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Cancer in Sub-Saharan Africa:
The Need for New Paradigms in Global Health

Maia Olsen



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ABSTRACT

Cancer now ranks as the leading cause of death globally, outpacing mortality rates for HIV/AIDS, malaria, and tuberculosis combined. Cancers and other non-communicable diseases (NCDs), in particular, are quietly taking center stage in many low- and middle-income countries in sub-Saharan Africa and worldwide, and these countries are projected to carry as much as 80 percent or more of the global cancer burden by 2030. Yet, there are severe inequities in the response to this burden, and many patients diagnosed with cancer are unable to access comprehensive cancer care simply because of where they live. In policy and advocacy circles, cancer is often seen as too challenging and expensive to treat in low resource settings, and funding and priority-setting for cancer has fallen substantially behind the current disease burden in sub-Saharan Africa. This is an often repeated narrative in global health, with the HIV/AIDS epidemic serving as an especially telling example of how inaction can fuel the costly spread of disease. However, the global HIV/AIDS response has broken the cycle of inaction and achieved impressive successes in expanding access to treatment, even in the poorest regions of the world most in need of support. The trajectory of the HIV/AIDS epidemic in sub-Saharan Africa and its international response can provide critical lessons for the future of political advocacy, funding, and treatment delivery for cancer in low- and middle-income countries worldwide. This paper examines these lessons for cancer in the context of new international agenda-setting priorities such as the post-2015 Sustainable Development Goals, and discusses the feasibility of providing cancer treatment in sub-Saharan Africa.

ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AORTIC	African Organization for Research and Training in Cancer
APCA	African Palliative Care Association
ARV	Antiretroviral therapy
CANSA	Cancer Association of South Africa
DAH	Development assistance for health
EBV	Epstein-Barr Virus
EVD	Ebola Virus Disease
FCTC	Framework Convention on Tobacco Control
Global Fund	Global Fund to Fight AIDS, TB, and Malaria
GO	Global Oncology, Inc.
GTF.CCC	Global Taskforce on Expanded Access to Cancer Care and Control
HIV	Human Immunodeficiency Virus
IAEA	International Atomic Energy Agency
IARC	International Agency for Research on Cancer
IHME	Institute for Health Metrics and Evaluation
MDG	Millennium Development Goals (2000-2015)
MSF	Médecins Sans Frontières
NCDs	Non-communicable diseases
NCI	National Cancer Institute (United States)
NGO	Non-governmental organization
PEPFAR	President's Emergency Plan for AIDS Relief (United States)
SDG	Sustainable Development Goals (2015-2030)
TB	Tuberculosis
TPP	Trans-Pacific Partnership
UCI	Uganda Cancer Institute
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
USAID	United States Agency for International Development
WHO	World Health Organization

With the outbreak of Ebola virus disease (EVD) in Guinea, Sierra Leone, and Liberia in 2014, the global health community has been reminded of an infectious disease story that we know well. Throughout global health and international development, infectious diseases and intense, fear-inducing epidemics such as Ebola and HIV/AIDS, have been identified as the defining health issue for sub-Saharan Africa and low-income countries worldwide. After the first Ebola case was identified in Guinea in March 2014, the outbreak was initially met with a slow and insufficient response by the international community and diagnoses quickly escalated throughout countries unequipped to control and treat the virus, resulting in high mortality, and further overwhelming already fragile health systems across West Africa (Dahn, Mussah, and Nutt 2015, Alexander et al. 2015). By the summer of 2015, however, a substantial amount of global investment had been directed towards curbing the Ebola epidemic and case rates fell dramatically. Much remains to be done, and each of these countries have begun to work with various partners on the ongoing challenge of rebuilding health infrastructure in affected communities throughout the region (Save the Children 2015).

Like Ebola, HIV/AIDS highlights this well-known and often repeated narrative in global health — the costly spread of deadly epidemics fueled by inaction. But HIV/AIDS — and to a certain extent, Ebola — also highlights the impressive outcomes that can be realized when appropriate attention is paid, especially in neglected regions of the world most in need of support.

While conventional wisdom within global development consistently places infectious diseases such as Ebola and HIV/AIDS at the forefront of funding and advocacy efforts in both national and international settings, a story in global health that has rarely hit headlines is that of cancer and chronic diseases. A pernicious myth exists regarding cancer control in sub-Saharan Africa: in the midst of health crises surrounding well-known infectious diseases associated with poverty such as HIV/AIDS, Ebola, or malaria, cancer is considered by many to be neither a substantial problem in Africa, nor a problem that can be effectively addressed in a low-resource setting. Yet, rising burdens in cancer and other non-communicable diseases (NCDs) have gone largely overlooked in sub-Saharan Africa and the developing world, and these diseases are quickly en route to becoming the next overwhelming challenge for international health and development in the longer-range future.

With cancer in particular, the global health community appears to be repeating history. Although cancer represents a challenging set of diseases to treat and

a difficult patient experience regardless of where a patient might live, where a patient might live has a direct impact on whether his or her cancer will be treated at all. For many patients in low-income countries throughout sub-Saharan Africa, even a treatable cancer diagnosis is often a death sentence. In the face of myriad competing problems, the global health community has simply accepted this fate for millions of cancer patients worldwide. Similar to voices that stalled the initial implementation of an HIV/AIDS response in low-income regions like sub-Saharan Africa, and consistent with others that questioned whether the recent Ebola crisis was one that the international community should engage in, some development experts have raised concerns regarding the feasibility of a global cancer response; cancer has been deemed too challenging to address in low-income countries. Expanding access to cancer treatment, in particular, is a mere blip on the vast map of public health priorities in most low-income countries, especially in sub-Saharan Africa.

Yet, can lessons from infectious disease responses such as Ebola or the global AIDS movement be applied to the medically demanding complexities of care across various cancers? Considering the challenging interplay of infectious and non-communicable diseases in low-resource settings, how should the international development community prioritize prevention and treatment programs moving forward? Is there room for an expansion of integrated service delivery of cancer care across NCDs and within existing HIV/AIDS and infectious disease programs? Where does the experience of a cancer patient in sub-Saharan Africa fit within the post-2015 sustainable development goals agenda?

The paper examines the feasibility of providing cancer treatment in low- and middle-income countries in the developing world. In particular, it suggests ways in which the global HIV/AIDS movement can inform the future of political advocacy, funding, and treatment delivery for cancer in sub-Saharan Africa.

CANCER IN SUB-SAHARAN AFRICA: DISEASE BURDEN AND EMERGING TRENDS

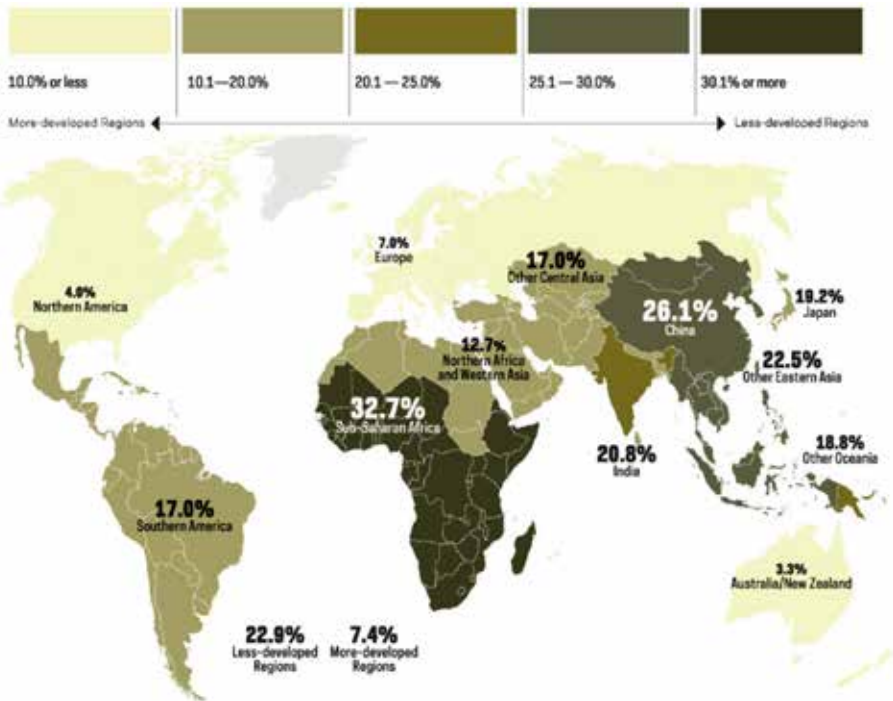
Empirically, cancer is a challenge for low- and middle-income countries. Cancers cumulatively now rank as the leading cause of death worldwide, outpacing mortality rates for HIV/AIDS, malaria, and tuberculosis combined (EIU 2009, Jemal et al. 2014). Low- and middle-income countries currently account for slightly more than half of all new cancer cases each year (Boyle and Levin 2008) and these countries are projected to carry as much as 80 percent or more of the global cancer burden by 2030 (Farmer et al. 2010). At the same time, only five percent of all global resources being spent on cancer are allocated in lower income countries, contributing to severe inequities in cancer treatment worldwide (Knaul, Frenk, and Shulman 2011). If current trends remain unaddressed, rising rates of cancer will continue to inflict a substantial impact on the health and socioeconomic stability of sub-Saharan Africa.

