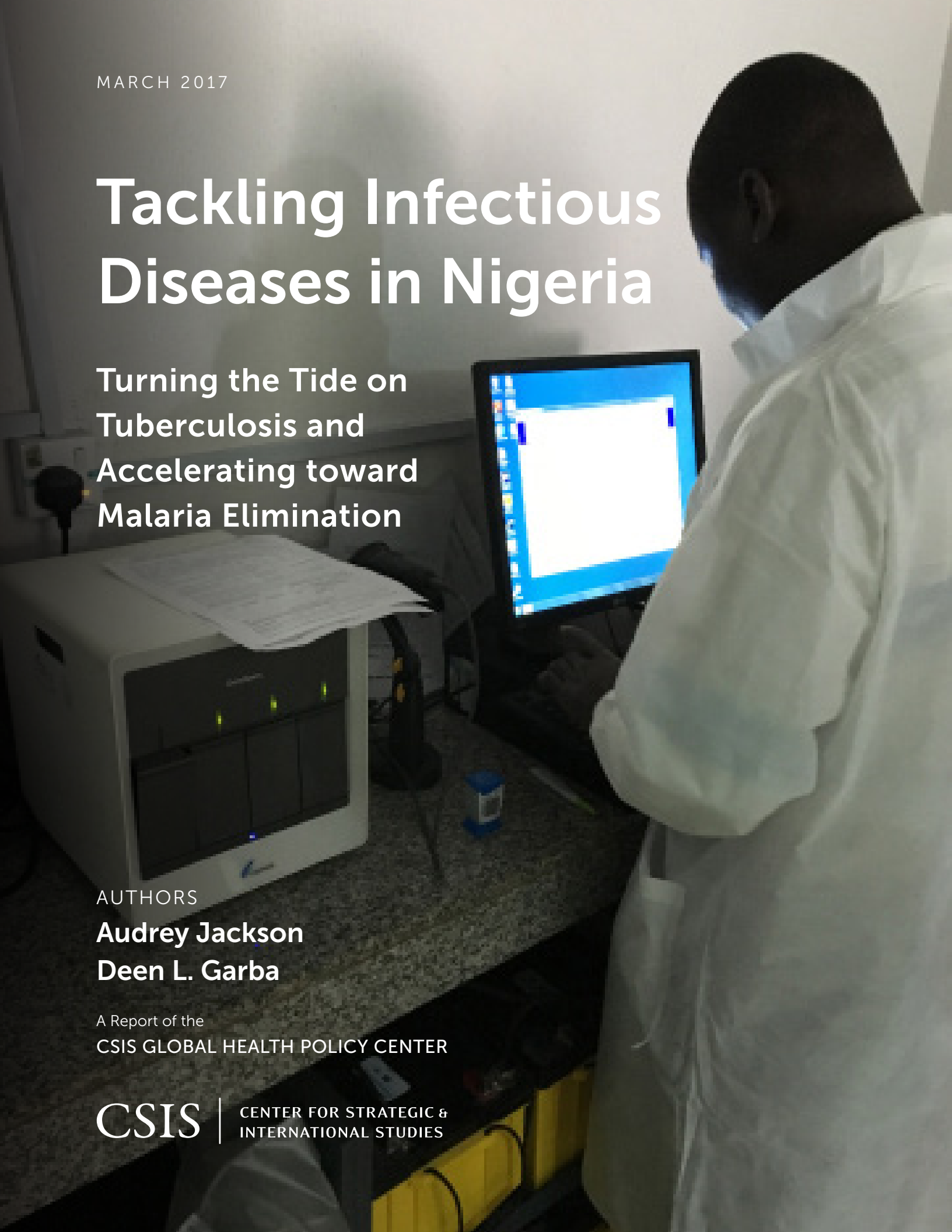


A person in a white lab coat is seen from the side, working at a computer. The computer monitor displays a blue screen with some text. To the left of the person is a large, white, box-like machine with a dark front panel and several small yellow lights. The background is a plain, light-colored wall.

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Acknowledgments

This report was made possible by the generous support of the Bill & Melinda Gates Foundation.

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Tackling Infectious Diseases in Nigeria

Turning the Tide on Tuberculosis and Accelerating toward Malaria Elimination

Audrey Jackson and Deen L. Garba¹

Executive Summary

Nigeria carries the highest burden of malaria and the fourth-largest burden of tuberculosis (TB) in the world. These two infectious diseases have significant impact on the health of Nigerians and must be addressed in Nigeria if there is to be any hope of ending TB and malaria globally. In recent years, the United States has invested in TB and malaria control in Nigeria through bilateral and multilateral programs, and has a significant interest in protecting the gains made. U.S. government bilateral assistance to Nigeria for fiscal year (FY) 2016 was US\$24 million for TB and TB/HIV program activities and \$75 million for malaria program activities.² The United States also contributes one-third of pledged funding to the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), which awarded Nigeria grants of \$220 million for TB from July 2015 to December 2017 and \$400 million for malaria from February 2015 to December 2017.³ While the absolute dollar amounts are not immense, the return on investment includes a more stable, healthy populace, better functioning systems, and governance structures that are better able to resist extremist insurgencies such as Boko Haram. The continuation of U.S. technical assistance and capacity-building efforts will enable the government and people of Nigeria to play a greater role in fighting TB, malaria, and other diseases, and will promote the sustainability of health programs.

