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gOPINION
STATE-OF-THE-ART REVIEW

Transforming South–South Technical Support to Fight Noncommunicable Diseases

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Abstract

At the UN High-Level Meeting on non-communicable diseases (NCD) in September 2011, each member state was challenged to create a multisectoral national policy and plan for the prevention and control of non-communicable disease by 2013. Few low-income countries, however, currently have such plans. Their governments are likely to turn for assistance in drafting and implementation to multilateral agencies and Contract Technical Support Organizations recommended by development partners. Yet because many NCD seen in the lowest-income countries differ significantly from those prevalent elsewhere, existing providers of external technical support may lack the necessary experience to support strategic planning for NCD interventions in these settings. This article reviews currently available mechanisms of technical support for health sector planning. It places them in the broader historical context of post-World War II international development assistance and the more recent campaigns for horizontal “South-South” cooperation and aid effectiveness. It proposes bilateral technical assistance by low income-countries themselves as the natural evolution of development assistance in health. Such programs, it argues, may be able to improve the quality of technical support to low-income countries for strategic planning in the NCD area while directing resources to the regions where they are most needed.

Developing countries face a growing burden of major chronic diseases and associated risk factors that already predominate in high-income settings, such as cardiovascular diseases, diabetes, cancer, respiratory illnesses, and mental illness. However, the risk factors and clinical course of many non-communicable diseases (NCD) seen in the lowest-income countries (along with resource-limited regions of middle-income countries) differ significantly from those prevalent elsewhere. Among the “bottom billion”—populations living on less than a US dollar a day—risk factors for NCD are often not behavioral but structural. Rheumatic heart dis-

ease, chronic obstructive pulmonary disease, cardiomyopathies, sickle cell anemia, Burkitt’s lymphoma, cervical cancer, and hyper-reactive splenomegaly can stem from pollution and lack of access to food or basic health care, including untreated human immunodeficiency virus (HIV), malaria, and other infectious causes. Endemic NCD present a challenge for strategic planning and resource mobilization that is not yet fully captured by the recent attention to chronic diseases in the developing world.

At the UN High-Level Meeting on Non-Communicable Diseases in September 2011, a call was

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made for the development by 2013 of “multisectoral national policies and plans for the prevention and control of non-communicable diseases.” The General Assembly mandated specific action to “strengthen and integrate, as appropriate, non-communicable disease policies and programmes into health-planning processes and the national development agenda of each Member State” (Sect. 45) [1]. Yet, only 9 of the 32 low-income countries recognized by the World Bank currently have NCD strategic plans; just 3 of them are in sub-Saharan Africa.

The response to the HIV/AIDS epidemic in the first decade of the 21st century offers some cause for optimism. After resources became available for comprehensive interventions, Rwanda and a few other developing countries were able to achieve universal access to antiretroviral therapy, sharply reducing transmission and mortality. However, in many resource-limited settings, there is little availability of technical support to plan clinical and preventive interventions against NCD, let alone operational research, supply chain management, financing, and other key health sector activities. Although UN delegates did “urge relevant international organizations to continue to provide technical assistance and capacity-building to developing countries, especially to the least developed countries, in the areas of non-communicable disease prevention,” (Sect. 52) [1] there is currently no specific agency with a track record in low-income settings that has the ability to render technical assistance and support to countries for NCD-specific planning. Governments of poor countries are likely to turn for advice either to their World Health Organization (WHO) representatives or to contract technical support organizations, independent consultants suggested by development partners.

Because of apparent differences in the epidemiology and clinical course of NCD among the bottom billion [2], it is not clear that there is adequate experience in these quarters to guide the strategic planning process. Recent discussions of strategic planning in the NCD policy area have emphasized the needs and considerations of middle-income countries. Even when the world's poorest nations are considered, the implicit intervention model is often based on experience in more affluent settings. The Political Declaration of the High-Level Meeting on NCD, for example, describes the “common modifiable risk factors for non-communicable diseases” as unhealthy diet, tobacco use,

physical inactivity, and the harmful use of alcohol—at least 2 of which are rare in most settings of absolute poverty (Sect. 35) [1].