There are many explanations for upward trends in cancer prevalence in Africa. In part, the rising rates of cancer can be explained by the epidemiological transition currently taking place in these regions. As many health initiatives and programs throughout sub-Saharan Africa have been successful in reducing preventable death from infectious diseases such as HIV/AIDS and tuberculosis, many Africans are living longer and are more likely to be diagnosed with both endemic and emerging non-communicable diseases like cancer (Lingwood et al. 2008). Changing lifestyle practices as a result of globalization have also been key in terms of transitioning disease burdens (Sasco 2008). Lifestyle risk factors such as increased tobacco and alcohol use, sedentary lifestyles, and unhealthy diets are common exposures for many priority cancers and will likely be major influences in the projected increase in cancer rates in low- and middle-income countries over the next few decades (American Cancer Society 2011, Jemal et al. 2014). Outdoor air pollution and increased exposure to carcinogenic contaminants from occupational risks and increased industrial production in urban settings are also expected to be major players in rising cancer rates throughout the African continent (NCD Alliance 2012).

Although increased urbanization and lifestyle-related risk factors may play an increasingly substantial role in the cancer narrative in sub-Saharan Africa, these pathologies do not entirely account for the disease burden in the developing world, especially among poor populations in low-income countries (Bukhman and Kidder 2011). In resource-limited settings, often a very different burden of disease and risk factor profile is prevalent. For instance, as a recent American

Cancer Society *Cancer Atlas* map illustrates (Figure 1), approximately 33 percent of all cancers diagnosed in sub-Saharan Africa were due to infectious agents, a percentage substantially larger than many other geographical regions (Jemal et al. 2014). Infectious diseases continue to be a leading risk factor for many of the most common cancers in low-income populations, resulting in cervical cancer diagnoses due to human papilloma virus (HPV) exposure, bladder cancer due to complications of schistosomiasis, liver cancer due to untreated hepatitis B infection, and Kaposi’s sarcoma and various lymphomas associated with HIV (American Cancer Society 2011). Other exposures related to poverty are at play as well, such as poorly ventilated indoor cooking stoves resulting in an increased risk of lung, nasopharyngeal, and esophageal cancers in populations with otherwise low tobacco smoking rates (Gordon et al. 2014).

Figure 1. Fraction of New Cancer Cases Attributable to Infection in 2008, by Region



Source: The Cancer Atlas, Second Edition (Jemal et al. 2014)
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Because data on cancer is often given as a combined figure, however, these projected data points highlighting rising incidence do not adequately illustrate the complexities of addressing the multitude of cancers and associated risk factors present in the region. As Table 1 demonstrates, health care providers in sub-Saharan Africa must be prepared to receive patients with many different types of cancers, at very different stages of disease, each carrying different risk factors, clinical outcomes, and treatment options (Institute of Medicine 2007, Jemal et al. 2014). For instance, in 2012, the leading causes of death for men diagnosed with cancer in sub-Saharan Africa were prostate, liver, Kaposi’s sarcoma, and esophageal cancers (IARC 2012). Prostate cancer is most often attributed to genetic predisposition and is difficult to treat, but can be detected in early stages through screening interventions. Common risk factors for liver cancer include both alcohol use and untreated hepatitis B infection. While the etiology and severity of esophageal cancer in African men is not well understood, it is often attributed to tobacco use, indoor air pollution, and non-

Table 1. Leading Cause of Cancer Death in Sub-Saharan Africa and Associated Risk Factors (2012)

RANK	CANCER	MORTALITY	COMMON RISK FACTORS
1	Cervical	57,381	HPV infection
2	Breast	47,583	Genetic predisposition, reproductive patterns, alcohol and tobacco use, obesity, environmental contaminants
3	Prostate	37,802	Genetic predisposition, dietary patterns
4	Liver	37,353	Hepatitis B and C, alcohol use, schistosomiasis, aflatoxin contamination
5	Kaposi sarcoma	25,352	HIV infection
6	Esophageal	22,373	Dietary patterns, tobacco and alcohol use, indoor air pollution
7	Colorectal	21,076	Dietary patterns, obesity
8	Non-Hodgkin lymphoma	18,923	Immune deficiency, HIV, malaria, or Epstein Barr Virus (EBV) infection
9	Stomach	16,763	H. pylori infection, dietary patterns, anemia, tobacco use
10	Lung	14,143	Tobacco use, indoor air pollution

Source: IARC 2013, American Cancer Society 2011

diverse dietary patterns (American Cancer Society 2011). Kaposi's sarcoma in sub-Saharan Africa has largely been associated with later-stage HIV infection, and treatment generally requires availability of chemotherapy, surgery, or radiation options (American Cancer Society 2011).

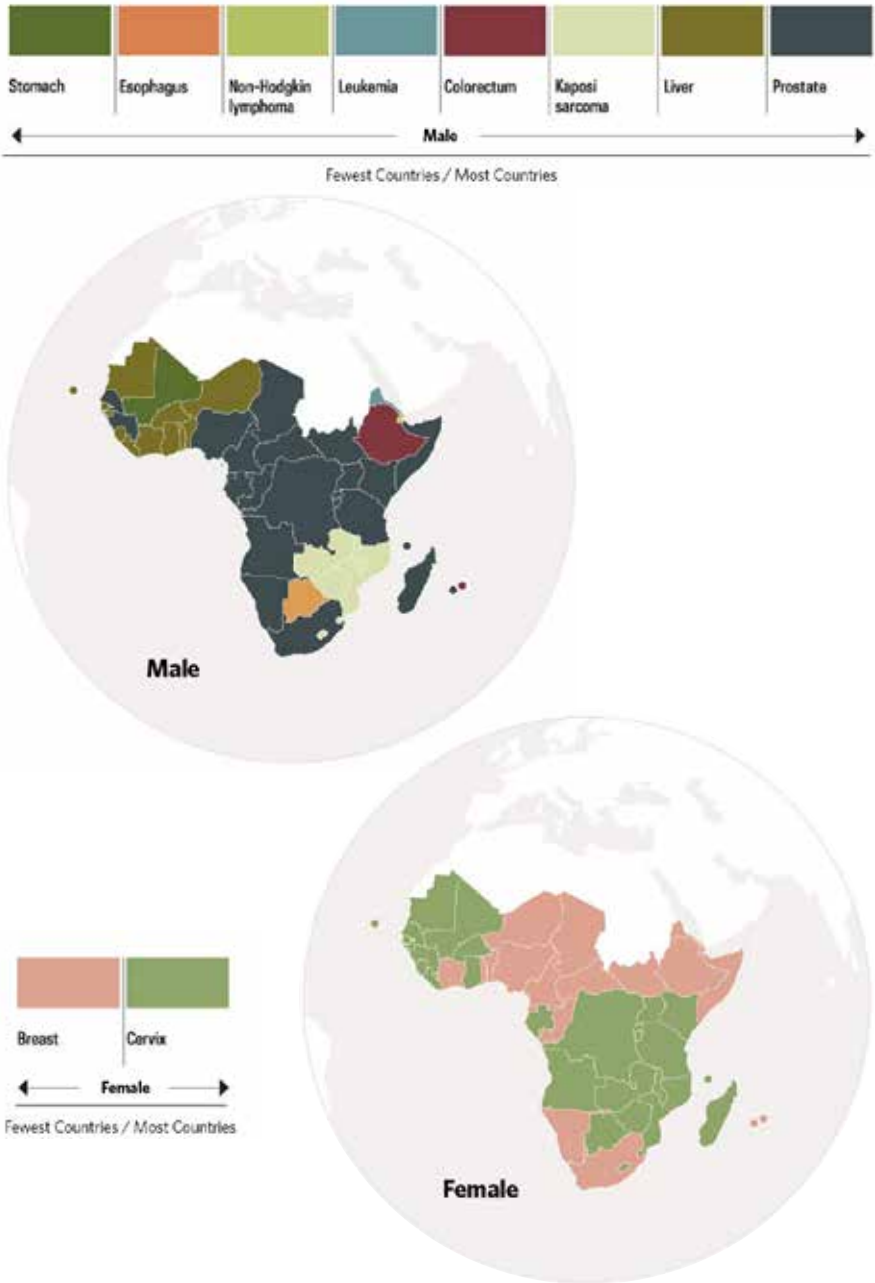
**...in the context of public health,
rising cancer rates pose a
particularly significant challenge
in resource-limited settings...**

In women, breast and cervical cancer are the leading cause of cancer deaths in sub-Saharan Africa (American Cancer Society 2011). Cervical cancer can be prevented cost-effectively by providing HPV vaccinations

to young women, and early detection programs using tested “see and treat” methods are important tools to reduce mortality in settings where treatment is available (Sahasrabudde et al. 2012). Breast cancer incidence is explained by a complicated mix of genetic predisposition, reproductive patterns, and lifestyle risk factors and can be difficult to treat at later stages, but like cervical cancer, treatment options such as surgery, radiation, and chemotherapy can be effective when cases are detected early (Institute of Medicine 2007).