The World Health Organization (WHO) *Global Tuberculosis Report* for 2016 estimates 590,000 new TB cases in 2015, ranking Nigeria fourth in the world in absolute TB incidence—numbers of new cases—after India, Indonesia, and China. Nigeria's 2012 national TB prevalence survey uncovered many more TB cases than expected, raising a warning flag to the global TB community that it may be underestimating the extent of the epidemic worldwide.⁴ Nigeria and

¹ Audrey Jackson is a senior fellow with the Global Health Policy Center at the Center for Strategic and International Studies (CSIS) in Washington, D.C. Deen L. Garba is a program coordinator and research assistant with the CSIS Global Health Policy Center. The authors are grateful to staff at the following for helpful and informative meetings and for their assistance in scheduling meetings and site visits: U.S. Agency for International Development (USAID); Centers for Disease Control and Prevention (CDC); U.S. Embassy in Abuja; Nigeria Federal Ministry of Health; ministries of health in Osun State, Oyo State, and Nasarawa State; KNCV Tuberculosis Foundation; APIN Public Health Initiatives; and TB Network (Civil Society For The Eradication of Tuberculosis in Nigeria).

² USAID Nigeria, <https://www.usaid.gov/nigeria>; ForeignAssistance.gov, <http://beta.foreignassistance.gov/>. All dollar amounts in this report are US\$.

³ The Global Fund, "Grants in Detail," <http://www.theglobalfund.org/en/downloads>.

⁴ World Health Organization (WHO), *Global Tuberculosis Report 2016* (Geneva: WHO, 2016), <http://apps.who.int/iris/bitstream/10665/250441/1/9789241565394-eng.pdf>.

its international partners have since embarked on new approaches to expand TB case identification and treatment, but results are still lagging. Nigeria did not meet any of the three TB targets⁵ in the UN's 2015 Millennium Development Goals, but senior health officials have committed to achieving the 2035 WHO End TB targets.⁶ The overarching priority for getting a handle on the TB crisis is to improve case identification—the diagnosis and reporting of TB patients to the public health system. Nigeria's minister of health, Dr. Isaac Adewole, recently declared 2017 the year of "Accelerating TB Case Finding," indicating a level of political will and prioritization for this goal.

Nigeria has the highest burden of malaria in the world—29 percent of malaria cases and 26 percent of global mortality, according to the 2016 WHO World Malaria Report.⁷ There has been significant progress in malaria control in recent years, led by the country's national and state malaria control programs with funding and technical assistance from international partners, primarily the U.S. President's Malaria Initiative (PMI) and the Global Fund. Malaria prevalence has fallen from 42 percent in 2010 to 27 percent in 2015,⁸ while the number of malaria deaths decreased 45 percent from 2000 to 2015.⁹ As resources for global health financing tighten, donors are looking to national governments to increase domestic resource mobilization for health. The private sector remains a possible source of increased financing for the fight against malaria.

In late September to early October 2016, CSIS traveled to Nigeria to analyze the impact of TB and malaria in Nigeria, ongoing efforts to control both diseases, and U.S. programmatic investments. We met with representatives of the Nigerian Federal Ministry of Health, state and local health departments, the U.S. Agency for International Development (USAID), the U.S. Centers for Disease Control and Prevention (CDC), and several nongovernmental organizations. Discussions in Nigeria were supplemented with a literature review and additional interviews conducted from the United States, including with representatives of the private sector and international donors. To get a better understanding of TB and malaria control programs at the state and local level, we traveled to Oyo, Osun, and Nasarawa states in southwest and central Nigeria and visited sites that are implementing programs.

The work of U.S. government agencies has been invaluable to progress in addressing both TB and malaria in Nigeria. PMI has contributed significantly to the fight against malaria since 2011 by supporting the scale-up of a core set of proven, evidence-based interventions through a stable and predictable source of funds. Through the strong partnership between the

⁵ The 2015 Millennium Development Goals included the following TB targets as compared to 2000: falling incidence rate, 50 percent reduction in prevalence rate, and 50 percent reduction in mortality rate.

⁶ The End TB Strategy calls for the following indicators in 2035, compared to 2015: a 95 percent reduction in TB deaths, a 90 percent reduction in TB incidence rate, and no patients facing catastrophic costs due to TB.

⁷ WHO, *World Malaria Report 2016* (Geneva: WHO, 2016), <http://apps.who.int/iris/bitstream/10665/252038/1/9789241511711-eng.pdf?ua=1>.

⁸ National Population Commission (NPC), National Malaria Control Programme (NMCP), and ICF International, *Nigeria Malaria Indicator Survey 2010: Final Report* (Abuja, Nigeria: NPC, NMCP, and ICF International, 2012), <https://dhsprogram.com/pubs/pdf/MIS8/MIS8.pdf>; National Malaria Elimination Programme (NMEP), National Population Commission (NPopC), National Bureau of Statistics (NBS), and ICF International, *Nigeria Malaria Indicator Survey 2015: Final Report* (Abuja, Nigeria: NMEP, NPopC, NBS, and ICF International, 2016), <http://dhsprogram.com/pubs/pdf/MIS20/MIS20.pdf>.

⁹ WHO, *World Malaria Report 2016*.

government of Nigeria and the United States and other international donors, malaria control programs have aimed at expanding coverage of core interventions to as much of the population as possible. Universal coverage has not yet been achieved and is still the primary goal, as Nigeria sets its sights on malaria elimination. In addition to striving for universal coverage, new efforts are needed to understand how to serve hard-to-reach populations, understand the barriers to uptake of certain interventions, and overcome those barriers.

TB control in Nigeria is at a much less advanced stage than malaria control. There is a clear difference in available resources: a gap of 55 percent in needed financing for TB versus 37 percent for malaria. Clinic-based approaches for TB control have relied on Nigeria's weak primary health care system, resulting in poor outcomes. The national and state TB control programs and international partners have been experimenting with different community interventions to increase case-finding. Lessons from community interventions implemented in other countries as well as community interventions implemented for malaria in Nigeria may have some value for TB programs.