Given the lack of available templates, high-burden, low-income countries may find strategic planning for NCD interventions as mandated by the General Assembly in September difficult. The challenge will be complicated further by cracks in the international framework for technical support. Implementers and government administrators want, on the one hand, to make the best use of scarce resources to address an urgent problem and, on the other, to preserve their strategic latitude. They often do not have a good sense of what assistance could be helpful to address their needs, let alone which organizations may be able to provide it. Providers, for their part, often do not have any systematic, timely sense of how much technical assistance is needed, of what kind, and where. Donors typically finance technical support reactively, in response to observed problems well downstream.

In the best case, the objectives of all stakeholders converge in a fruitful division of labor that assesses the demand for technical expertise and directs it to the areas of greatest need. In the worst case, however, inappropriate technical support can be a significant and unnecessary waste of scarce human and material resources. Supply-driven technical support tends to divorce it from local needs, impeding feedback from programs into norms and guidelines, hindering the development of local expertise and capacity, and undermining replication of good practices in the long term [3].

A broad consensus now exists that an unprecedented expansion of NCD-related interventions is necessary, and furthermore, that it will be predicated on stronger international cooperation “in support of national, regional, and global plans for the prevention and control of non-communicable diseases, inter alia, through the exchange of best practices in the areas of health promotion, legislation, regulation and health systems strengthening” (Sect. 45) [1].” To that end, this paper reviews the structure and origins of currently available mechanisms of technical support for health-sector planning, placing them in the broader historical context of the post-World War II international development regime and the more recent movement for aid effectiveness. It then proposes a mechanism for horizontal collaborations by low income-countries in NCD strategic planning as a natural and necessary evolution of development assistance in health.

TECHNICAL SUPPORT TO DEVELOPING COUNTRIES 1949–2000

Technical support and assistance typically refer to a wide variety of inputs that span the short, medium, and long terms, often relating to particular technical issues and systems. These inputs can range from initiatives to train and build local capacity in a narrow range of skills (reading electrocardiograms) or a broader one (laboratory microscopy), secondment of staff to ministries to fulfill a particular function, solving immediate supply-chain management problems, and so on. Given the breadth of functions represented by technical support, it is no surprise that coordinating, implementing, and evaluating it has proven a major challenge.

External technical support has been a key component of international development efforts since shortly after World War II. In his 1949 inaugural address, US President Harry Truman launched a campaign to make “the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas.” With European overseas empires and trade networks shattered by the war, many citizens of newly decolonized nation-states were facing conditions of great scarcity: “Their food is inadequate. They are victims of disease. Their economic life is primitive and stagnant.” Though Truman underscored limitations in “the material resources which we can afford to use for the assistance of other peoples,” he nonetheless urged American policy makers “to make available to peaceloving peoples the benefits of our store of technical knowledge” while pursuing international technical cooperation “through the United Nations and its specialized agencies . . . for the achievement of peace, plenty, and freedom” [4].

The presidential initiative that evolved over the next decade into the US Agency for International Development (USAID) was shaped explicitly by the Cold War. Many new nations had embraced a “false philosophy which purports to offer freedom, security, and greater opportunity to mankind” and others threatened to do so. Truman saw the poverty of post-colonial successor states, which made them more receptive to the Soviet Union, as “a handicap and a threat both to them and to more prosperous areas” [4]. His agenda for expanded technical assistance to poor countries was thus in keeping with the other 3 points of the anti-communist geostrategy outlined in his inaugural address: support for the United Nations, expanded

aid to Europe under the Marshall Plan, and expanded military assistance to friendly regimes worldwide [5,6].