As a mere subsection of the total cancer burden in sub-Saharan Africa, these six diseases alone illustrate the diversity and intricacies that come with addressing cancers at the population level. Across the entire cancer spectrum in sub-Saharan Africa, communities and patients require adequate coverage for not only prevention, early screening, and detection services, but also for varied and often complicated treatment needs, including surgery and radiation capabilities, drug delivery for chemotherapy and adjuvant drugs, as well as palliative care and end-of-life support (Kingham et al. 2013, Vento 2013). Largely due to the complexity of oncology as a medical field and in the context of public health, rising cancer rates pose a particularly significant challenge in resource-limited settings.

Figure 2. Most Commonly Diagnosed Cancers Per Country in Sub-Saharan Africa, Male and Female (2012)



Source: The Cancer Atlas, Second Edition (Jemal et al. 2014)
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Emerging trends in cancer incidence in sub-Saharan Africa are even more distressing considering that despite the existence of effective, low-cost cancer therapy, treatment coverage for cancers is nearly non-existent in many low-income countries (Kingham et al. 2013). In the years between 2000-2020, approximately 10 million patients are estimated to die of cancer in sub-Saharan Africa (Kerr, Milburn, and Arbutnott 2007). Although greater numbers of patients are diagnosed with cancer each year in higher income countries, a patient diagnosed with cancer in a low-income country is much more likely to die of their disease due to a later stage diagnosis, lack of access to treatment, and weak health care capacity (Kanavos 2006). Patients in poorer countries do not have access to effective community education, preventive services, screening and early detection, or adequate primary health care, and thus, tend to come to health centers and hospitals with late stage cancer diagnoses that are incredibly difficult to treat (American Cancer Society 2011). Often, these

... a response to cancer will be critical for the longer-range future of sub-Saharan Africa.

patients who have the greatest medical need have the least access to affordable treatment options and are unable to receive care (Maher and Ford 2011). As is the case with many diseases afflicting patients in low- and middle-income countries, cancer medications

are rarely provided at discounted rates by the government — thus, patients are faced with a choice between purchasing expensive cancer therapies, which contribute to catastrophic household health expenditures, or refusing necessary treatment due to exorbitant costs of therapy (Sambo et al. 2012). Medicines for non-communicable diseases like cancer also tend to require a greater economic burden for families due to their chronic or complex nature (Lage 2011).

Yet, currently, very little funding and policy attention is being directed at the emerging burden of cancer and non-communicable diseases in sub-Saharan Africa (Knaul, Frenk, and Shulman 2011). As infectious diseases such as HIV/AIDS and Ebola have consistently demonstrated, the costs of inaction for cancer in Africa will be enormous, in terms of both mortality and financial sustainability (Knaul et al. 2010). As cancer incidence and mortality rates continue to rise throughout the continent, many will struggle with the catastrophic costs of treatment and care, more and more people will be kept out of work, and poorer families will bear a disproportionate share of illness and suffering (Samb et al. 2010). Cancer and other non-communicable diseases threaten to exacerbate issues of poverty at the national level as well,

endangering economic productivity, burdening already fragile health systems, and markedly driving up health care costs (World Bank 2011). As a result, cancer control in Africa will require a broad, comprehensive response across a multitude of risk factors and diseases, ranging from less expensive, simpler interventions to more substantial investments in health infrastructure. Ultimately, cancer in sub-Saharan Africa reveals the interconnectedness in communicable and non-communicable disease burden in low-resource settings and the crucial role of effective health systems in preventing needless death.

Encouraging progress in HIV/AIDS and infectious disease control has had a substantial impact on the health profile of many low- and middle-income countries. However, infectious diseases considered more indicative of regions of poverty, such as HIV/AIDS, have not gone away and in some cases, even contribute directly to the burden of non-communicable diseases like cancer. Cancer, like HIV/AIDS, poses severe health and development threats to already limited national budgets and traditional funding and advocacy channels in global health (Boyle and Levin 2008). As a result, a response to cancer will be critical for the longer-range future of sub-Saharan Africa.

SETTING AN ADVOCACY EXAMPLE: HISTORY OF THE GLOBAL HIV/AIDS RESPONSE

Since the introduction of the HIV virus in the early 1980s, HIV/AIDS rapidly emerged as a devastating public health threat that has frustrated the international community and has decimated the health and development of low- and middle-income countries worldwide (El-Sadr, Holmes, et al. 2012). While the HIV/AIDS movement in the United States was characterized by early activism, attention to the rising global threat of HIV/AIDS in low-income countries in sub-Saharan Africa was slow to develop (El-Sadr, Morrison, et al. 2012). In the early years of the epidemic, HIV/AIDS had progressed relatively unchecked in poorer countries and HIV was initially met with little to no coordinated, comprehensive response in either national or international arenas (Broder 2010). Medically efficacious antiretroviral treatment (ARV) had been developed by the early 2000s, but therapy was only available at a high cost and many believed cost-effective scale-up of HIV programs in low-resource settings to be a pipe dream (Piot, Kazatchkine, et al. 2009). The chorus of international development experts echoed a familiar refrain: HIV/AIDS was too complicated and too expensive to treat globally,

especially in regions like sub-Saharan Africa (El-Sadr, Morrison, et al. 2012). Yet, some argued otherwise. For instance, at a Presidential Fellows Lecture to the World Bank in November 2003, Peter Piot, then the Executive Director of the Joint United Nations Programme on HIV/AIDS (UNAIDS) and Under Secretary-General of the United Nations, addressed the international community with these words about the epidemic: “Act now, or pay later. Africa has learned this lesson the hard way. Denial and ignorance do not reverse the epidemic” (Piot 2003).

From an advocacy standpoint, many momentous events aligned in the early 2000s, which helped propel HIV/AIDS in Africa to become a priority international development issue and a cause célèbre in global aid efforts. In January of 2000, the HIV/AIDS epidemic notably became the first emergency health issue addressed by a special session of the United Nations General Assembly (Goosby, Dybul, et al. 2012). In addition, the announcement of the Millennium Promise initiative in September 2000, operationalized as eight Millennium Development Goals (MDGs) expiring in 2015 (Figure 3), was a key policy moment for agenda-setting in global health that has had significant impacts on development agencies and non-governmental partners worldwide (Saith 2006, Kim et al. 2011). Due to the influence of then UN Secretary General Kofi Annan, reversing the spread of the HIV/AIDS epidemic became the central priority for MDG 6, which was later edited to include malaria, tuberculosis (TB), and other parasitic diseases (Hulme 2009). Largely due to the influence of the MDGs, HIV/AIDS has quickly emerged as a primary beneficiary of health funding and advocacy over the last fifteen years (Saith 2006, Shiffman 2008).

Figure 3. Millennium Development Goals, 2010-2015

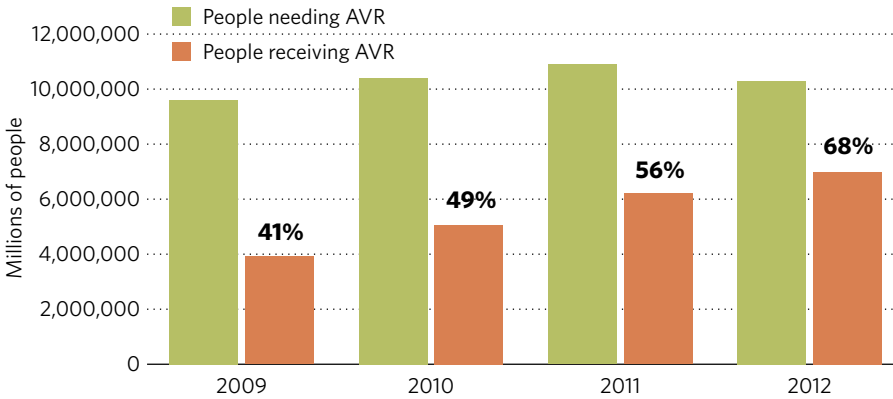


Source: United Nations

Funding for HIV/AIDS, like advocacy, has been propelled into the mainstream through the influence of a few groundbreaking aid initiatives. Launched in 2003 by President George W. Bush, the US Government's President's Emergency Plan for AIDS Relief (PEPFAR) pledged an initial \$15 billion to HIV/AIDS programming over five years and has since grown to become the largest bilateral aid initiative for a single disease in the developing world (El-Sadr, Holmes, et al. 2012). PEPFAR drove the global expansion of HIV treatment, and the world has changed dramatically for millions of HIV/AIDS patients in low-resource settings (El-Sadr, Morrison, et al. 2012). The Global Fund to Fight AIDS, TB, and Malaria, founded in 2002, has been another prominent leader in the international community (Tan, Upshur, and Ford 2003). The Global Fund exists exclusively as a funding agency, receiving funds from aid agencies and private donors which are then allocated to governments and non-governmental organizations (NGOs) implementing HIV/AIDS programs in low- and middle-income countries (Maciocco and Stefanini 2007). UNITAID, a financing mechanism that is primarily supported through an international levy on air ticket sales, also emerged in the early 2000s, again focusing efforts on extending access to medicines and equipment for HIV/AIDS, malaria, and tuberculosis (Atun, Knaul et al. 2012). Like PEPFAR and the Global Fund, UNITAID has become one of the most innovative and influential development funding platforms currently in existence worldwide (Hulme 2009, Atun, Knaul, et al. 2012).