At the beginning of a new administration and Congress, U.S. foreign assistance funding is facing increased budgetary pressures and higher scrutiny. We recommend that the U.S. government fund TB and malaria programs in Nigeria in ways that emphasize greater accountability, operational management to maximize return on investments, and high-level diplomacy to stimulate domestic resource mobilization. By investing wisely, demonstrating U.S. commitment with continued funds and technical assistance, and using the persuasive power of U.S. diplomacy, the United States can build on its role as a leader in fighting global TB and malaria. The U.S. government should work through its bilateral relationship and through multilateral organizations to implement the following recommendations:

- **Through high-level diplomacy, encourage higher prioritization of TB and malaria programs in Nigeria, matched by increased government budgetary commitments**
 - **Senior U.S. government officials should engage with the Office of the President, Minister of Health, Minister of Finance, and select state governors to promote greater federal and state investment in TB and malaria programs.** The U.S. government should incentivize increased Nigerian government investments with continued bilateral and multilateral commitments of funding and technical assistance.
 - **The United States should promote greater investments by the private sector in TB and malaria and help the government of Nigeria develop coordinated strategies to boost private-sector engagement.** Nigerian and American companies in Nigeria have a vested interest in a healthy workforce. The United States should prioritize working with the government of Nigeria to develop a common private-sector strategy for TB, as has been done for malaria; to align existing disparate private-sector efforts around a common strategy; to stimulate increased investments from the private sector through delivery of services, medical products, and commodities; and to promote the development of public-private partnerships that amplify government investments.

- **Support capacity building that will enhance sustainability and accountability**
 - **Invest in information technology (IT) systems to improve data gathering and enhance the reliability of available data.** Lack of data is a significant barrier to greater progress in improving health outcomes in Nigeria. The U.S. government is already investing in health information technology for TB and malaria programs. These investments should continue, with an emphasis on IT systems that are not stand-alone or that exist only in a few focus states, but, rather, are interoperable with the national health data system and can be used throughout the country.
 - **Identify opportunities to strengthen training and capacity building at the local level.** Gaps in the numbers and capacity of health care workers represent one of the biggest challenges in Nigeria and one of the best targets for investment to improve sustainability of health programs. As one example, training funds from Global Fund grants are accessible only by the principal recipient organization, not by sub-grantees. As the sub-grantees are often doing much of the work on the ground, their staff would also benefit from training opportunities.
 - **Strengthen the capacity of civil society organizations to engage in health advocacy.** The United States should provide support, educational resources, and training opportunities for civil society organizations (CSOs) to build the capacity of their staff and network with other CSOs. Active CSOs would then be empowered to advocate for increased health funding from their policymakers, organize public discussions on health with state and local candidates, and otherwise enhance the ability of civil society to hold officials accountable for improving health delivery.
- **Identify areas where IT, product and commodity delivery, and other health care delivery systems funded by the U.S. government, including the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the U.S. President's Malaria Initiative (PMI), and TB programs, can be combined or integrated.** For example, PEPFAR and PMI are now working to integrate their independent, parallel medical reporting systems into Nigeria's health management information system, and to integrate disparate commodity delivery systems. Similar opportunities may exist for TB and with the Global Fund. Coordinating with the Global Fund and other international donors presents additional complexities, but ultimately such efforts will strengthen national delivery systems and enhance the sustainability of health programs.
- **Fund operational research to understand barriers to the uptake of some malaria interventions.** PMI currently supports behavior change communication regarding community and health care worker behavior, such as sleeping under bed nets and only treating malaria after a diagnostic test confirmation. Behavior change communication will be enhanced by understanding the reasons for the local population's responses to some interventions, such as low bed-net utilization and low use of intermittent preventive therapy (IPT) for pregnant women.

Introduction

Nigeria, Africa's most populous country, is a diverse nation of 182 million people comprising more than 250 ethnic groups distributed in 36 different states and the Federal Capital Territory (FCT) surrounding Abuja, the country's capital. Although it currently boasts Africa's largest economy—the title bouncing back and forth between Nigeria and South Africa—Nigeria is highly dependent on oil revenues, and falling oil prices dragged the economy into recession in September 2016 after steady growth of up to 7 percent annually for several years.

Years, and in some cases decades, of recurring violence in parts of the country have played a large role in Nigeria's current economic, political, and public health distress. The militant extremist group Boko Haram launched an uprising in Bauchi, Borno, Kano, and other northern states beginning in 2009, with devastating consequences for the civilians caught in the attacks and subsequent fighting between Boko Haram and the Nigerian military. The health systems of many northern states have been decimated, and the lack of security makes it difficult for domestic and international health implementers to operate in northeastern Nigeria as effectively as in other parts of the country. Activists in the southern Niger Delta region continue to attack and destroy oil pipelines, contributing to depressed oil production and revenues and helping to trigger the recent economic recession. In the summer of 2016, increased violence accompanied an uptick in the number of demonstrations staged by separatist groups in the southeast, a recurring flare-up that dates back to the Biafran War, the civil war of the late 1960s. President Muhammadu Buhari was elected in 2015 with the promise of enhancing security throughout the country and bringing a firm anticorruption stance to governance. To date, Nigerians and the international community have been underwhelmed by the effectiveness of Buhari's administration.¹⁰

Nigeria's Health System

In the context of numerous political, economic, and governance challenges, Nigeria's health system is also in a weakened state. Health care delivery is a concurrent function of Nigeria's decentralized government, with responsibility shared by the three levels of government—the federal, state, and local government area (LGA). According to the National Health Policy, the federal government is responsible for tertiary health facilities throughout the country; the 36 state governments and the FCT oversee secondary health facilities in each state or the FCT; and each of the 774 LGAs are responsible for all the primary health centers within their borders.

Nigeria's health system is under-resourced by all tiers of government. Health spending accounts for about 4 percent of the federal budget,¹¹ far below the 15 percent pledged by Nigeria and other African countries in the 2001 Abuja Declaration. The Federal Ministry of Health (FMOH) manages an allocation from the federal budget to provide for tertiary health care facilities

¹⁰ For a more detailed accounting of the political, economic, and governance challenges underlying Nigeria's health system, see Richard Downie, *Promoting Accountability in Nigeria's Health System* (Washington, DC: CSIS, February 2017), https://csis-prod.s3.amazonaws.com/s3fs-public/publication/170221_Downie_PromotingAccountabilityNigeria_Web.pdf?87Nrn7MgZAoMhwhj6jcfzbZPKWYtkaJd.

