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# Noncommunicable Diseases In East Africa: Assessing The Gaps In Care And Identifying Opportunities For Improvement

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**ABSTRACT** The prevalence of noncommunicable diseases in East Africa is rising rapidly. Although the epidemiologic, demographic, and nutritional transitions are well under way in low-income countries, investment and attention in these countries remain focused largely on communicable diseases. We discuss existing infrastructure in communicable disease management as well as linkages between noncommunicable and communicable diseases in East Africa. We describe gaps in noncommunicable disease management within the health systems in this region. We also discuss deficiencies in addressing noncommunicable diseases from basic science research and medical training to health services delivery, public health initiatives, and access to essential medications in East Africa. Finally, we highlight the role of collaboration among East African governments and civil society in addressing noncommunicable diseases, and we advocate for a robust primary health care system that focuses on the social determinants of health.

**T**he East African Community, located in the Great Lakes region of East Africa, comprises Burundi, Rwanda, Kenya, Tanzania, and Uganda and accounts for a population of 153 million people with a gross domestic product of \$29 billion.<sup>1</sup> Serving principally as an economic free-trade zone, the East African Community has significant political and social overlap among member countries, with integrated disease surveillance efforts. The countries in the region are all classified as low-income countries, defined by a gross national income of less than \$1,045 per capita, as calculated using the World Bank Atlas.<sup>2</sup> Low-income countries, in general, face well-documented challenges in administering health care and receive substantial disease-specific external funding while having greatly underfunded overall health systems.<sup>3</sup> The burden of health care financing often falls on patients, who face heavy out-of-pocket costs

for medical care. In Uganda, for example, up to 75 percent of health care is paid for through private spending.<sup>3,4</sup>

In addition to confronting the globally prioritized noncommunicable diseases—cardiovascular disease, diabetes, cancer, and lung disease—East Africa also faces regionally important noncommunicable diseases including rheumatic heart disease, sickle cell disease, and mental illness.<sup>5</sup> Although 40 percent of deaths in East Africa are currently attributable to noncommunicable diseases, these diseases are expected to overtake communicable diseases as the leading causes of death in sub-Saharan Africa (of which East Africa is a part) over the next twenty years.<sup>5</sup> Estimates of age-standardized mortality suggest that patients in sub-Saharan Africa may have up to threefold higher mortality rates than similar European cohorts for noncommunicable diseases.<sup>6</sup> This seems to be largely attributable to disparities in care, because the prevalence of

some noncommunicable diseases among these regions is similar.<sup>7</sup>

### **Communicable Disease Background**

Since 2000, a global consortium of funding agencies have committed billions of dollars to combating AIDS, TB, and malaria. In East Africa alone, the Global Fund to Fight AIDS, Tuberculosis, and Malaria has placed 1.65 million people on antiretrovirals for HIV and 335,722 people on anti-TB treatment, and has distributed 77 million insecticide-treated mosquito nets.<sup>8,9</sup> These financial investments have had profound impacts on health outcomes in East Africa. Prior to 2000, life expectancy in the region was fifty years and falling, largely because of HIV/AIDS. With widespread adoption of antiretrovirals, life expectancy in the region increased to fifty-eight years between 2000 and 2012.<sup>10</sup>

The implementation of concerted global communicable disease funding overcame barriers to longitudinal care in East Africa and fostered innovations in the delivery of health care. Although HIV and TB are characterized as communicable diseases, they are managed using a chronic care model. Patients follow up regularly with medical providers and adhere to long-term medication regimens. Funding directed toward decentralized models of health care delivery translated into the provision of community-based care with the patient at the center of that care—a key feature of effective chronic care delivery.<sup>11</sup>