The global HIV/AIDS response provides one of the strongest, if still imperfect, models for supporting the expansion of treatment in low-resource settings. The rollout of antiretroviral treatment for HIV in low- and middle-income countries has resulted in substantial policy shifts in various arenas related to access to medicines, including in the pharmaceutical industry, international trade law, drug delivery systems, and health system infrastructure. The production of generic antiretroviral medications has dramatically reduced the cost of HIV treatment and substantially improved affordability for patients in low-resource settings (Maher, Ford, and Unwin 2012). In 2012, approximately 9.7 million patients worldwide received antiretroviral therapy for HIV, and the global percentage of patients covered by treatment continues to rise (UNAIDS 2013a). As HIV medications have become more available and more affordable in the developing world, HIV/AIDS has transitioned from an acute disease to a manageable, chronic condition for many patients and communities (see Figure 4). Access to HIV treatment in sub-Saharan Africa looks completely different than it did 15 years ago because of political will and financial resources leveraged by international partners and national governments (Steinbrook 2007).

Figure 4. Percentage of People Living with HIV Who Are Receiving AVR Therapy in Sub-Sahara Africa, 2009–2012



Source: UNAIDS 2012, 2013a, and 2013b

LESSONS FROM HIV/AIDS

Although its many successes are well known throughout international health circles, the HIV/AIDS response in sub-Saharan Africa also highlights the ruinous consequences of inaction and inefficiencies in development approaches and advocacy. As with HIV/AIDS and other infectious diseases like Ebola, an insufficient response to cancer in the developing world will result in widespread preventable death and suffering in countries throughout sub-Saharan Africa (Mills and Ford 2012). Thus, a look at how the HIV/AIDS movement overcame an initial lack of urgency and emerged as a priority issue in global health offers important lessons for the future of cancer in the developing world.

The Importance of Advocacy, Funding, and Coalition Building

One of the most meaningful lessons from the international AIDS response is the importance of broad participation and coalition building around a global call to action. As a result of a unifying commitment like the Millennium Development Goals agenda and through the leadership of centralizing organizations such as the Global Fund and UNAIDS, international HIV/AIDS advocacy was able

to build an impressive multi-stakeholder effort that helped to address various aspects of the epidemic (Farmer et al. 2010). The MDGs were designed to be simple, easy to communicate, and measurable, and as a result, have become a rallying cry for the global health and development community (Global Thematic Consultation on Health 2013).

Since the formation of the MDGs, the international community has successfully framed HIV/AIDS as a broader issue critical to international security, economic sustainability, and human rights (Lamptey and Dirks 2012); this approach has significantly broadened support for HIV/AIDS in terms of both high-level political backing and bilateral aid commitments (Woodling, Williams, and Rushton 2012). In the same vein, a focus on social issues related to the epidemic — including the rights of poor and marginalized communities and the ethical imperative to broaden access to antiretroviral medication — has captured the attention and commitment of human rights agencies, international NGOs, and community-based organizations throughout sub-Saharan Africa (Lamptey and Dirks 2012). Support across bilateral, multilateral, private sector, and civil society actors has fueled a sizeable international advocacy movement which has contributed to the success of HIV/AIDS programming and technical assistance across the developing world (Narayan et al. 2011, Goosby, Von Zinkernagel, et al. 2012).

HIV/AIDS also provides an instructive example of a remarkable funding success in global health.

HIV/AIDS also provides an instructive example of a remarkable funding success in global health. In just a few years, HIV/AIDS has become one of the most well-funded health issues of all time (El-Sadr, Holmes, et al. 2012). A committed coalition of donor partners has helped to inspire greater participation and responsibility in national, regional, and international settings (Lamptey et al. 2011). While agencies like PEPFAR and the Global Fund are certainly not without their critics, many have argued that centralized funding mechanisms like these have reshaped global health infrastructure for the better, especially in low-income countries (El-Sadr, Morrison, et al. 2012).

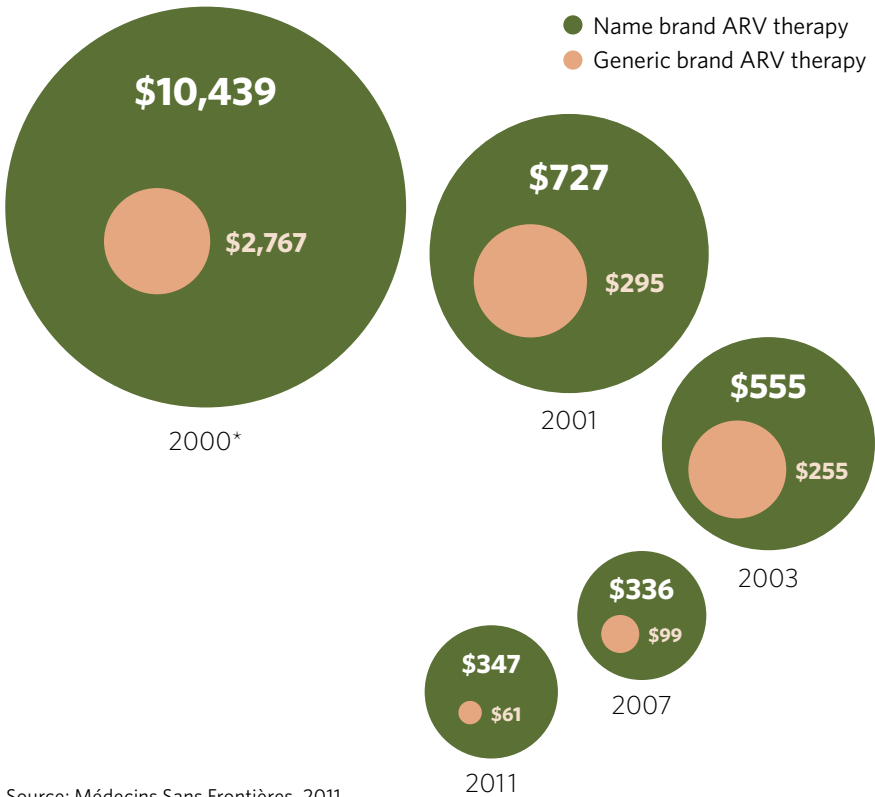
Evidence-based Programs to Cost-Effectively Expand Access to Treatment

Organizations and advocates central to the international HIV/AIDS response have continually placed emphasis on evidence-based approaches (Achmat 2006). Through these efforts, the HIV/AIDS movement has highlighted the importance of data in driving policy and advocacy decisions — both in terms of quantifying

the imperative for a strong public health response for communities in need, and in demonstrating the feasibility of sustainable solutions in low-resource settings (Broder 2010). Although there have been a slew of missteps since the broader implementation of HIV/AIDS programming in sub-Saharan Africa, the HIV/AIDS movement should also be lauded for the development of tested service delivery strategies. For instance, task shifting interventions focused on training nurses to include higher-level medical tasks into their workload have been highly effective in addressing gaps in medical care across a variety of disease programs, especially in low-income regions with an insufficient health workforce (Oti 2012). Similarly, numerous HIV/AIDS initiatives have been built on successful community-based strategies, using trained community health workers to provide patients with better access to prevention, screening, and follow up services necessary for consistent chronic care (El-Sadr, Holmes, et al. 2012).

The HIV/AIDS movement is also well known for changing the face of drug delivery in low- and middle-income countries where the prohibitive cost of necessary antiretroviral medications stood squarely in the way of access to care (El Sadr, Holmes, et al. 2012). Generics have become a key strategy to cost-effectively improve access to HIV medicines — by offering generic medications at a fraction of the cost of first-line therapy, national governments and aid agencies are able to reach many more patients worldwide and save hundreds of millions of dollars (Holmes et al. 2010). In particular, India has emerged as a major supplier to the generics industry, contributing more than 80 percent of antiretroviral medications to countries in sub-Saharan Africa, significantly improving global health, research, and development infrastructure on both continents (Steinbrook 2007). Due to facilitative policies targeted at reducing intellectual property law barriers for companies producing generic medications as well as expanding licensing options for low- and middle-income countries looking to improve access to medicines for their patients, the cost of the recommended first-line antiretroviral therapy for HIV has been reduced by nearly 99 percent from 2000 to 2010 (Hoen et al. 2011). Over the course of the epidemic, organizations like Médecins Sans Frontières (MSF) have observed these dramatic reductions in generic HIV medications (Figure 5), and have continued to advocate for pharmaceutical policies that encourage increased global access to antiretroviral therapy (MSF 2011).

Figure 5. Fall in Price of First-line ARV Medicines, 2000-2011 (in USD)



Source: Médecins Sans Frontières, 2011.

*2000 graphic not to scale.