¹¹ Budget Office of the Federation, Ministry of Budget and National Planning, Federal Republic of Nigeria, *Appropriation Bill 2016*, www.budgetoffice.gov.ng/pdfs/2016/2016AppropriationBill.pdf.

throughout the country. The state government receives an appropriation from the federal government and supplements it with state resources. The state ministry of health and other state health agencies provide funding of secondary health facilities and other state-based health programs. State funding is critical for paying the salaries of state-employed health workers in the public sector. But state governments have repeatedly owed workers several months of salary payments, leading to months-long strikes and health system shutdowns, an increasingly frequent phenomenon in Nigeria termed industrial action. Primary health centers are supposed to be funded by LGAs supplemented by funds from the Primary Health Care Development Agency, an agency under the FMOH. The LGAs are allocated funds from the federal government that are directed through the state government, but most of the time, LGAs never actually receive most of this allocated funding. As a result, the majority of primary health centers are dilapidated, lack adequate staff, and would not qualify as operational by most definitions.

Health policies and strategic plans are developed at the federal level, but successful implementation depends on health care delivery at the state and LGA level, and often depends on effective coordination between the federal, state, and LGA health programs. Diversity in geography, climate, ethnic composition, and disease epidemiology across 36 states and the FCT contributes to the challenge of implementing any national health policy or plan. Successful implementation often requires flexibility and the ability to tailor activities at the state level.

There is a tiered network of laboratories that intersects with the tiered system of health facilities and government structure. Laboratories play a role in the diagnosis and management of individual patients, as well as in surveillance for the central disease control programs. Peripheral laboratories are associated with primary health centers and conduct basic sample collection and diagnostic testing, such as TB smear tests with a microscope. State laboratories provide external quality assurance review for the peripheral laboratories and perform more complicated testing, including testing samples for resistance to drugs and molecular diagnostic assays such as GeneXpert. The next level up consists of six zonal reference laboratories distributed throughout the country, primarily within university teaching hospitals. They are equipped to handle more complicated testing, such as TB culture, drug sensitivity testing, and molecular diagnostic assays. The personnel in these laboratories also participate in training and supervision of the state laboratories. Finally, there are two national reference laboratories for TB that provide additional supervision and training, help conduct research activities, and support the national programs with network implementation activities.

In late September to early October 2016, CSIS traveled to Nigeria to analyze the impact of TB and malaria in Nigeria, ongoing efforts to control both diseases, and U.S. programmatic investments. We met with representatives of the Nigerian Federal Ministry of Health, state and local health departments, the U.S. Agency for International Development (USAID), CDC, and several nongovernmental organizations. Discussions in Nigeria were supplemented with a literature review and additional interviews from the United States, including with representatives of the private sector and international donors. To get a better understanding of TB and malaria control programs at the state and local level, we traveled to Oyo, Osun, and Nasarawa states in southwest and central Nigeria and visited sites that are implementing programs.

Oyo State in southwest Nigeria has an estimated population of 7 million people living in 33 LGAs throughout the state, 25 percent of which are classified as urban and 75 percent as rural. The state has a reported per capita gross domestic product (GDP) of \$2,666, which makes it the fourth-wealthiest state in the country, just behind Lagos, Rivers, and Delta states.¹² Neighboring Osun State, carved out of a formerly much larger Oyo State, has an estimated population of 3.5 million residing in 30 LGAs. Its reported per capita GDP of \$2,076 places it at 14 out of 36 states in Nigeria.¹³ Nasarawa State, located in the heart of the country next to the FCT, has a population of just under 2.1 million concentrated in 13 predominantly agrarian LGAs. Economically, Nasarawa State differs very much from the other two states we visited. Nasarawa is one of the poorest in the country, with a reported per capita GDP of \$1,588, which ranks it at 31 out of Nigeria's 36 states.¹⁴

Oyo, Osun, and Nasarawa were among 27 states that received an economic bailout from the federal government in 2015 for the purpose of paying government-employed workers, including teachers and health care workers. In April 2016, the Independent Corrupt Practices and Related Offences Commission published an investigative report indicating that a significant amount of the disbursements received from the federal government had not been used to pay salary arrears of government workers.¹⁵ In fact, health care workers in all three states went on strike from May 2016 through July 2016 due to lack of salary payments.

Burden of Tuberculosis

Nigeria ranks fourth globally in the absolute number of annual new TB cases, following India, Indonesia, and China.¹⁶ The World Health Organization (WHO) Global TB Report estimates 590,000 incident active TB cases in Nigeria in 2015,¹⁷ and an incidence rate of 322 cases per 100,000 people. A 2012 national prevalence study revealed two times the previously estimated prevalence rate and three times the previously estimated incidence rate, a wake-up call to the Nigerian and global TB community that the disease was exacting a far greater toll than was realized, and that public health efforts needed to be strengthened significantly.¹⁸ Despite renewed efforts to identify and treat TB patients, 180,000 Nigerians still died from TB in 2015, as well as 57,000 who had both TB and HIV.¹⁹ The WHO maintains three lists of the 30 top high-

¹² Oyo State Ministry of Health, *Strategic Health Development Plan 2010-2015*, March 2010, <http://www.mamaye.org/sites/default/files/evidence/Oyo%20SSHDP%2005.01.11.pdf>.

¹³ Ibid.

¹⁴ Nasarawa State Ministry of Health, *Strategic Health Development Plan 2010-2015*, March 2010, <http://www.mamaye.org/sites/default/files/evidence/Nasarawa%20SSHDP%2005.01.11.pdf>.

¹⁵ "How states squandered FG bailout funds," *Vanguard*, April 23, 2016, <http://www.vanguardngr.com/2016/04/states-squandered-fg-bailout-funds>.