The Point Four agenda of technical assistance to what Truman called “underdeveloped areas” reflected—and exploited—the language of a new professional class [7,8]. As the historian Amy Staples notes, conferences at resort locations like Hot Springs, Virginia, and Bretton Woods, New Hampshire, were framed initially within the Allied war effort, but focused on “tasks to be handled by experts rather than on traditional topics of diplomacy” [9]. The specialized UN agencies soon expanded their official mandate along with that of the parent organization, which by 1949 was adding new members almost as fast as bankrupt European empires could disgorge them. As at the US Social Security Administration and Tennessee Valley Authority during the 1930s, technical staff of the WHO and Food and Agriculture Organization (FAO) set themselves to rationalistic, long-term development planning within a state model similar to the one established by the Roosevelt Administration’s New Deal [10]. After defining health as a “state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” and affirming the highest locally attainable standard of health as a fundamental human right, the WHO 1946 constitution highlighted its mission to “(d) . . . furnish appropriate technical assistance and, in emergencies, necessary aid upon the request or acceptance of Governments . . . (f) establish and maintain such administrative and technical services as may be required, including epidemiological and statistical services . . . (j) promote co-operation among scientific and professional groups which contribute to the advancement of health” (Cap. 2, Art. 1) [11].

Between the 1950s and the 1970s, success stories of “technology transfer” between the global North and South inspired practitioners. Improvement of modern technological capacity in poor countries—not only physical artifacts but also new organizational forms and ways of thinking—was credited by the sociologist Govindan Parayil and many subsequent observers for lasting social changes and rapid economic development [12]. An example cited by many development specialists is the so-called Green Revolution in agricultural production which grew out of joint activity by governments, private donor agencies such as the Ford and Rockefeller Foundations, bilaterals such as USAID, multilaterals such as the FAO, interna-

tional research institutions, and local peasants [13]. Together, they created agricultural universities patterned after the land-grant universities of the United States, an indigenous national agricultural research system, a reorganized government farming authority that undid colonial priorities and networks and facilitated the diffusion of new seeds and expertise and a commitment to innovation by rural food producers [8]. A decade later, farmers were realizing 2- to 3-fold increases in yield compared with yield from 1965 [14].

More often, however, international technical support was blunted by Truman's limits on "the material resources which we can afford to use for the assistance of other peoples." Well over 80% of American economic aid under Truman went to Europe and the "rim countries" of the Soviet Union [15]. When the Korean War broke out in 1952, most US official development assistance (ODA) was shifted to Southeast Asia. Only 21% remained to divide between Africa, Latin America, and the Middle East, and a substantial proportion of that was in the form of loans subsidizing the exports of American manufacturers and farmers [15]. To the present day, the high-water mark of US ODA is 1951, when it amounted to about 0.6% of the gross domestic product (US\$62 billion in 2008 dollars). A year later, when the Marshall Plan expired, aid was 0.3% of the gross domestic product and the ratio has continued to decline—by 2008, it stood at about 0.2%. Worldwide, the ratio of ODA to donor country national income has never exceeded the 1961 figure of 0.54%. After the Cold War, it fell to 0.22%, and now it stands at about 0.31%, including large US transfers to Iraq and Afghanistan [16,17].

Underfunding of the mandate for technical support disappointed its practitioners. In 1968, the International Institute for Medical Electronics and Biological Engineering was approached by an unnamed country in North Africa (likely Algeria) that was in the process of reorganizing its national health system. A technical support team had been dispatched by WHO, but it lacked experts on instrumentation, automation, or information processing. "The Minister of Health of that country sends his representative to see us thinking that we should be able to supply such expertise," wrote the institute's director in frustration. "Our resources do not permit it. They should" [18]. The most dramatic international public health project of the 1960s and 1970s, the global smallpox eradication campaign, is now thought to have succeeded

in part because it moved away from piecemeal technology transfer to national governments and secured a major financial commitment from the United States [19–21].

Inadequate resources for infrastructure development called into question the plausibility of the agenda outlined by Truman. "Farm machinery is of little value without roads, skilled operators, and available mechanics," complained one observer in 1969. "Without a coordinated movement toward social reconstruction, there can be little hope that technical aid can do any more than sink a splintered 20th century framework into the quagmire of an old order that brims with tragic potentiality" [22]. This reflected a philosophical divergence, but it also underscored a key weakness in the prevalent model of technical support. The experts of donor countries were often not well-equipped to share and reproduce the "store of technical knowledge." When the users of health intervention models and other technologies failed to communicate directly with scientists and engineers who developed them, new tools were imported without any ability to put them into practice—or any sense of whether they would in fact be useful [23]. The problem was particularly acute in the poorest settings: "Two of the essential elements are the utilization of local knowledge, and the participation of the local people in the whole process" [24].