The global HIV/AIDS movement has also successfully propelled innovative research and development collaborations, such as patent pools, to further enable access to essential medicines in low-income countries. For instance, the Medicines Patent Pool is a well-known example of innovative research infrastructure (Childs 2010). Sponsored by UNITAID and other international partners, the Medicines Patent Pool offers voluntary licensing agreements for first-line HIV medications to developing world manufacturers in exchange for royalties paid to patent holders in the pool (Hoen et al. 2011). These agreements greatly reduce the cost of medications and as of 2012, the Medicines Patent Pool has expanded access for 71 HIV/AIDS related patents to 78 low- and middle-income countries across the world (Medicines Patent Pool 2012).

Finally, through research and impact evaluation, the HIV/AIDS movement has demonstrated that improving access to treatment in low- and middle-

income countries entails much more than policies that merely lower the cost of medications. Import taxes, procurement and distribution inefficiencies, poor quality assurance, and bureaucratic delays in many countries continue to impede access to HIV treatment, despite the availability of lower-cost therapies (Steinbrook 2007, Knaul et al. 2010). Over the last 10-15 years, global actors have observed that there is no single solution to improving the availability of care; while pharmaceutical policies that allow for increased access to medicines in low-income countries are important, improved health infrastructure, robust care delivery systems, and financial commitments from both national governments and aid agencies are as essential (Selemogo 2005). Thus, improved treatment delivery is possible but requires broad, flexible, and far-reaching funding and capacity-building efforts across a variety of institutions and actors.

BUILDING A GLOBAL CANCER MOVEMENT

Throughout the last 15 years, the international HIV/AIDS response in low-resource settings has stressed the importance of collaboration, innovation, and capacity building at all levels, from supply chain logistics to service delivery strategies to financing. While some progress has been made towards highlighting cancer and non-communicable diseases as an emerging policy priority in low-income countries, the global cancer community still has a long road ahead. Cancer funding is currently far behind trends in disease burden, and access to essential cancer therapies is severely lacking in many countries throughout sub-Saharan Africa. These shortfalls in providing care to cancer patients worldwide must, and can, be addressed.

In recent years, non-communicable diseases, such as cancer, have started to enter policy discussions in international health. Similar to HIV/AIDS in the 2000s, the NCD movement has been galvanized by a call to action raised at a 2011 United Nations Special Session on the emerging threat of NCDs in low- and middle-income countries, marking only the second time the UN General Assembly has convened on an emergency health issue in its history (NCD Alliance 2012). Since then, various organizations have arisen as leading voices in the international cancer community. Most markedly, UN-sponsored organizations promoting cancer efforts consist of the International Union for Cancer Control (UICC), International Agency for Research on Cancer (IARC), the

International Atomic Energy Agency (IAEA), and World Health Organization (WHO)-led initiatives such as the Framework Convention on Tobacco Control (FCTC) and the Global Strategy on Diet, Physical Activity, and Health (WHO 2013). In addition to multilateral agencies, other players supporting cancer efforts in sub-Saharan Africa include academic partners, NGOs, and country-led initiatives. These actors range the gamut, from national research institutions such as the U.S. National Cancer Institute (NCI), academic and professional consortiums such as the Global Taskforce on the Expanded Access to Cancer Care and Control

(GTF.CCC) and Global Oncology, Inc. (GO), and prominent university-to-university twinning relationships such as the Uganda Cancer Institute (UCI)

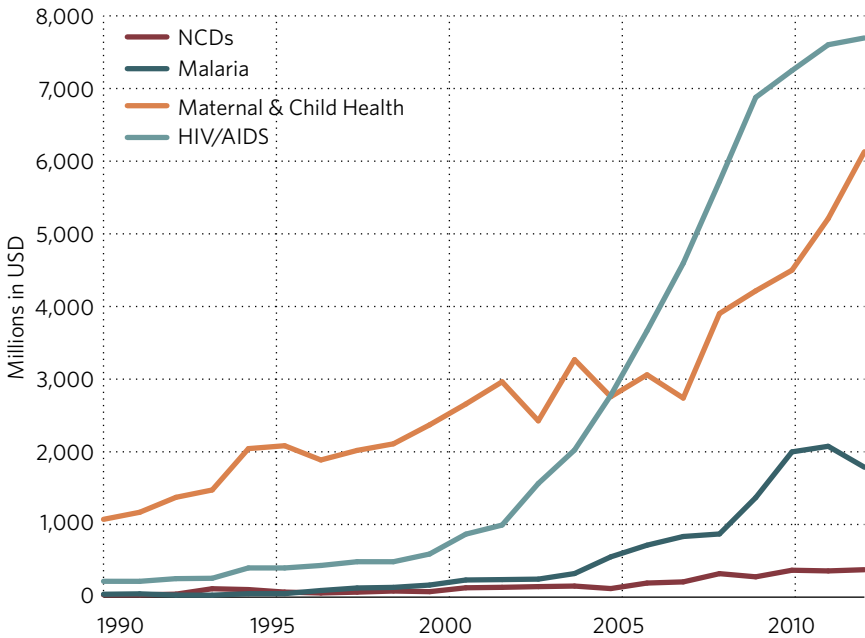
/ Hutchinson Cancer Center Alliance at the University of Washington. Various U.S. non-profit institutions have also broadened their missions to incorporate cancer programs in low- and middle-income countries, such as the American Cancer Society, LIVESTRONG, Partners In Health, among others (Knaul, Frenk, and Shulman 2011). Countries throughout Africa have strong leadership from local entities as well, including ministries of health, regional initiatives such as the African Organization for Research and Training in Cancer (AORTIC) and the African Palliative Care Association (APCA), and national civil society organizations like the Cancer Association of South Africa (CANSa) and the Africa Cancer Foundation in Kenya (Morhason-Bello et al. 2013).

Although advocacy for cancer care in low- and middle-income countries has started to make some headway in international development circles, these efforts have been piecemeal and funding has fallen far behind both current and future disease burdens. Unlike HIV/AIDS, there is no centralized financing agency for cancer or NCDs on the international stage, nor has a large-scale funding commitment for cancer or NCDs been proposed by governments and development partners (Daniels Jr., Donilon, and Bollyky 2014). Despite being responsible for nearly two-thirds of global disease and mortality, total NCD funding accounts for only 1.2 percent of all development assistance for health (IHME 2013). In fact, NCDs have yet to be included as an official funding category for the United States Agency for International Development (USAID) and allocations to NCDs as a whole, and especially for specific non-

Despite being responsible for nearly two-thirds of global disease and mortality, total NCD funding accounts for only 1.2 percent of all development assistance for health.

communicable diseases like cancer, is poorly tracked by most bilateral agencies (Samb et al. 2010, Wexler 2015). Even more strikingly, nearly 25 percent of all international assistance continues to be allocated to HIV/AIDS programs alone, even though HIV/AIDS is currently only responsible for 3.7 percent of global mortality (Woodling, Williams, and Rushton 2012). Observed in Figure 6, these gaps in development assistance funding (DAH) by health focus area have continued to widen in recent years — in 2011, while total DAH for HIV/AIDS was nearly \$7.7 billion in U.S. dollars, NCDs, as a category, only secured a paltry \$377 million in development assistance (IHME 2014).

Figure 6. Development Assistance for Health (DAH) by Select Health Focus Area, 1990–2011



Source: IHME 2014

As some experts have noted, funding patterns in international development tend to reflect the past and build on old expertise in infectious diseases like HIV/AIDS, rather than adequately evaluate and address changing conditions (Stuckler et al. 2008). Without key agencies willing to take on a primary funding role for NCDs in the developing world, organizations addressing cancer in low-income countries have had scattered success securing funding for programs

in sub-Saharan Africa (Nugent and Feigl 2010). In addition, the failure of the international cancer community to pair commitment-based initiatives mirroring the MDGs, such as the WHO Global Action Plan for NCDs, to a solid funding infrastructure has further hindered cancer efforts in low-resource settings (Knaul, Frenk, and Shulman 2011). As a result, cancer and non-communicable diseases have been at a severe disadvantage in terms of resource mobilization (Kanavos 2006).

The lack of quality data on cancer incidence in low-income countries has been another stumbling block; such data could reinforce advocacy efforts around the need for cancer care and help set policy priorities that best address the disease burden impacting low-income countries (Boyle and Levin 2008, Samb et al. 2010). The lack of rigorous research on cancer in the developing world has made it difficult for the global health community to

... cancer has only recently been incorporated into discussions of health and human rights, despite the significant inequality of access to cancer treatment in low- and middle-income countries.

develop evidence-based programs for cancer in low-resource settings throughout sub-Saharan Africa (Knaul, Frenk, and Shulman 2011). Some researchers and organizations have started to discuss the impact that cancer will have on the economic sustainability of low-income countries (EIU 2009, American Cancer Society and LIVESTRONG 2010), but arguments promoting cancer control and care as an international security or economic concern have yet to make a substantial impact in high-level policy settings (Mills and Ford 2012). Similarly, cancer has only recently been incorporated into discussions of health and human rights, despite the significant inequality of access to cancer treatment in low- and middle-income countries (Knaul, Frenk, and Shulman 2011). As HIV/AIDS has demonstrated, data on disease burden, an emphasis on sustainability, and a rights-based dialogue inclusive of marginalized and poor populations are critical tools for further promoting and informing efforts in cancer control in low- and middle-income countries, especially in sub-Saharan Africa.