¹⁶ WHO, *Global Tuberculosis Report 2016*.

¹⁷ While one-third of the world's population is infected by latent TB bacteria, only about 10 percent of those infected will develop active TB disease over their lifetime.

¹⁸ National Tuberculosis and Leprosy Control Programme (NTBLCP), Federal Ministry of Health, *Report: First National TB Prevalence Survey 2012, Nigeria*, http://www.who.int/tb/publications/NigeriaReport_WEB_NEW.pdf.

¹⁹ The 2015 mortality rate for TB (excluding TB/HIV) was 99/100,000; the 2015 mortality rate for TB/HIV was 31/100,000.

burden countries for TB, for TB/HIV coinfection, and for multidrug-resistant TB (MDR-TB),²⁰ and Nigeria appears on all three lists.

MDR-TB is an alarming and growing global public health threat. In 2015, an estimated 29,000, or 4.3 percent, of new TB cases in Nigeria were caused by either MDR-TB or rifampicin-resistant TB bacteria.²¹ A 2010 WHO drug resistance survey in Nigeria estimated that 2.9 percent of new TB cases and 14.3 percent of retreatment cases were infected with MDR-TB.²² However, a study recently published by the West African Network of Excellence for TB, AIDS and Malaria suggests that rates of MDR-TB may be higher than those WHO estimates.²³ Samples from clinical sites in Ibadan and Lagos were tested for drug-resistance from 2009 to 2013. While no new TB cases sampled in Ibadan were MDR-TB, 39 percent of retreatment cases in Ibadan were found to be MDR-TB, three times higher than the 2010 WHO estimate. In Lagos, the rates were even higher: 32 percent of new TB cases and 66 percent of retreatment cases tested as MDR-TB. It should be noted that the Lagos samples included referral cases that had already been identified elsewhere as drug-resistant and had been sent to Lagos for confirmation, which would bias the results towards higher resistance rates. Regardless, the new data argue for more extensive surveillance throughout Nigeria, and improved access to second-line treatment for patients whose TB is resistant to first-line treatment.

A New Approach to TB Control

Following the 2012 national prevalence study that uncovered a larger TB burden than had been expected, a subsequent survey of the general public's knowledge, attitudes, and practices regarding TB also revealed that less than 20 percent of the population recognized the symptoms of TB.²⁴ It was clear to the National Tuberculosis and Leprosy Control Programme (NTBLCP), the country's central TB control program under the Department of Public Health of the FMOH, that a new strategic approach was needed to address the country's TB problem. The NTBLCP and stakeholders developed a new six-year National Strategic Plan for Tuberculosis Control 2015-2020. Gaps in TB program strategy and implementation were identified, and new activities were prioritized to reflect an intensified response to the TB epidemic in Nigeria. Five priority program goals have been established:

- 1) increase adult and pediatric case detection from its current rate of 17 percent, one of the lowest rates in the world,
- 2) improve treatment success rates in specific locales,

²⁰ MDR-TB is TB that is resistant to rifampicin and isoniazid, the two most common TB drugs.

²¹ Rifampicin-resistant TB (RR-TB) is only resistant to rifampicin. In 2016, the WHO recommended that both MDR-TB and RR-TB be treated with the same second-line regimen of drugs and began tracking RR-TB cases in addition to MDR-TB cases.

²² NTBLCP, *The National Strategic Plan for Tuberculosis Control 2015-2020: Towards Universal Access to Prevention, Diagnosis and Treatment*, 4–5, http://www.health.gov.ng/doc/National%20Strategic%20Plan%20for%20Tuberculosis%20Control%20%20%20%202015_2020.pdf.

²³ Florian Gehre, Jacob Otu, and Lindsay Kendall et al., "The emerging threat of pre-extensively drug-resistant tuberculosis in West Africa: preparing for large-scale tuberculosis research and drug resistance surveillance," *BMC Medicine* 14 (2016): 160–171, <https://bmcmmedicine.biomedcentral.com/articles/10.1186/s12916-016-0704-5>.

²⁴ Interview with Nigeria country director, KNCV Tuberculosis Foundation.

- 3) increase integration of TB and HIV services,
- 4) build capacity to diagnose and treat MDR-TB, and
- 5) enhance data and other support systems to monitor and evaluate the performance of TB control programs.²⁵

Finally, the NTBLCP articulated long-term goals in an effort to make progress toward the WHO's 2035 global TB targets in its End TB Strategy.²⁶ By 2025, Nigeria intends to achieve a 50 percent reduction in TB prevalence rate and 75 percent reduction in TB mortality rate (excluding TB/HIV), compared to 2013 figures.²⁷

The provision of universal access to TB services from 2015 to 2020 as prioritized in Nigeria's TB strategic plan would cost an estimated \$2.53 billion, or 393 billion naira.²⁸ Currently available resources from domestic and international sources provide only 45 percent of the funds needed to address Nigeria's TB public health threat, leaving 55 percent unfunded.²⁹ Domestic resources provide 12 percent of financing, while the United States contributes 9 percent, and other external donors contribute 24 percent of total funding. Other than the United States, international funding comes primarily from the Global Fund to Fight AIDS, TB and Malaria (Global Fund), to which the United States donates about a third of total pledged funds. TB funding from the U.S. government is primarily channeled through the USAID TB program and TB/HIV funding from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) to USAID, CDC, and the Department of Defense (DOD). In fiscal year (FY) 2016, the U.S. government contributed \$13.5 million in TB funding and \$10.5 million in TB/HIV funding, for a total of \$24 million. Due to a cut in PEPFAR funds, FY 2017 funding will total \$22 million, with \$14.5 million in TB funds and \$7.5 million in TB/HIV funds.³⁰

The NTBLCP and international donors coordinated and focused resources for TB program implementation in priority states. All states and the FCT were categorized into four bands, based on characteristics such as high TB burden, lower-than-expected case notification figures, and low coverage of TB health services. Priority states in band 1 and 2 represent 70 percent of the country's gap in TB case notification, with band 1 contributing 50 percent and band 2 contributing an additional 20 percent. Program implementation was initiated in band 1 states and expanded to band 2 states about a year ago. We visited TB program sites in Oyo, a band 1 state, and in Osun, a band 2 state.

