infectious diseases of poverty. It would also allow the identification of funding gaps, duplications and challenges, and would help identify research and disease priority areas that are either overlooked or oversubscribed by stakeholders.

Funds would be needed to create a database (based on review and analysis of data available) and identify resources to create, support and maintain the platform. If the platform is to be truly useful, updates at regular intervals also need to be supported. A systematic and recurring process would therefore need to be put into place to collect, collate, analyse and monitor resources and funding flows (e.g. every three years). These reviews would need to provide a transparent picture of research resources and guide the intelligent creation of strategies, policies and partnerships. This information will help the relationship between research and health outcomes to be understood and will provide the evidence base for future investment in research programmes relevant to disease endemic country priorities.

**What will success look like?**

The online platform would provide valuable information to policy-makers, funders and researchers on resources for research. Taken together with information emerging from the infectious diseases of poverty index (Option 1) and the innovation platform (Option 4) this action could lead to better support of research for infectious diseases of poverty in terms of strategies, policies and funding commitments.

As an example, the infectious diseases of poverty index may indicate the need to tackle a particular infectious disease in isolated communities in parts of Africa. The resource platform might show that little research is taking place on this disease regionally but...
that similar work is being carried out in parts of India. The funding analysis might show that no global funding is currently committed to this. Further analysis through the platform for innovation might indicate that, although drugs are available, the best regime for rural use has not been worked out. Working together under the “One Health, One World” strategy outlined (Option 2), policy-makers in agriculture, health, and science and technology might decide this issue needs to be addressed as the disease is a potential threat to agricultural workers, and parts of Africa affected by the disease grow profitable crops. Funders, including aid agencies, might provide financial commitment to a collaborative effort to tackle the disease; researchers (e.g. from Africa and India) might work together to devise best ways to get treatments to those that need it, so that the disease is managed appropriately and transmission controlled.

The process should result in a more balanced portfolio of funding across the “One Health, One World” sectors, and enable funding of research on infectious diseases of poverty to be congruent with national priorities, burden of disease and types of research required for impact. All in all this action builds on, and is useful for, the other four actions that we have outlined in this chapter and could make a real difference to how research is supported.

Fig. 6.4. An online global platform on resources and expected impact on research for infectious diseases of poverty. The global platform would be populated by information from various sources to provide a database of resources for research for infectious diseases of poverty. This would be available online, in association with a detailed analysis of these resources. With information on research needs emerging from use of the index on infectious diseases of poverty outlined in Option 1, the platform (which would be updated at regular intervals) could be used to identify priority resource needs. This would then enable policy-makers, funders and researchers to develop new strategies and policies to address infectious diseases of poverty and, in turn, would lead to development of new funding commitments and mechanisms of funding.

Source: TDR
Conclusions

This report has laid out the need for a systems-based approach to address infectious diseases of poverty, and has made a case for significant changes to be made to decrease the global disease burden.

The emergence of new institutions, partnerships, networks and funding streams focusing on infectious diseases of poverty is a proof of political will and offers great hope for the eradication of these maladies. However, greater transparency and coherence is essential for monitoring and evaluating the impact of ongoing research, resources and for sharing data and research findings. The scientific community, especially in countries heavily burdened by infectious diseases of poverty, needs a more enabling environment to access resources, share knowledge and contribute to disease control efforts. Partnerships need to be forged and sustained to capitalize on resources and to build capacity. Progress – both success and failure – needs to be monitored and gaps in knowledge about disease and affected communities identified if the true potential of the five actions proposed in this report is to be fulfilled.

Through this report, and the five options for action that we outline above, we are boldly making our call for action. Making the call is not enough – action still has to be taken. Much is being asked of policy-makers, funders, researchers, civil society organizations and of the communities that support and are supported by them. But if nothing is done, nothing will change. We believe our call to action will dramatically transform the global research landscape and result in a better life for those who suffer the most from infectious diseases of poverty, and benefit the communities and countries in which they live.

Before we conclude this report, let us return to the story of Christophe (the fictional mineworker introduced in the opening pages of this report) to glimpse the future that our action agenda might offer him (see Box 6.3).

If the key messages from this report are used to inform research strategies, then the possibility for a better future is one step closer to a reality. We call for policy-makers, funders and researchers to focus on the five options for action that we have outlined in this chapter. Technology has advanced, knowledge about diseases has improved and there is political resolve. This momentum must not be lost. The time for action is now. Let us use current political willpower to shift from a world of inaction further towards a world in action.

But if nothing is done, nothing will change. We believe our call to action will dramatically transform the global research landscape and result in a better life for those who suffer the most from infectious diseases of poverty.
**BOX 6.3. WHAT OF CHRISTOPHE?**

**THE IMPROVEMENTS IN PEOPLES’ LIVES THAT COULD OCCUR WITH THE CHANGES RECOMMENDED IN THIS REPORT (see page 16 for this fictionalized representation)**

Disease endemic countries (such as the country where Christophe lives and works) will have developed a research agenda that better matches their own needs. Money will have been invested in research for better drugs and diagnostics for diseases that have a high national disease burden – diseases such as sleeping sickness.

A new culture of public health innovation will have led to concerted efforts to develop new diagnostics and treatments. Through this, a new rapid diagnostic blood test will have been developed to detect the infection that causes sleeping sickness, and an effective, non-toxic, oral drug will be available to treat the late stage disease. As a result of implementation research the best way of delivering these to relevant communities will have been developed. Local availability of these new tools will mean that diagnosis and treatment will be safer, more easily administered, less costly for the patient and more effective.

Adoption of One Health, One World will mean that various research disciplines and ministries (health, agriculture, science and technology) will be working together, in partnership with both human and animal health control programmes, sharing data and information and spearheading a more holistic approach to health. New geographical information system (GIS) and cellular telephone networks will be helping to assess disease risks and report health problems. They will also be used to deliver health messages to Christophe’s mining colleagues, who now receive treatment for trypanosomiasis under an integrated programme targeting sleeping sickness while deploying tsetse traps. Cost-effectiveness research will have led to the development of an integrated strategy of preventative chemotherapy for helminthic infections within a river blindness programme. New monitoring and surveillance techniques will also be proving beneficial to such programmes.

Because there will be a new infectious disease development index (and associated media interest and public pressure), stakeholders in international development (such as aid agencies) will be investing in such programmes. The index will have compelled policy-makers to develop new regulations that ensure that the formal health system monitors community health. This will lead to improved data, which in turn will lead to resources being sent to where they are needed – such as to Christophe’s small mining community.

Finally, monitoring of resources and funding flows will have indicated a number of funding gaps – such as investment in research on the association between infectious diseases of poverty and mental health problems. Funds will have been directed to this area and research and policy-makers will be stimulated to recognize these as important issues. Christophe’s wife, a small trader at this point, will be able to use a newly adopted health insurance scheme resulting from research into health financing to cover costs of treatment. Christophe’s mother, now partially blind as a result of poorly managed trachoma, will be able to access new drugs and therapies that make her life easier as her health deteriorates. Despite these demands, the health insurance scheme will decrease out-of-pocket expenditure on health by Christophe and his family, so they can afford to send their daughter onto higher education. Eventually Christophe’s daughter will become a nurse, working at the local hospital that serves the miners.
References – Chapter six