In addition, far more work can be done to build on the success so far in adopting innovative HIV/AIDS strategies and pricing models to extend access to essential cancer medicines. As with HIV/AIDS, generics have emerged as the predominant strategy in ensuring access and affordability of essential cancer medicines. As of 2014, twenty-six of the 29 cancer therapies on the essential medicines list are

currently off-patent (Farmer et al. 2010). This context, as well as recent efforts to review and update the WHO Model List for Essential Medicines for cancers has further increased the potential for the promotion of access to medicines and cost savings through the generic industry (UICC 2015). India, as a main supplier of generic drugs in sub-Saharan Africa, won a groundbreaking court battle against Novartis in 2013, over a patent bid for the leukemia drug Imatinib (Chatterjee 2013). Yet, very few countries worldwide are able to take advantage of these developments, and most patients in sub-Saharan Africa remain unable to access or afford cancer therapy (Westerhaus and Castro 2006). The cancer community in the developing world has also not implemented innovative access and financing mechanisms, such as the Medicines Patent Pool or UNITAID (Elzawawy 2012). With proper buy-in from pharmaceutical companies and the generics industry in countries like India, patent pools for essential cancer medicines could be a promising approach to help cost-effectively address the rising cancer treatment burden in regions like sub-Saharan Africa.

UNANSWERED QUESTIONS FOR THE FUTURE OF GLOBAL HEALTH

In many ways, the global AIDS response is an instructive example of advocacy and development that works, and the international community should continue to take a close look at how best to apply lessons learned from the HIV/AIDS community to cancer efforts in sub-Saharan Africa. But, neither the story of HIV/AIDS nor cancer are that simple. Lingering questions remain: Is the broad, far reaching success of the HIV/AIDS community in building a well-funded movement an exceptional achievement or can other global health issues share that momentum? Does the international HIV/AIDS response have to be replicated at scale for each health problem the world faces or are there ways to funnel advocacy to strengthen health systems more broadly? Most importantly, as countries face the dual challenges of infectious and chronic diseases in upcoming decades, what lies ahead for the future of global health?

Many unresolved policy debates in HIV/AIDS have direct relevance to the future of cancer control efforts in sub-Saharan Africa and worldwide.

Prioritizing Prevention or Treatment: Low-hanging Fruit or Long-term Solutions?

One such unresolved policy debate centers around the prioritization of advocacy, funding, and program implementation. For many years, stakeholders in the HIV/AIDS community have passionately drawn sides between prevention and treatment in low-resource settings (Goosby, Von Zinkernagel, et al. 2012). Proponents of preventative approaches argue that poorer countries lack the resources they need to treat their way out of the AIDS epidemic and a focus solely on treatment fails to address the underlying causes of the disease (Woodling, Williams, and Rushton 2012). Advocates of prioritizing treatment-based programs contend that preventative approaches in HIV/AIDS, either focused on individual behavioral change or more structural issues, has only had limited success in halting the epidemic and that refusing to address current treatment needs condemns generations of patients to unnecessary suffering and death (Kanavos 2006).

Despite divisive discussion, the HIV/AIDS epidemic has ultimately demonstrated that the answers to this debate lie somewhere between either extreme. Both treatment and prevention need to be included as part of a comprehensive long-term approach to addressing the impacts of any health issue (Farmer et al. 2010). Many successful HIV/AIDS initiatives have shown that prevention and treatment efforts should be pursued in concert — prevention mitigates the underlying factors behind the epidemic and reduces the cost of treatment, while access to treatment allows current and future patients to receive care and enables more effective prevention (Knaul, Frenk, and Shulman 2011).

Cancer efforts in low- and middle-income countries to date have arguably been heavily skewed towards prevention. In the WHO Global Action Plan for the Prevention and Control of NCDs (Figure 7) — the most rallying international policy commitment made thus far for NCDs — eight of the nine voluntary targets focus almost exclusively on prevention of lifestyle risk factors, while only one target discusses increasing the availability of affordable essential medicines for diseases such as cancer (WHO 2013). For the most part, international agencies have followed the WHO Global Action Plan's focus on prevention and lifestyle risk factors as the key strategy to reduce the global NCD burden (Ngoma 2006). The WHO Framework Convention on Tobacco Control (FCTC), for instance, is a notable international covenant promoting anti-tobacco policies signed by 168 countries worldwide (Maher and Ford 2011). The FCTC model has been promoted broadly across the UN agencies, and similar international initiatives targeting

diet and physical activity have arisen in recent years as well (WHO 2013). The World Cancer Declaration promoted by the UICC has adopted a more inclusive health systems approach, incorporating capacity building, data and registries, community education, diagnosis and treatment, and pain control into its target setting priorities, but global funding and programmatic efforts have yet to match these more expansive aspirations (Adams et al. 2011, UICC 2013).

Figure 7. WHO Global Action Plan Voluntary Targets, 2013-2030

25%	reduction in premature mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases	Mortality and morbidity
10%	reduction in harmful use of alcohol	Lifestyle risk factors for non-communicable diseases (NCD)
10%	reduction in physical activity	
30%	reduction in salt/sodium intake	
30%	reduction in tobacco use	
25%	reduction in raised blood pressure	
0%	increase in diabetes and obesity	
50%	coverage in drug therapy and counseling to prevent heart attacks and strokes	National systems response
80%	coverage in essential NCD medicines and technologies	

Source: WHO 2013

For many cancers, especially those more difficult to treat, prevention and early detection initiatives are undoubtedly the most cost-effective interventions at a population level, if targeted at the diverse range of cancers present in low-income countries, beyond merely the control of lifestyle risk factors. Large scale efforts to provide HPV and hepatitis B vaccinations, for instance, are comparatively low-cost solutions that could dramatically reduce the incidence of infection-related cancers, currently a key component of the cancer burden in sub-Saharan Africa (Institute of Medicine 2007, Jemal et al. 2014). Tobacco and alcohol use, leading risk factors for a variety of cancers, can be reduced through national, profit-generating policies such as sales and import taxes (Maher and Ford 2011). For cervical cancer, “see and treat” programs that

incorporate visual inspection methods using vinegar and cryogenic removal of cancer cells is another cost-effective strategy that has become a standard of care in many low- and middle-income countries (Sahasrabudde et al. 2012). In breast cancer, early detection and screening programs have been a key focus for improving outcomes for patients with early-stage diagnoses (Brown et al. 2006). For some cancer types such as lung, prostate, colorectal, and breast where treatment is particularly difficult and expensive, palliative care remains the most feasible option available, especially for patients presenting with late stage diagnoses (Vento 2013). Although many regulatory barriers exist, pain control medications are inexpensive and successful palliative care efforts in countries like Uganda have received global attention, inspiring organizations such as the American Cancer Society to incorporate “Treat the Pain” initiatives as a primary policy objective in their international aid portfolio (Jagwe and Merriman 2007, American Cancer Society 2011).

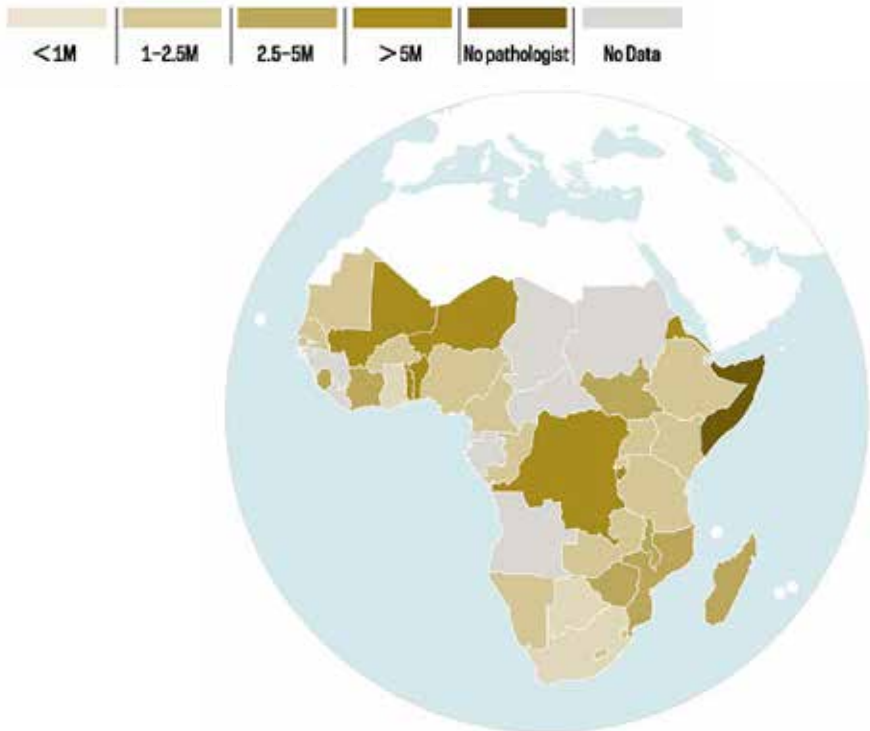
In all of these cases, players throughout the global cancer community have chosen to prioritize and devote resources to cost-effective “low-hanging fruit” interventions, which constitute an essential first step to reducing cancer rates worldwide (Daniels Jr., Donilon, and Bollyky 2014). Through these efforts, advocates have started to dispel the myth that cancer is too complicated or expensive to address in low-income countries, convincing the international community that low-cost, effective interventions are currently available at a population level (Brown et al. 2006, Jemal et al. 2014, Knaul, Frenk, and Shulman 2011).