With improved access to treatment and health care delivery, HIV-related mortality rates are decreasing. Compared to seronegative individuals, however, those with HIV experience increased noncommunicable disease-related morbidity and mortality.<sup>12</sup> In many cases, the shift of mortality from communicable to noncommunicable diseases is a consequence of success in addressing HIV/AIDS. People living with HIV/AIDS are also at increased risk for cardiovascular disease, cancers, and other noncommunicable diseases as a result of both HIV infection and its treatment. Long-term treatment with antiretrovirals has known metabolic complications such as hypertension, diabetes, dyslipidemia, and osteopenia.<sup>13</sup>

Health system financing in low-income countries, catalyzed by the HIV epidemic, was plagued by a focus on HIV-specific programs at the expense of overall health system improvement. These health systems were subsequently ill equipped to manage the epidemiologic transition to noncommunicable diseases. A newer, innovative approach is embodied by the World Health Organization's (WHO's) Package of Es-

sential Noncommunicable Disease Interventions for Primary Health Care in Low-Resource Settings. This is a “prioritized set of cost-effective interventions” that is meant to result in high-quality care while strengthening the “building blocks of the health system” and integrating noncommunicable disease management into the primary health care system.<sup>14</sup>

### **Regional Deficiencies Along The Noncommunicable Disease Spectrum**

There are numerous knowledge, policy, and implementation gaps regarding noncommunicable diseases in East Africa, from basic science research and medical training to health care service delivery and public health initiatives. An analysis by the Global Forum for Health Research shows that despite an increase in overall funding for global health research that has grown steadily at a rate of US\$20 billion per year, little has been devoted to the study of noncommunicable diseases.<sup>15,16</sup> Few studies have included sub-Saharan African populations in determining which medications are best used for diseases such as hypertension, heart failure, and diabetes.<sup>17</sup> Locally derived epidemiologic data on noncommunicable diseases are minimal.<sup>18</sup> The WHO's STEPwise approach to Surveillance (STEPS) survey is the natural starting place for countries to gather such basic data. STEPS has been completed once in Tanzania (and separately in Zanzibar) and Uganda, and preparations are under way in Kenya. STEPS is intended to be repeated over time to yield a picture of evolving risk factors and disease prevalence. Yet even the cost of conducting STEPS once is fiscally challenging for most low-income countries. Beyond basic prevalence data, a deeper understanding of the regional drivers of noncommunicable diseases will come from longitudinal cohort studies. The Partnership for Cohort Research and Training, delayed as a result of funding constraints, is one such large-scale effort that aims to enlist 500,000 individuals from African countries, including Uganda and Tanzania in the East Africa region.<sup>19</sup> Finally, implementation research will need to be done to understand how to translate this scientific knowledge into practice.<sup>20</sup> It is estimated that the costs of conducting such cohort studies would be half the cost of similar ongoing studies on communicable diseases.<sup>21</sup>

Workforce shortages continue to plague noncommunicable disease management in East Africa. The gap of health care workers in low-income countries, estimated at 7.2 million in 2012, is expected to increase to 12.9 million by 2035.<sup>22</sup> East Africa continues to face a significant

## EXHIBIT 1

## Price Variability For Selected Noncommunicable Disease Medications In Kampala, Uganda

Medication	Average cost in US dollars	Range of costs in US dollars (country of origin)
Atorvastatin 40 mg	\$21.00	\$15.00 (UK)–\$26.00 (India)
Aspirin 81 mg	\$2.00	\$1.50 (India)–\$4.00 (UK)
Captopril 12.5 mg	\$1.40	\$0.75 (Cyprus)–\$2.50 (India)
Glibenclamide 5 mg	\$4.60	\$3.00 (Cyprus)–\$6.17 (India)
Metformin 500 mg	\$4.00	\$3.00 (Cyprus)–\$5.00 (Cyprus)

**SOURCE** Authors' survey, Medication Prices in Central Kampala March 16–20th 2015. **NOTE** Price variability for a thirty-day supply of recommended generic medications for a typical adult with diabetes and hypertension, among six dispensaries in Central Kampala.