By the late 1970s, with poor and affluent countries alike caught in a major global recession, there was a widespread sense that the post-war development regime had come to a dead end. "The most basic needs of nearly one billion people remain unmet," a critic wrote, noting with many others that although technological and resource capacity to address these needs existed, a lack of political will was hindering the response [25].

Poor countries increasingly sought to take matters into their own hands. The Buenos Aires Plan of Action was written by 45 national ministers and high-ranking development planners in 1978. It advocated "South–South" or "horizontal" models of technical cooperation as an evolutionary shift in international relations. Horizontal technical support was seen as the core of a new international economic order, "a vital force for initiating, designing, and organizing" relations between developing countries [26]. Analogous to the "positive deviance" approach in community health, South–South partnerships aim to capitalize on the similarities between developing countries and to promote the systematic analysis and implementation of success-

ful approaches [27]. As the Iron Curtain crumbled and aid budgets plunged, formerly devoted advocates of top-down development endorsed the new spirit of horizontal technologization. Even W.W. Rostow, a key early advocate of the vertical development model, took note of the horizontal trend in his preface to the third edition of *The Stages of Economic Growth*: “Countries in the drive to technological maturity are closer to the early phases of development and should be able to provide effective technical assistance” [28].

Like the Alma-Ata Declaration on primary health care (also in 1978), action on the Buenos Aires document was slow. Balance-of-payments crises, debt defaults, high interest rates, and low world prices for commodities absorbed the attention of governments in developing countries during the 1980s and reduced their latitude for action. Even Argentina did not establish its official technical support agency, the Fondo Argentino de Cooperación Horizontal, until 1992 [29]. As of the mid-1990s, the UN Development Program found that developing countries tended to devalue horizontal technical advice despite its far lower costs, and that the UN system had failed to promote or fund it adequately, due to “its underlying orientation and pervasive institutional culture in favor of traditional technical cooperation activities.” They recommended that each country with the capacity to do so follow the Argentinean model of a special unit for horizontal technical support with administrators competent to oversee the necessary contractual relationships [30].

AID EFFECTIVENESS AND TECHNICAL SUPPORT IN GLOBAL HEALTH 2000–2012

After aid flows rebounded from the end of the Cold War, a notable investment was made in development assistance for health by bilateral, multilateral, and private sector agencies [31–33]. From US\$5.6 billion in 1990, global development assistance for health increased to more than US\$21 billion in 2007 [34]. This increase was paralleled by expansion in the number of global health organizations and initiatives [35].

To the frustration of many stakeholders, however, a significant amount of development assistance for health never arrived in the recipient countries. From the earliest days of the post-war international aid regime, experts in developed

countries were the direct recipients of most grants for the implementation of global health projects. After excluding supranational organizations such as global health partnerships and intergovernmental organizations, 82% of grants from the Gates Foundation between 1998 and 2007 went to US-based organizations, 13% to recipients in Europe and other high-income countries, and only 5% to recipients in low- and middle-income countries [36,37].

Technical support continued to account for a significant proportion of grants for development activities in developing countries. In 2003, US\$18 billion was allocated to technical aid—more than one-quarter of all contributions [38]. Critics argued that although many external consultants and contract technical support organizations lacked expertise on matters of contextual importance and failed to deliver adequate return on investment, they were nonetheless prioritized over national researchers and implementers. External consultants were less likely to feel responsible to ensure improvements in capacity; indeed they had perverse incentives to maintain their usefulness and relevance at a given project location. Meanwhile, they were impeding government personnel and other national staff from developing their own skills in the assumption that external experts would always be available, while duplicating activities by the establishment of parallel institutions [39,40].