However, even if prevention efforts expand successfully and begin to reduce rates of cancer in low-resource settings like sub-Saharan Africa, a considerable number of patients who currently lack access to sufficient care will still be diagnosed with treatable cancers over the course of their lifetime (Farmer et al. 2010). This inequity in access to care has resulted in mortality-to-incidence ratios as much as 20 percent higher in low- and middle-income countries as compared to wealthier regions (Jemal et al. 2014). Expanding wider access to cancer treatment requires a much more complex web of resources, including affordable therapy across various modalities, treatment delivery capacity, equipment, and a trained health workforce (Knaul, Frenk, and Shulman 2011). As a result, cancer treatment has often been overlooked in agenda-setting discussions, especially in low-income countries. Effective cancer therapies exist for many of the priority cancers common in sub-Saharan Africa, and extensive work remains to be done to make these care options more accessible to patients throughout the region (Kanavos 2006). While prevention, screening,

and palliative care efforts are an essential strategy to reduce the global cancer burden, increased investment in health systems and access to medicines policy cannot be ignored.

Beyond medicines alone, effective health systems are critical to improving treatment access, as cancer care requires highly trained medical professionals and specialized care platforms to address various cancers and diverse treatment modalities such as radiation and surgery (Oti 2012, Kingham et al. 2013). In sub-Saharan Africa, however, human resource capacity in cancer is abysmally low — many countries have as few as one pathologist or one medical oncologist per one million population (Figure 8), if any at all (Jemal et al. 2014). With more specialized modalities like radiation, access to care can be even more limited. Despite estimates that radiation can be beneficial in approximately 60 percent of diagnosed cancers, only 18 percent of the global population currently has access to radiation services, another inequity that is particularly stark in sub-Saharan Africa and south Asia (Jemal et al. 2014).

Figure 8. Population per One Pathologist in Sub-Saharan Africa, 2012



Source: The Cancer Atlas, Second Edition (American Cancer Society 2014)
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As HIV/AIDS has clearly demonstrated, the dichotomy between prevention and treatment presents a false choice. Sustainable solutions for prevention and treatment of cancer in low- and middle-income countries are sorely needed, and it is essential that the world take actions to achieve a comprehensive, sustainable approach to global cancer control for the longer-range future of sub-Saharan Africa.

Future of Global NCDs: Disease-specific Funding or Integrated Approaches?

The highly successful disease-specific approach taken by the HIV/AIDS community provides hope for any global health issue previously written off as too challenging (Tan, Upshur, and Ford 2003). At the same time, in promoting the emerging HIV/AIDS epidemic as an exceptional health issue requiring a targeted international response, HIV/AIDS efforts have contributed significantly to the “siloeing” of health agendas into vertical, single disease programs (Lamptey et al. 2011). The discussion regarding vertical and horizontal approaches to health financing and program implementation is another debate that has fervently divided the global health community. While HIV/AIDS presently sits at the center of this discussion, the policy and funding directions international development agencies choose to take in coming years will have considerable impacts on cancer efforts in low- and middle-income countries worldwide.

Proponents of vertical approaches argue that disease-specific responses have been particularly effective in curbing the rapid spread of epidemics such as HIV/AIDS and Ebola, as well as instrumental in raising widespread awareness of critical, targeted health problems across the international community (Mills and Ford 2012). Critics of vertical funding approaches, however, argue that rather than strengthening international health as a whole, single disease efforts have impeded an integrated approach to health systems, disease, and poverty at the country level (Nugent and Feigl 2010). As a result, vertical programs have created unnecessary competition among disease priorities and have diverted funding, resources, and advocacy from achieving broader health system objectives (Shiffman 2008, Lamptey and Dirks 2012).

Rather than channeling funding into specific disease programs, horizontal approaches to funding emphasize the importance of comprehensive health systems strengthening. This approach acknowledges that most low-income countries cannot afford to address all diseases in entirely separate siloes, especially at the level of vertical funding and technical support that has been expected for HIV/AIDS (Nigatu 2012). This is especially true for NCDs and cancer, as the number of separate diseases and cancers under the auspices of the NCD response

necessitate prevention and treatment initiatives that cut across a multitude of risk factors and medical specialties (Bukhman and Kidder 2011, Oti 2012). Focusing on expanding the capacity of health systems in low-income countries and training medical personnel comprehensively across multiple disease groups can improve health outcomes and mortality across the board (Bukhman and Kidder 2011, Samb et al. 2010). In doing so, however, many experts have expressed concern that purely horizontal approaches in low-income countries will spread funding and expertise too thin across health priorities and could undermine disease-specific program effectiveness, allowing room for both communicable and non-communicable diseases to spread unchecked (Mills and Ford 2012).

Funding and advocacy needs for cancer reveal the tensions between these differing approaches. Like nearly any neglected global health issue, cancer efforts in sub-Saharan Africa would benefit considerably from a strong single-disease approach that could achieve the funding and advocacy successes of the global HIV/AIDS response. At the same time, cancer shows why a broader health systems approach is needed. In particular, cancer care in low- and middle-income countries will require a comprehensive response and robust health systems that span prevention, early screening and detection services, surgery and radiation capabilities, drug delivery, patient support, and palliative care, across various cancers (Farmer et al. 2010). However, in advocating for a more comprehensive health systems approach in the face of funding constraints and competing disease priorities in global health, will cancer get lost in the shuffle?

As with the prevention versus treatment debate, the answers regarding vertical and horizontal approaches to funding and program implementation likely lies somewhere in the middle. The diagonal approach, recently coined by development experts, strikes a middle ground between the horizontal and vertical funding dichotomy (Farmer et al. 2010). Diagonal funding approaches aim to leverage successful disease-specific programs like the HIV/AIDS movement as an avenue to improve health systems and broaden support for health and development as a whole (Ooms et al. 2008). More simply, diagonal funding advocates are proposing integration across existing health platforms. While the international development community would be unwise to dismantle successful disease-specific programs, funding and advocacy momentum from strong vertical programs can be used to benefit a wider set of diseases and health issues (Rabkin and Nishtar 2011). For instance, many organizations have achieved benefits from combining disease efforts in HIV and tuberculosis, and have successfully incorporated HIV screening and prevention efforts into maternal and child health programs (Atun et al. 2013).

When asked in 2007 to consider the role of NCDs such as cancer in national health budgets, African health ministers emphasized the need for integrating across health programs at the national level (Kerr, Milburn, and Arbuthnott 2007). The diagonal approach advocated by African policymakers might be the best way to conceptualize development strategy in resource-limited countries struggling with the control of both communicable and non-communicable diseases. By promoting an integrated, health systems strengthening agenda through incorporating disease-specific cancer control strategies onto existing health platforms and priorities, efforts to provide cancer care in low- and

Table 2. Examples of Ways to Leverage Existing Platforms to Support Cancer Prevention and Treatment in Low- and Middle-income Countries

CANCER	EXISTING HEALTH PLATFORM	INTERVENTION
Cervical	Maternal & Child Health	HPV vaccination coverage targeted at girls and young mothers
Liver	Infectious Diseases	Hepatitis B and Hepatitis C vaccination coverage
Breast, prostate	HIV/AIDS, NCDs	Early detection and screening programs, combined with screening for other priority diseases (HIV, diabetes, hypertension)
Kaposi's sarcoma, lymphomas	HIV/AIDS	Screening and referral, follow-up services
Various cancers	HIV/AIDS	Palliative care and pain relief services
Various cancers	Human Resources for Health, Primary Care	Nurse and community health worker training in cancer protocols and follow-up care
Various cancers	Emergency Care	Surgical training for priority cancers

Sources: Bukhman and Kidder 2011, Daniels Jr., Donilon, and Bollky 2014, Jemal et al. 2014, Rabkin and Nishtar 2011

middle-income countries could become more feasible (Beaglehole, Bonita, and Magnusson 2011). Realistically, cancer-specific funding could be funneled into integrated care and capacity-building programs in a variety of ways, as shown in Table 2. For instance, HPV vaccination initiatives could be rolled out with existing maternal and child health infrastructure; cancer screening services

could be paired with community health efforts providing screening for HIV, diabetes, or hypertension; and existing nurse training, surgical care specialties, and community health worker training efforts could be expanded to include protocols and training in cancer care (Bukhman and Kidder 2011, Daniels Jr., Donilon, and Bollyky 2014, Jemal et al. 2014, Rabkin and Nishtar 2011).