²⁵ NTBLCP, *National Strategic Plan for Tuberculosis Control 2015-2020*, 66–67.

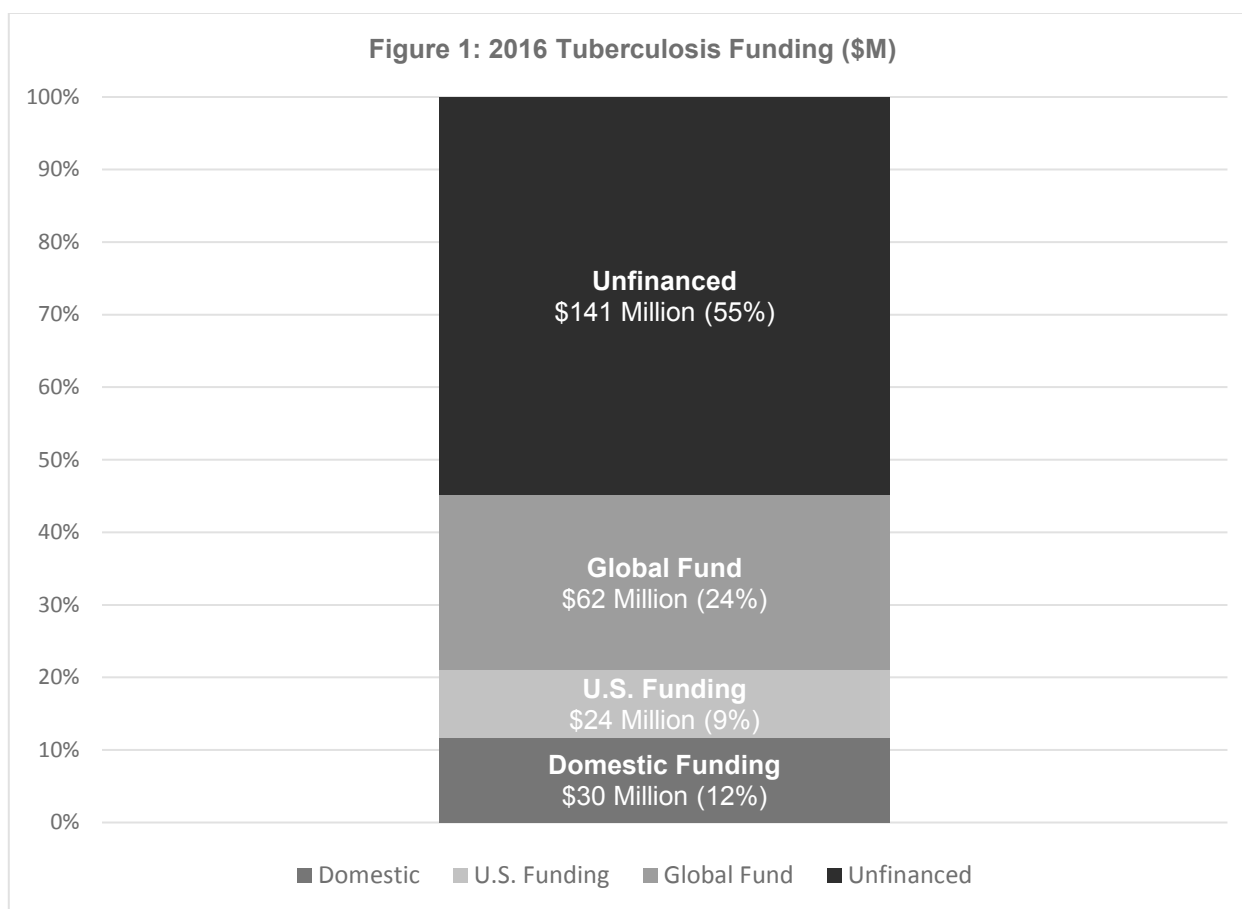
²⁶ WHO, *The End TB Strategy*, http://www.who.int/tb/End_TB_brochure.pdf?ua=1.

²⁷ The TB prevalence rate is targeted to decrease from 326/100,000 in 2013 to 163/100,000 by 2025. The TB mortality rate is targeted to decrease from 94/100,000 to 24/100,000 by 2025.

²⁸ NTBLCP, *National Strategic Plan for Tuberculosis Control 2015-2020*, 199.

²⁹ WHO, *Global Tuberculosis Report 2016*.

³⁰ U.S. government funding figures from USAID Nigeria.



Source: World Health Organization, *Global Tuberculosis Report 2016* (Geneva: WHO, 2016), <http://apps.who.int/iris/bitstream/10665/250441/1/9789241565394-eng.pdf>.

Finding the Undiagnosed TB Sufferers

Lack of knowledge about TB and lack of access to care were identified in 2012 as significant barriers to TB case detection in Nigeria. To improve the diagnosis and treatment of TB patients, the national TB control program pivoted from a strategy of passive identification to one of active case-finding. Passive identification relied on patients being diagnosed for TB upon presenting themselves to a health facility. National TB control programs have long relied on TB clinics as a critical component for diagnosing and treating patients. Treatment is managed at clinics implementing DOTS, or Directly Observed Therapy, Short-Course. While there are about 35,000 documented health facilities in the country, there were 5,863 DOTS centers at the end of 2015.³¹ Funding from the Global Fund and federal and state governments has supported the expansion of DOTS sites in recent years. The NTBLCP plans to increase the number of facilities to approximately 8,700 by 2020, the equivalent of one DOTS center for every 25,000 people.³² Additionally, there are approximately 2,000 facilities that are capable of diagnosing TB, primarily through sputum smear microscopy, an old, basic diagnostic technique that can be performed at peripheral laboratories, the lowest tier of laboratories in the country. However, as noted above,

³¹ NTBLCP, *2015 NTBLCP Annual Report*.