At high-level global forums on aid effectiveness in Paris (2005) and Accra, Ghana (2008), participants focused considerable attention on the need to strengthen, rather than undermining, countries’ own institutions and systems for technical support, and their local expertise. Echoing 30 years of advocacy on behalf of South–South cooperation, the Accra Agenda reimagined the project of development as a horizontal partnership rather than a vertical transfer, with an emphasis on building technical skills. Poor countries were urged to “systematically identify areas where there is a need to strengthen the capacity to perform and deliver services at all levels—national, sub-national, sectoral, and thematic,” and to design their own strategies for addressing these deficits. Capacity development was to be demand-driven rather than supply-driven and was to support country ownership. To that end, donors and recipients would jointly select and manage technical cooperation and promote local and regional experts as consultants [41].

The experience of the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) pro-

vides a good illustration of some of the forces that have shaped technical support in the health sector. Established as a financing instrument, with a mandate only to provide funding, the initial vision was for GFATM financing to flow seamlessly into existing national programs, with a host of partners (both domestic and external, whether multilateral, governmental or from civil society, and the private sector) contributing any technical support needed to make the programs function effectively [3].

According to a 2005 external review [42], this approach suffered from—and revealed—several problems in the international architecture of technical support.

Inadequate capacity among providers. In many cases, the partners that were supposed to be providing the accompanying technical support were not ready to scale-up their activities. There was no international agreement on who should do what and where, nor were there any mechanisms in place at the global level to ensure coordination among providers. At the country-level, there were typically several structures that could play this role. In general, however, they were not adequately involved in the process of identifying technical support needs and matching these with providers due to confusion over roles and mandates, capacity deficits, and a lack of willingness on the part of some providers of technical support to engage in collaborative endeavors (a tendency that was perhaps exacerbated by the competitive market approach fostered by the Global Fund).

Inadequate coordination between providers and funders. Initially, the link between Global Fund financing and technical support providers was not smooth. In the first several rounds of Global Fund financing, there was a lack of clarity about whether Global Fund resources could be used to finance technical support, meaning that few countries included discrete budget requests for it. Although this was subsequently clarified, budget requests for technical support continued to be minimal. Even when dedicated financing was received, the market-based approach of enabling countries to shop around and buy-in technical support did not immediately work as well as hoped. This seemed to be at least in part because the fundamentals necessary to make the market function had not been established. In particular, stakeholders at country-level were often poorly acquainted with organizations able to provide technical support (and their strengths and weaknesses). Further, a country-driven approach often did not adequately fund global

public goods [43,44]. Global or cross-country activities—such as normative work or the sharing of lessons learned—were typically not reflected in the planning process of individual countries.

To address problems with the financing of technical support, several other organizations, including the German Agency for International Cooperation (GIZ) and the World Bank, directly financed the provision of technical support related to Global Fund grants. Despite this, some providers of technical support—particularly WHO and the Joint United Nations Programme on HIV/AIDS (UNAIDS) and to a lesser extent bilateral organizations—argued that the advent of the Global Fund created an “unfunded mandate” that obligated them to provide additional assistance without adequate additional resources [3].

Inadequate funding for needs assessment. There was initially no systematic way to identify which countries required technical support in the event that the countries themselves did not detect problems and to ensure that technical support was being provided to address them. In the early days of the Global Fund, as in the NCD area today, this manifested primarily around the provision of support for the preparation of proposals. The problem was largely resolved through a combination of initiatives by countries themselves (the potential availability of resources making them more willing to seek outside assistance) and of analyses by the Global Fund, WHO, and UNAIDS enabling technical support to be targeted to the countries that were having difficulty preparing high-quality proposals.

However, identification of problems in the course of implementation went less smoothly, and the results were seen as countries started to reach the first major evaluation point (Phase 2). A number of countries experienced difficulties severe enough to jeopardize additional financing in the Global Fund’s performance-based funding system, requiring the formation of an “Ad Hoc Working Group on Technical Support” [45]. In 2005, the World Bank was forced to provide an emergency International Development Association credit for technical and implementation support to permit the use of a Global Fund grant for HIV/AIDS. In another instance, the UK Department for International Development was compelled to second its own staff members to the Global Fund to monitor Global Fund-supported projects [46].