“brain drain” to higher-paying countries. Uganda currently has one-third of the WHO-recommended minimum number of health care workers.<sup>23</sup> A recent agreement to send 300 Ugandan health care workers to Trinidad and Tobago in exchange for oil exploration assistance highlights conflicting government priorities in the region and exacerbates the human resource shortage. Finally, deficits in knowledge and confidence related to noncommunicable diseases have been documented among health care workers in the region, but little is known about the factors contributing to these deficits and how they affect the quality of care provision.<sup>18</sup>

The availability and affordability of noncommunicable disease medicines, including those on the WHO Essential Medicines List, present an ongoing challenge as well. A multinational survey that included eight sub-Saharan African countries (of which three were in East Africa) revealed 81 percent mean availability of a common antibiotic, compared to 37 percent and 14 percent for diabetes and asthma medication, respectively.<sup>24</sup> Out-of-pocket expenses of these medications remains prohibitively high for most households. There is also wide price variability for medications in both the private and public sectors in low-income countries.<sup>24</sup> Although no regional data in East Africa have been published, an informal survey of pharmacies in Kampala, Uganda, revealed marked variability in pricing for noncommunicable disease medications on the WHO Essential Medicines List (Exhibit 1). The average monthly cost for a patient with uncomplicated diabetes and hypertension would be \$33—roughly one-third of the average monthly income in Uganda.<sup>25</sup> Even when affordable medications are accessible, medication quality is a persistent problem in East Africa. A study in Rwanda found that 20 percent of antihypertensive medications purchased on the market were of substandard content and that 70 percent were of insufficient stability.<sup>26</sup> While patient advocacy has resulted in dramatic reduction of the cost of antiretrovirals and landmark agreements con-

cerning intellectual property rights among pharmaceutical companies, there remains a lack of consensus concerning sustainable pricing for medications to treat noncommunicable diseases.<sup>27</sup> Although antiretrovirals were made affordable by large global funds and procurement programs, the market for noncommunicable disease medications remains fragmented, which limits the ability to decrease cost through purchasing power. Furthermore, although most medications for noncommunicable disease management are generic, low profit margins in producing these medications may render many of them unavailable in the future.<sup>27</sup>

### Emerging Noncommunicable Disease Management Strategies

In line with recent global declarations on noncommunicable diseases such as the 25 by 25 Initiative and the Global Monitoring Framework, East African governments have enacted noncommunicable disease management programs, albeit with different degrees of financing and implementation strategies. Uganda, Tanzania, Zanzibar, and Rwanda have created national noncommunicable disease plans in collaboration with civil society organizations, although only Kenya has enacted noncommunicable disease targets. As a measure of political commitment to a noncommunicable disease agenda, Uganda, Kenya, and Rwanda have held government-organized noncommunicable disease conferences in the region.<sup>5</sup>

Civil society organizations have played a unique role in galvanizing consensus regarding noncommunicable disease management. In 2014 the NCD Alliances of Uganda, Tanzania, Zanzibar, Kenya, and Rwanda formed the East African NCD Alliance Post-2015 Initiative, in partnership with the global NCD Alliance and academic partners. Each organization is composed of member associations (for example, Tanzania Heart Association, Neurological Society of Kenya, and Uganda Diabetes Association) with the aim of promoting regional cooperation as well as providing a coordinated platform for advocacy on noncommunicable diseases in health and development agendas.<sup>5</sup> (Authors Jeremy Schwartz, Gerald Yonga, and Kaushik Ramaiya are three of the founding members of the East African NCD Alliance Post-2015 Initiative.) Modeled after a similar regional civil society collaboration in the Caribbean, the East African initiative undertook a benchmarking survey in 2014 to document the noncommunicable disease response in the East African Community from a civil society perspective. The initiative articulated six priorities (Exhibit 2). Those pri-