³² NTBLCP, *National Strategic Plan for Tuberculosis Control 2015-2020*, 35.

many primary health centers are relatively nonfunctional, and thus it is an ongoing challenge to ensure that the associated DOTS clinics and laboratories have adequate trained staff, medications, and laboratory supplies. The resource gaps at laboratory and health facilities will only increase as Nigeria seeks to increase the uptake and use of the GeneXpert TB molecular diagnostic assay, a newer technology that requires specialized cartridges and a stable source of electricity.

Passive identification also requires patients to know and recognize TB symptoms and to be able to transport themselves to a health facility, which would often be a secondary or tertiary facility at some distance from their home. Hidden costs for patients include a facility fee charged by some health facilities, and the opportunity cost of taking time away from work. Active case-finding, on the other hand, involves the implementation of community-based interventions to find those with TB, instead of waiting for them to find their way to a health facility. Nigerian TB control staff, U.S. and international donors, facility-based health care workers, and community-based nongovernmental organizations (NGOs) have been piloting innovative community outreach strategies to find the undiagnosed TB patients.

The Global Fund has focused on a case-finding strategy of house-to-house searches. Through funding to the principal recipient NGO, the Association of Reproductive and Family Health (ARFH), this approach was initiated in 22 states in early 2016.³³ The TB Network, a civil society organization based in Abuja, is one of the sub-recipients of the Global Fund grants, and manages the search program in 11 northern states, with a focus on rural and urban slums. TB Network staff engage community-based organizations (CBOs) in each locale to train groups of 10 community health workers to go door to door, identifying presumptive TB patients through a short checklist of four questions. Sputum samples are collected for analysis, and health workers return with the results, escorting any diagnosed patients to a health facility for treatment and helping support patients through treatment adherence. Community health workers are usually patent medical vendors or retired nurses, midwives, and other healthcare workers who are invested in the community. They receive a small monthly stipend of 60,000 naira, about \$180, and are trained in infection prevention protocols. Finally, community leaders and influencers provide both positive and negative reinforcements to ensure treatment adherence by patients, up to and including exile from the community. For treatment of MDR-TB, TB Network CBOs host monthly support group meetings and provide treatment supporters who visit patients daily. They have found that the best treatment supporters are community members but not family members, who may be easily manipulated or swayed by the patients. ARFH statistics indicate that about 50,000 TB cases were detected in the first half of 2016, an increase of 13 percent over cases detected in the first half of 2015.³⁴ There has been some debate in the TB community about whether the yield of the house-to-house search strategy is justified by the investment of time and personnel.³⁵ Anecdotal, the investments also yield additional benefits, including education of community leaders and members about TB and buy-in from the

³³ Hassan Zaggi, "ARFH: Ending TB through active house to house search," *The Authority*, September 8, 2016, <http://authorityngr.com/2016/09/ARFH--Ending-TB-through-active-house-to-house-search/>.

³⁴ Ibid.

³⁵ Interview with USAID Nigeria; O. Onazi et al., "Innovative approaches for increased case finding: the role of house-house screening in TB case finding," November 2015, <https://www.kncvtbc.org/uploaded/2015/11/Nigeria-poster-presentation-house-to-house-case-finding.pdf>.

community. In one example, community members pooled their meager resources to fix a broken microscope in the laboratory facility, allowing TB testing to resume.

Challenge TB, the flagship USAID-funded TB program, takes a slightly different approach to active case-finding in Nigeria by creating awareness and demand for TB services. Challenge TB is implemented in 14 states by KNCV Tuberculosis Foundation, an international NGO. In states where Challenge TB is collocated with the Global Fund, such as in Osun State, half of the LGAs implement Challenge TB programs and the other half implement Global Fund programs. This can pose a logistical and management challenge for the state TB program staff, who must coordinate and reconcile different strategies and working styles. In 2016, the United States expanded its engagement with the state health ministries, an important new approach in Nigeria's decentralized government environment. In addition to managing the program from its national and regional headquarters, Challenge TB has now integrated a project officer into each of the 14 state TB program offices.

Demand creation is one component of Challenge TB's four-part "FEED" strategy in Nigeria:

Fix nonfunctioning health facilities;

Expand DOTS centers strategically and as necessary;

Ensure quality of existing services; and

Demand creation for services.

Media campaigns, including radio ads and social media campaigns, create awareness about TB symptoms and treatment facilities. A mobile phone campaign includes a telephone hotline to a nationwide TB call-in center, where the operator provides callers with TB service delivery information such as the location and contact information for the nearest appropriate health facility. Community outreach campaigns are two-day affairs in which DOTS clinic staff join with community-based organizations, community leaders, TB survivors, and others to garner attention through the use of megaphones, drummers, and dancing, for example, and to disseminate information about TB. Sputum samples are collected for testing and information about health facilities is provided. When necessary, patients are transported to a DOTS center or clinic staff are brought into the community. Since the arrival of Challenge TB in 15 Osun LGAs in August 2015, the number of TB cases detected in those LGAs rose from 514 to 614 between the first half of 2015 and the first half of 2016, an early sign of modest improvement at 19 percent.³⁶

While active case-finding strategies are showing initial indications of moderate improvement in TB case detection, these efforts must be scaled up and sustained over the long term in order to raise the country's TB detection rate significantly. Nigeria's minister of health, Dr. Isaac Adewole, recently declared 2017 the year of "Accelerating TB Case Finding," indicating a level of political will and prioritization for this goal. Additionally, the focus on pediatric TB case detection needs to be intensified. Children under the age of 15 are underdiagnosed for TB, as they comprised 44

³⁶ Data provided by Osun State Ministry of Health.

percent of the population in 2015³⁷ but only 6 percent of notified TB cases in the country. There are technical challenges that must be overcome, as children with TB do not produce sputum as readily for testing. Challenge TB has engaged with the Pediatric Association of Nigeria and has made efforts to identify health facilities that are seeing large numbers of children, with the goal of increasing TB screening at those facilities.