Following the Paris Declaration on Aid Effectiveness (March 2005), UNAIDS convened an expert panel to help improve management and

implementation of HIV-related country programs. It discovered surprisingly few thorough evaluations of the technical support needed to meet targets such as the Millennium Development Goals and the “3 by 5” Initiative for scale-up of antiretroviral treatment. Monitoring and evaluation were often “add-ons appended to plans by specialists,” rather than being an integral part of the broader planning process [47]. Countries such as Rwanda echoed this critique, pleading with donors and their technical advisors for a single set of training, evaluation, and reporting frameworks, whose proliferation was causing miscommunication and wasted resources.

In retrospect, the social structure of international development projects would seem to have been undermining their effectiveness. Instead of leveraging local knowledge and capacity for technological change, donors were once again succumbing to the overreliance on consultants from high-income countries that had haunted the international aid regime since the 1950s.

Late in 2005, UNAIDS began to experiment with “technical support facilities” (TSF), small management teams hosted by existing regional institutions. Covering some 80 countries in Eastern, West-Central, and Southern Africa; Southeast Asia; and South Asia–Oceania, the TSF arranged training and support for over 2000 national and regional consultants and country partners between 2005 and 2011. With the aid of this new mechanism, US\$1.7 billion in Global Fund grants were disbursed and 59 countries were helped to develop national strategic or operational plans. Of 125 technical support assignments, 85% were undertaken by consultants from the same country or region, helping to develop local capacity and reducing costs [48].

The TSF are a novel manifestation of the broader trend toward endogenous or “triangular” technological change. Brazil’s successful maternal milk bank program for combating infant mortality has been adapted by several Latin American countries [49]. In 2009, Ecuador and Bolivia collaborated on a dengue fever surveillance project that focused on epidemiologic surveillance, outbreak control, and community participation [50]. Between 2008 and 2011, Mexico provided technical assistance and consulting services to facilitate the implementation of the National Care Model for Children’s Mental Health in Costa Rica [49]. The Argentine Republic collaborated on a project on capacity development for the provision of health services provided to the Labor and Public Office

Ministry of Niger between 2007 and 2009 [50]. Cuba’s specialized vaccine producers (Finlay and Heber Biotec) partnered with the Egyptian national vaccine production facility to improve capacity in the field of selected vaccine manufactures [51]. There has also been knowledge-sharing between Brazil and Ghana, as well as other African countries, on “conditional cash transfer” programs and other similar initiatives [52]. The government of India is now partnering with the African Union member states to develop a Pan African e-network for medical services and human resources [53]. Not least, ministries of health in the Bahamas, Barbados, Belize, Guyana, Jamaica, and Trinidad and Tobago have begun a joint collaboration on the surveillance of NCD within their territories through the development of a Caribbean Regional NCD Surveillance System [50].

These government activities are increasingly complemented by health policy institutes in low- and middle-income countries. Many such think tanks were initially established with state funding but now contribute independently to health policy agenda setting, implementation, monitoring, and evaluation. A recent article by Bennett *et al.* [54] offers 6 detailed case studies of health policy think tanks in Bangladesh, Ghana, India, South Africa, Uganda, and Vietnam—ranging from nongovernmental organizations, to university institutes, to government-owned entities—finding them quite effective as drivers of policy development through advice to decision makers and policy-relevant research. The INSouth website [55], meanwhile, has catalogued over 80 independent or quasi-governmental think tanks in developing countries, along with 118 intergovernmental agencies dedicated to technical collaboration on urgent policy questions.

A NEW MODEL FOR HORIZONTAL TECHNICAL SUPPORT?