**EXHIBIT 2****Priorities For Addressing Noncommunicable Diseases In East Africa, 2014**

Priority	Related components
Priority 1: Raising priority of noncommunicable diseases through international cooperation and advocacy	Inclusion of noncommunicable diseases in national health and development plans Operational national noncommunicable diseases alliance, coalition, or network of nongovernmental organizations that engages people living with noncommunicable diseases Government-led, -supported, or -endorsed national noncommunicable diseases conference, summit, or meeting held in the past two years with active participation of nongovernmental organizations Government-led or -endorsed public media and awareness campaigns on noncommunicable diseases prevention, partnering with nongovernmental organizations and held in the past two years
Priority 2: Strengthening national capacity, multisectoral action, and partnerships for noncommunicable diseases	None
Priority 3: Reduce noncommunicable disease risk factors and social determinants	Tobacco, alcohol, unhealthy diet, and physical inactivity
Priority 4: Strengthen and reorient health systems to address noncommunicable diseases	None
Priority 5: Promote national capacity for research and development to address noncommunicable diseases	None
Priority 6: Monitor and evaluate progress on noncommunicable disease targets	None

**SOURCE** East Africa NCD Alliance Post-2015 Initiative. A civil society benchmark report: responses to NCDs in East Africa (see Note 5 in text). **NOTE** Priorities of the East Africa NCD Alliance presented to the United Nations high-level review on noncommunicable diseases.

orities were then used to formulate the East Africa Civil Society Charter, a call to action for regional governments, institutions, and the global community that was presented at the United Nations High-Level Meeting on noncommunicable disease in July 2014.<sup>5</sup> The inclusion of noncommunicable disease targets in Kenya, a result of advocacy from the NCD Alliance Kenya in 2011, demonstrates the important role that civil society organizations can play in catalyzing national noncommunicable disease planning.<sup>5</sup>

### Regional Social Determinants Of Health And Noncommunicable Diseases

The United Nations Development Programme aptly summarizes the many complicated drivers of noncommunicable diseases: “NCDs are not just one of the world’s most pressing health concerns but also a significant development challenge. They impede social and economic development and are driven by underlying social, economic, political, environmental, and cultural factors, broadly known as ‘social determinants’.”<sup>28</sup> Social inequalities are responsible for a majority of the disparity in noncommunicable disease health outcomes and constitute a critical barrier to overall health improvement.<sup>29</sup> While some social determinants of health that drive noncommunicable diseases, such as poverty, urbanization, and environmental degrada-

tion, are widespread in low-income countries, there are well-documented regionally important determinants that deserve attention, too.

Urbanization, advancing throughout East Africa, leads to a rapid increase in blood pressure among urban dwellers—a major risk factor for cardiovascular disease.<sup>30</sup> Urbanization also results in an increase in consumption of prepackaged and lower-quality foods, a nutritional transition long under way in East Africa.<sup>31</sup> The environmental conditions (poor air quality, poor education, and stressful conditions) that accompany life in urban slums are known drivers of poor health status among inhabitants.<sup>32</sup> East Africa is home to some of the world’s largest urban slums, such as those in Nairobi, Kenya. A reliance on biomass cooking fuels among the region’s poor is contributing to high rates of chronic lung disease.<sup>33</sup> Finally, cultural and traditional beliefs play a large role in determining the health perceptions of people in the region. These beliefs, as well as greater accessibility and lower cost, drive many to seek the services of traditional or faith healers for conditions such as diabetes, epilepsy, depression, and schizophrenia. Unfortunately these services often come with unrealistic promises of a cure.<sup>34</sup>