Increased levels of funding and advocacy are sorely needed for cancer in sub-Saharan Africa. Although the global HIV/AIDS response has been a remarkable example of funding success over the last 15 years, it is unclear whether we can expect an entirely separate disease response to emerge fully funded for non-communicable health threats like cancer in a difficult economic climate. Yet, these severe funding inequities in global cancer and NCDs must be addressed. In addition to advocating for a much-needed increase in funding for NCDs in low-income countries, the international cancer community should continue to explore ways to achieve high service coverage for cancer through integrated care delivery programs and leveraging existing infrastructure and funding streams.

Issues of Feasibility, Sustainability, and Power in Expanding Access to Cancer Care

HIV/AIDS has helped provide a potential trajectory for expanding access to cancer treatment worldwide. However, HIV/AIDS has seemingly emerged as a cause célèbre, with far less having been achieved to improve access to medicines for other diseases like cancer (Van Puymbroeck 2010). Considering the emerging threat of NCDs in sub-Saharan Africa, the success of HIV/AIDS treatment rollout efforts should not remain an anomaly. Provided similar voices stand up in protest of the current lack of access to cancer treatment in low- and middle-income countries, unanswered questions regarding power, political will, and the feasibility of treatment delivery are important to keep in mind for the future of cancer therapy in low-resource settings.

Treating cancers in low- and middle-income countries is arguably much more complex than the existing model of antiretroviral rollout facilitated by global partners to address HIV/AIDS. As a set of diverse diseases, cancers common in sub-Saharan Africa call for a variety of medicines and chemotherapies to be included on the essential medicines list (Knaul, Frenk, and Shulman 2011). Chemotherapy, as a form of treatment, is also more medically demanding to administer than antiretroviral therapy for HIV. Chemotherapy requires functioning clinical facilities or options for home-based care, trained staff to administer treatment and monitor patients, and follow-up services throughout

the care process (Sikora et al. 1999). In addition to improving access to chemotherapy drugs, successful care for many of the priority cancers in sub-Saharan Africa often relies on additional treatment modalities such as surgery and radiation (Mattke et al. 2011). Although improving access to essential cancer medicines is an important step to improve cancer care in sub-Saharan Africa, adequately addressing cancer in low- and middle-income countries will demand more resources and policy change than HIV/AIDS.

The cancer community in low-income countries does have at least one strategic advantage — cancer affects far more patients in rich countries than HIV (El-Sadr, Morrison, et al. 2012). With a high demand for essential and novel cancer therapies in more affluent countries, pharmaceutical companies are generally ensured payback on research, development, and marketing of cancer drugs, and as a result, investment in generic manufacturing and lower-

... very few countries worldwide are taking advantage of international policies that allow generic imports and inexpensive licensing for cancer drugs.

cost treatment solutions in low-income countries could seemingly be a less controversial proposition for the industry (Outterson 2013). In addition, many countries in sub-Saharan Africa are starting to be targeted as emerging markets for these therapies (Towse et al. 2011). To date, the cancer community has been successful in reviewing and securing essential medicine status for a number of important therapies, and India's victory in the Gleevec decision may stand as an indicator of encouraging progress to come for access to cancer medicines in low- and middle-income countries (Chatterjee 2013, Shulman and Torode 2014).

Yet, very few countries worldwide are able to take advantage of international policies that allow generic imports and inexpensive licensing for cancer drugs. Low- and middle-income countries currently have compulsory licensing options available to them for both HIV and cancer medicines, but the process is complicated and a lot of political will is needed on the part of low-income countries to stand up to powerful pharmaceutical companies (Westerhaus and Castro 2006). Even in the face of public health crises, the United States and European countries have consistently attempted to limit the use of compulsory licensing and further weaken the bargaining power of poorer countries (Westerhaus and Castro 2006); this is evident especially in recent trade agreements being brokered with countries in the Pacific, which have attempted

to further solidify wealthier countries' restrictive intellectual policy provisions (MSF Canada 2013, Thow et al. 2014). Unfortunately, global trade agreements have often sustained the gap in power and resources between high and low-income countries (Van Puymbroeck 2010). It will be worth watching to see how the generics environment may shift for HIV, cancer, and NCDs when export extensions for compulsory licensing products expire in 2016, and in light of the recently negotiated Trans-Pacific Partnership (TPP) trade agreement (Sanjuan 2015, MSF Canada 2013, Steinbrook 2007); significant setbacks to providing access to low-cost cancer therapy could have a disastrous impact on the future of the cancer burden in sub-Saharan Africa.

The HIV/AIDS movement has also called into question the sustainability of current policy solutions around expanding access to medicines. As the nature of the HIV/AIDS epidemic has changed in recent years, so have the expectations and responsibilities of governments and the development community (Woodling, Williams, and Rushton 2012). Since institutional leaders in global health have committed to providing access to affordable HIV treatment worldwide, these efforts need to be sustainable in the long-term (Maher, Ford, and Unwin 2012). Many involved in the international HIV/AIDS response are expressing concern that institutions such as the Global Fund have showed signs of donor fatigue, with a decline in funding commitments in recent years (Hoen et al. 2011). With approximately 15-20 million HIV patients eligible for antiretroviral therapy still without access to treatment in low- and middle-income countries (UNAIDS 2014), questions around the sustainability of international commitments and country-level financing responsibilities are important to consider, especially in discussions around access to medicines.

The challenges that come with expanding access to cancer treatment in low- and middle-income countries once again emphasize that in many cases, the global health community must extend beyond "low-hanging fruit" options most attractive to policymakers, funders, and implementing organizations, and strive towards effective solutions to comprehensively address gaps in care delivery. In an austere economic climate with substantial policy constraints regarding increased access to medicines, the sustainability of these efforts is not secure. Substantial progress remains to be achieved in both HIV/AIDS and cancer to ensure that affordable treatment is a long-term reality for patients in sub-Saharan Africa and worldwide.

IMPLICATIONS FOR THE LONGER-RANGE FUTURE

Cancer currently sits at an historic crossroads for the international health community. At the end of the Millennium Development Goals era, the United Nations and the international community have recently adopted the Sustainable Development Goals (SDG) which will carry international development through 2030 (United Nations 2015, United Nations 2013). As with the MDGs, the post-2015 agenda will have a critical impact on the future of cancer and non-communicable diseases in low- and middle-income countries worldwide (Alleyne et al. 2013). As the UN SDG negotiations have progressed, cancer and NCDs have been placed squarely on the agenda, and institutional efforts defining the next 15 years of international development policy is placing more emphasis on stronger integrated health systems

... the many actors in global health will once again be tested on our ability to extend beyond cost-effective “low-hanging fruit” solutions and on our willingness to commit to long-term prevention and care delivery efforts...

necessary for a comprehensive cancer care approach in low- and middle-income countries (United Nations 2013). Cancer in low-resource settings is beginning to be spotlighted as a critical policy issue for the international community, and encouraging developments are occurring in terms of the protection of essential cancer medicines in the generics industry.

While these are all promising signs for the elevation of cancer as a policy priority in low- and middle-income countries, an immense amount of attention, funding, and institutional support is urgently required to scale-up both cancer prevention and treatment efforts, and reduce the number of cancer patients globally that needlessly fall to illness and death. Undoubtedly, cancer in low- and middle-income countries will also compel policy makers to grapple with a series of important questions related to the longer-range future of health and development in sub-Saharan Africa. The international community will need to thoughtfully consider priorities across a breadth of issues, including population-based prevention programs, health system capacity-building efforts, pharmaceutical policy, development of financing mechanisms and research infrastructure, and sustaining multi-stakeholder collaborations across care delivery platforms. Even more importantly, the many actors in global health will

once again be tested on our ability to extend beyond cost-effective “low-hanging fruit” solutions and on our willingness to commit to long-term prevention and care delivery efforts that will more sustainably and equitably address the neglected cancer burden in sub-Saharan Africa.

The challenges ahead of us are complex and demanding but we cannot shy away from the longer-range implications of the cancer threat on the sustainability of communities throughout sub-Saharan Africa. In the wake of an intensifying burden of cancer and chronic diseases in low- and middle-income countries worldwide, new paradigms and policy solutions will need to be forged in global health and development. In addressing some of these questions, the international community would be wise to follow the important lessons that have been learned over the last 30 years of the HIV/AIDS epidemic.

In his seminal President Fellows Lecture at the World Bank in 2003, Peter Piot concluded:

“The stakes are high. The agenda is clear. AIDS demands that we do business differently. AIDS requires more than personal behavior change. It requires institutional behavior change. AIDS is one the great moral causes of our time. We can save lives and reduce suffering. Effectively rising to the challenge will be a key test for the international system.” (Piot 2003)

Piot’s words continue to ring true in the post-2015 development era, both for alarming communicable diseases like Ebola that have quickly captured global public interest, as well as for non-communicable diseases like cancer which are more quietly taking center stage across low-income countries in sub-Saharan Africa and worldwide. Institutional behavior change will be required, and the stakes are high for many cancer patients without access to treatment and care in resource-limited settings. It is increasingly important that their voices are not lost in current and future policy planning for advocacy, funding, and treatment delivery in global health and development. ■

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