By examining the modern history of technical assistance, we are able to see the project of development along a very different trajectory, and even to alter the strategies that we pursue. The 3 years since the Accra conference have seen a marked intensification in what is termed South–South cooperation, reflected among other places in the General Assembly’s Political Declaration on NCD itself (Sect. 48) [1]. Recent research demonstrates that developing countries have been active in such exchanges throughout the last century

[56]. This runs counter to longstanding modernist problematizations of development. In 1960, when the Cold War hot spots of Eastern Europe and Central and Southeast Asia still accounted for 79% of US ODA, Rostow used public health as an example of the homeostasis that enforced his invariant 5-part sequential model of economic and social change. It is, he argued, “virtually impossible for responsible leaders to reject measures . . . that will lengthen life but put pressure on the food supply.” Moreover, he warned, “Societies that deny themselves modernization also leave themselves open to intrusion, and soon or late they may be driven to accept the world of modern technology” [28].

From Rostow’s time to our own, however, the urgent question has not been whether governments and other stakeholders should embrace modern technological organization, but according to what specific model and under whose auspices. Narratives in which modern, developed nations of the global North were able to “close the book on infectious disease” (in contrast to infection-plagued regions of the global South) became routine by the 1960s, reaching their height in the widely cited abstract models of Egyptian demographer Abdel Rahim Omran. Like Rostow, Omran [57] argued that all societies in the modern world go through three consistent stages of development: an “Age of Pestilence and Famine” with average life expectancy at birth under 40 years; an “Age of Receding Pandemics” in which life expectancy increases to about 50 years; and finally, an “Age of Degenerative Diseases” as biomedicine and improved living standards outrun microbial pathogens and lifespans have increased so much that people are more likely to die from chronic diseases and NCD than infectious ones.

Omran’s theory of an epidemiologic transition was proposed in 1971, when many felt that progress against smallpox, measles, and tuberculosis through mass vaccination and pharmacotherapy made it possible to shift funding either toward treating cancer, heart disease, diabetes, and other NCD (in wealthy countries) or toward population control programs (in poor ones) [58,59]. Yet, over the last 3 decades, it has become clear that the advocates of development and modernization overstated the inevitability and impact of these processes. There is no “post-infectious world,” and all societies are not progressing along a single epidemiological path. From the vantage of Mexico 2 decades ago, Frenk and colleagues [60,61] recog-

nized that for middle-income countries with both communicable and noncommunicable disease burdens, this narrative simply did not hold.

Frenk’s critique of the idealized epidemiological transition in favor of a complex process of health transitions would become all the more significant by the early 21st century, when the double burden of infectious diseases and NCD became evident even among the poorest nations. As the first comprehensive NCD interventions are undertaken in countries such as Haiti and Rwanda, this picture has become still more complex; major chronic diseases that characterize high-income settings, such as cardiovascular diseases, diabetes, cancer, respiratory illnesses, and mental illness, are to be found both in middle-income settings and low-income countries—but their etiology is often quite discrepant.

Rwanda offers an excellent illustration of how the Non-Aligned Movement’s conceptual framework of South–South technical cooperation breaks down in the context of actual health interventions. Despite strong economic growth over the past decade, more than 50% of the country lives on less than a dollar a day [62]. In findings summarized by the Rwanda 2007–2008 interim Demographic and Health Survey (DHS) more than 80% of the Rwandese population lives in rural areas, and the 2002 census showed that roughly 80% of the population worked in the agricultural sector [63]. The 2005 DHS documented a relatively low prevalence and intensity of tobacco use (4.6% in women aged 15–49 years and 21% in men aged 15–59 years) [64,65]. A population-based cancer registry from the Butare prefecture between 1991 and 1994 found that only 5% of identified malignancies could possibly be attributed to tobacco use [66]. The 2005 DHS found that whereas only 10% of women aged 15–49 years in rural areas had a body mass index consistent with overweight (≥ 25 kg/m²), 20% of this population had a body mass index consistent with malnutrition (≤ 18.5 kg/m²).

Given the currently low level of tobacco use in Rwanda, the high proportion of labor-intensive subsistence farming, and the high rate of malnutrition, the country’s endemic burden of NCD almost certainly reflects the impact of infection, cooking-related pollution, and gaps in some health services, rather than those risk factors normally associated with lifestyle-related diseases.