### Policy Prescriptions

**COMMUNICABLE DISEASE INFRASTRUCTURE AND NONCOMMUNICABLE DISEASE MANAGEMENT**

There exists great potential to leverage existing communicable disease health care delivery systems and lessons learned from the HIV epidemic to address noncommunicable diseases in East Africa.<sup>12</sup> To date, few studies examine the use of communicable disease infrastructure to expand noncommunicable disease management, and most evaluate the efficacy of expanding noncommunicable disease care only among people living with HIV/AIDS. The initial adoption of TB screening and treatment among people living with HIV/AIDS can serve as an example for effective comanagement strategies. In Uganda, the integration of HIV and TB services resulted in greater medication adherence and decreased mortality, and it has been shown to be “very cost-effective.”<sup>35</sup> While some efforts to integrate primary care within the existing HIV care infrastructure have shown potentially unintended consequences (longer wait times, increased cost of training, and decreased efficacy of staff managing multiple conditions), the benefits of expanding noncommunicable disease comanagement among people living with HIV/AIDS may prove to be similarly cost-effective to the HIV and TB model in the long run.<sup>36</sup> Conversely, the adoption of innovative approaches to address HIV has the potential to revolutionize the expansion of noncommunicable disease public health efforts across the wider population. Voluntary counseling and testing programs for HIV created an infrastructure for opportunistic screening of patients presenting to health facilities. This can be adapted to include common noncommunicable disease screening. Treatment protocols and the development of combination pills such as the polypill (a fixed-dose combination of noncommunicable disease medications) may have similar benefits to fixed-dosed drug combinations for HIV by reducing prescribing errors and improving medication adherence through cost reduction.<sup>27</sup> Use of mobile health technology (mHealth) can improve effectiveness in medication adherence and decrease costs of integrated care among patients with noncommunicable diseases.<sup>37,38</sup> mHealth also has the potential to act as a mechanism for nascent electronic medical records in areas where care is poorly coordinated and documentation often fragmented.<sup>39</sup> Decentralization of care, prioritized in HIV management, both geographically (from central hospitals to regional clinics) as well as professionally (task shifting from doctors to nurses) can provide community-based and patient-centered noncommunicable disease management. Systems innovations such as novel medication and appointment reminders systems, home-based care, community follow-up, and counseling to support treatment adherence, are the

## Workforce shortages continue to plague noncommunicable disease management in East Africa.

products of a decade of HIV care experience and contributed to the widespread success of treatment programs throughout sub-Saharan Africa.<sup>11</sup>

Importantly, the global campaign to eradicate HIV embedded public health strategies within a socioeconomic framework, which transitioned from a previously held dogma that placed blame on people living with HIV/AIDS and instead focused on socioeconomic inequity and social determinants of health. This transition reduced stigma among patients and allowed for more accurate assessments of disease burden and the creation of effective treatment strategies. Economic incentives to improve medication adherence and clinic appointment fidelity, such as providing direct payments or nutritional supplementation to patients, have shown modest benefit.<sup>40,41</sup> Efforts to target historically stigmatized populations, who often faced the highest rates of infection and mortality, attempted to reduce reservoirs for HIV.<sup>42</sup> Although these strategies might not be evenly applied to a noncommunicable disease model, addressing social determinants of health may similarly prove to be both successful and cost-effective.

**EVALUATING THE COST OF ADDRESSING NON-COMMUNICABLE DISEASES** The WHO’s Package of Essential Noncommunicable Interventions for Primary Health Care in Low-Resource Settings provides governments and donors with a framework for estimating the costs of expanding noncommunicable disease programs in low-income countries.<sup>43</sup> However, limited locally derived costing data have been published. The cost of primary prevention for cardiovascular disease, stroke, and diabetes is far less expensive than that of managing the diseases and their complications. A 2012 unit cost estimate of primary prevention for cardiovascular disease using the WHO guidelines for cardiovascular disease management in Tanzania was \$30–\$41 to \$52–\$71 per patient per year at the health center and hospital levels for rural and urban facilities, respectively. The study also estimated that ade-

# East African countries can collaborate on regional legislation to address the environmental risk factors for noncommunicable diseases.

quate management of patients with cardiovascular risk by WHO guidelines would require a doubling of current health expenditures.<sup>44</sup> Ministries of health and donors need better local cost estimates in order to guide and implement noncommunicable disease initiatives in the region.

**MODELS OF REGIONAL COLLABORATION** Regional collaboration among governments in East Africa can both unify disparate national noncommunicable disease plans and decrease cost of noncommunicable disease research and drug procurement. Regional tracking of health research funding should be undertaken so as not to duplicate efforts. The ability of governments in East Africa to work synergistically in creating regional noncommunicable disease research plans must be assessed. Currently, there are few operational data demonstrating the effectiveness of noncommunicable disease management programs. Partnerships between civil society groups such as the East African NCD Alliance Post-2015 Initiative, regional ministries of health, and academics could set a foundation for evaluation of these nascent programs. Implementation studies assessing which programs should be applied to the region can be performed across countries in East Africa.

Regional procurement agencies can increase the availability and decrease the cost of essential noncommunicable disease medications through bulk purchasing. The introduction of Gardasil, a vaccine against the virus that causes cervical cancer, in Uganda and Rwanda demonstrated that markets for essential drugs can be created through bulk procurement.<sup>27</sup> An East African Community-wide regulatory agency can assess imported drug quality and safety rapidly at regional ports of entry. Monitoring the quality of noncommunicable disease medications is essen-

tial as well. Using models of communication technology such as text messaging could increase procurement efficiency and monitoring. Similar approaches for first-line antimalarial drugs have resulted in a 50 percent decrease in pharmacies running out of antimalarial medication.<sup>27</sup> Standard treatment algorithms and prescription guidelines in the region could significantly reduce variability of pricing in the private sector.<sup>27</sup>

East African countries can also collaborate on regional legislation to address the environmental risk factors for noncommunicable diseases. Efforts in Rwanda to ban public smoking and implement clean cooking stoves should be replicated throughout the East Africa Community.<sup>45</sup> Although most East African countries have ratified the WHO Framework Convention on Tobacco Control, which governs the production, sale, distribution, advertisement, and taxation of tobacco, legislative implementation remains poor and faces considerable lobbying by foreign tobacco interests.<sup>46</sup>

While increased funding and international prioritization for noncommunicable disease management is urgent, creating an effective infrastructure for noncommunicable disease care in East Africa will be multifaceted. For practice patterns to change, noncommunicable disease management will need to be emphasized more in health care worker training and in delivery of health services. Public health efforts must be instituted to raise awareness of the long-term effects of unhealthy dietary choices and tobacco use, as well as obesity. Patient education efforts must be initiated to advise them of the signs of acutely fatal manifestations of chronic disease such as stroke and heart attacks and when to seek care. Years of vertical approaches to communicable disease by focusing on each disease separately instead of a health systems approach have created fragmented health sectors throughout sub-Saharan Africa. Vertical approaches to health management identify single-issue funding priorities such as HIV or malaria and devote resources solely to the research and management of these single disease entities. These health systems have been inadequate in addressing the shifting disease burden and have also proven to be ill prepared for identifying and managing emerging infectious diseases such as Ebola.

## Conclusion

The global community has started making headway toward addressing noncommunicable diseases. Strong international consensus exists proclaiming noncommunicable diseases as a global

health and economic threat. National governments in East Africa are starting to implement national plans and targets for tackling these diseases. Civil society organizations are developing frameworks for regional advocacy. Yet the global fight against noncommunicable diseases risks the same pitfalls as the battle against HIV and TB faced decades earlier. If the focus remains on disease-specific impact packages (interventions aimed at decreasing morbidity and mortality of single-disease entities) and noncommunicable disease targets, further fragmentation of health

resources will occur. The march toward health and well-being must move past disease-specific frameworks and focus on global primary care with an emphasis on comprehensive health management. A focus on integrated noncommunicable disease management with a diagonal approach, which also takes aim at the social determinants of health, can not only serve to ebb the tide of morbidity and mortality from these diseases but also will forge a stable foundation for overall health systems improvement in East Africa in the twenty-first century. ■

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