Like many other low-income countries, the challenge confronted by Rwanda in intervening against epidemic and endemic NCD is magnified by not only poverty and its recent history of state

violence and social upheaval, but also by resource deprivation in all aspects of the health sector. Yet, over the past 5 years, Rwanda has cut infant mortality in half by preventing and treating the top infectious killers—malaria, tuberculosis, HIV/AIDS, respiratory infections, and diarrheal diseases. Now it is rolling out the first national strategic action plan for NCD in a low-income country, decentralizing to the district and health-center levels an innovative service integration model that trains or augments existing healthcare resources (e.g., HIV/AIDS accompagnateurs) to deliver NCD interventions [67].

To Rwanda's public health experts, the experience with HIV made clear that approaches to prevention, care, and treatment must be integrated with each other and with comprehensive primary care from the start. Integration, they found, is the key to sustainability and program flexibility in the face of complex dynamics in global health funding and policy. Thus, their approach to NCD control built on and was integrated with communicable disease management programs.

Over the last 12 months, aid from the Rockefeller Foundation has allowed Rwanda to offer bilateral technical support on health financing and child and maternal health to Congo, Tanzania, Swaziland, Bangladesh, Togo, Sierra Leone, Nigeria, Benin, the Comoros, and Chad. Like other government departments, the Health Ministry recently established a "Single Project Implementation Unit" to oversee execution, monitoring, and reporting of externally financed projects in keeping with the Paris Declaration and the Kigali Statement of Action adopted at the 9th Government of Rwanda and Development Partners Meeting in 2010. The Single Project Implementation Unit currently manages more than \$500 million in grants from Rockefeller Foundation, the World Bank, UK Department for International Development, and German Agency for International Cooperation, among other donors. The Global Fund's March 2011 audit of its funding to Rwanda found tight control over the quality of grant progress reports, strong government commitment, involvement and leadership in planning, implementing and providing oversight of the programs, and impressive program achievements. Rwanda was rated in 2011 as the least corrupt country in East Africa in Transparency International's Corruption Index; 1 of only 3 African countries to make the top 50.

Countries classified as low-income have been recent recipients of so-called South–South techni-

cal support, but rarely if ever initiators. The material bar to such collaboration has been too high. The standard model of horizontal cooperation requires a significant opportunity cost to participating government agencies as well as an up-front material outlay. Yet, given adequate external funding, Rwanda's government personnel can serve as the catalyst of truly collaborative and durable technical alliances.

CONCLUSIONS

Increasing burden and awareness of NCD in the developing world present the international system with a challenge no less important than the one it faced a decade ago with HIV/AIDS. Untreated heart disease, cancer, diabetes, and other NCD can shorten the average life expectancy by much as 20 years in many settings, but equipping health systems with the means to prevent, treat, and monitor them is a daunting task. Nonetheless, the technologies to do so exist. The question is whether they will be adapted and shared. That would require an evolutionary step in the international aid regime.

Rwanda's leadership has emphasized to development partners the importance of "sustainable and dignified" aid that avoids dependent relationships, facilitating popular participation and private sector involvement [68]. In keeping with these priorities, a Rwanda-based initiative for horizontal technical support in the NCD sector might supply, for example, a temporary funding stream allowing work with other low-income countries to produce multisectoral NCD strategic plans adapted for circumstances on the ground. Simultaneously, it would train Rwandan personnel in norms and procedures of international consulting, allowing them to participate fully in the regional consulting market—at which point, the horizontal cooperation unit would be self-sustaining.

Such a project would widen the market for technical support and provide a novel public–private model in the health sector; nor need low-income countries be the only beneficiaries. Many wealthy nations now look to Bangladesh, India, and Rwanda for lessons on high-value delivery of care for infectious disease. A Rwanda-based horizontal cooperation unit focused on strategic planning for NCD could offer a viable mechanism for reverse innovation from poor countries to more affluent ones, bringing the 60-year project of development full-circle.

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