Building Capacity to Diagnose, Treat, and Prevent MDR-TB

MDR-TB is a growing public health problem in Nigeria and significant efforts are needed to improve the country's capacity to diagnose, treat, and prevent it. We visited two facilities in Ibadan, Oyo State, that house MDR-TB clinics. University College Hospital (UCH) and Government Chest Hospital Jericho are two of the 12 centers in the country (as of 2015) capable of treating patients during the intensive hospitalization phase of treatment for drug-resistant TB. UCH is a federally funded tertiary facility, and the TB laboratory serves as a zonal reference laboratory for four southwest states, Oyo, Osun, Ogun, and Kwara states. Government Chest Hospital Jericho is a state-funded secondary health facility, and it houses a state TB reference lab that serves Oyo State. We also visited a primary health center in Ibadan, the Oniyanrin Primary Health Center.

The range of resources and services available in the three Ibadan facilities illustrates vividly that while adequate resources and training can aid the fight against TB and drug-resistant TB, there are significant barriers and gaps in many facilities and locales that do not have a similar level of resources. To facilitate testing for drug resistance, there are five GeneXpert machines in Oyo State. Three of those are located in Ibadan, including one at UCH and one at Jericho Hospital. Using PEPFAR funding, CDC provides technical assistance along with its implementing partner, APIN Public Health Initiatives (formerly AIDS Prevention Initiative in Nigeria). At UCH, APIN helped build and maintains laboratory infrastructure such as biosafety cabinets, procures cartridges and reagents for the GeneXpert, provides regular calibration and servicing for the GeneXpert, and is assisting the laboratory in qualifying for WHO accreditation. APIN also provides the staff at Jericho with support for training, seminars, and conferences. At both UCH and Jericho, sputum samples arrive from all over the state and zonal region, are tested in batches of four—the capacity of the GeneXpert, and results are provided to the patient's facility in two to three days. The NTBLCP is able to access results electronically, and a positive MDR-TB result triggers a notification and initiation of a search for hospital bed space.

Major challenges at UCH and Jericho include an irregular supply of electricity and a perennial shortage of human resources. At the state lab, government staff are often transferred out and replaced by new staff who need training. A lack of laboratory coats, gloves, and slides was noted by Jericho staff. As mentioned above, the inability or the unwillingness of the state to provide counterpart funding for salaries has led to staff being unpaid for several months at a time. Oniyanrin Primary Health Center contends with the same challenges and additional concerns. There is no air conditioning and refrigeration, so the lab can only use reagents that are stable at room temperature. The lab head must prepare reagents quarterly at the Jericho Hospital and goes there about once a week to finish her slide analysis when her facility does not have

³⁷ World Bank, "Population ages 0-14, 1960-2015," <http://data.worldbank.org/indicator/SP.POP.0014.TO.ZS>.

electricity. In addition to getting support from the state lab at Jericho, staff at primary health center laboratories also form a network to enable referrals and resource-sharing among themselves.

Treatment of drug-resistant TB currently involves a 20-month regimen consisting of an 8-month intensive hospitalization phase followed by an outpatient treatment phase. More patients are being diagnosed as drug-resistant than there are hospital beds available, creating a dangerous bottleneck of waiting MDR-TB patients. Nigeria is in the planning stages of adopting a newer WHO-recommended 9- to 12-month regimen, which will shorten the hospitalization phase and ideally lead to fewer patients on the waiting list. On the other hand, the NTBLCP has recently adopted a new policy calling for use of GeneXpert as the first TB diagnostic test for patients who are presumed to have TB based on symptoms. The preceding policy called for use of GeneXpert for patients at high risk of drug-resistant TB. The new testing policy is already resulting in more patients being identified as drug-resistant,³⁸ and there is some debate over whether the country is ready for such a policy shift, given the limited distribution of GeneXpert machines, inconsistent availability of electricity, the need for a renewable stock of expensive cartridges and related supplies, lack of available hospital beds, and periodic drug shortages of second-line treatment regimens. Periodic drug stock-outs increased in 2016, caused according to some reports by a shift to the use of third-party logistics companies by the Global Fund principal recipient.

Prevention of MDR-TB should be emphasized as a bigger priority in the country's TB control efforts. MDR-TB very often results from incomplete or unsuccessful treatment of drug-sensitive TB. Public health experts in the country cite monitoring of DOTS as a challenge for many facilities. This problem is not limited to Nigeria, and innovative new methods of adherence and service delivery are needed to tackle this issue. Infection control guidelines and training for health care workers in facilities should be enhanced. The NTBLCP is beginning to explore the use of contact tracing, which would help identify close contacts of patients who are at highest risk of acquiring drug-resistant TB.

Addressing TB/HIV Coinfection through Greater Integration

Discussions with HIV program experts in Nigeria revealed two major areas for improvement in addressing TB/HIV coinfection: the need for better epidemiological data on HIV and TB/HIV coinfection, and the need for greater integration of HIV and TB programs. Several public health experts maintained that the current WHO data on HIV infection and TB/HIV coinfection do not accurately reflect the realities on the ground. The National Agency for the Control of AIDS (NACA) estimates TB/HIV coinfection at 9.5 percent in 2015 while the WHO estimates it to be 17 percent in 2015.³⁹ According to one national public health figure, the current estimate of HIV infection as 3 percent of the population may be an overestimate, and better surveillance is needed to understand the true infection rate as well as the distribution of hot spots of

³⁸ Personal communication from Osun State TB program staff.

³⁹ Interview with former National Agency for the Control of AIDS (NACA) representative; WHO, *Global Tuberculosis Report 2016*.

infection.⁴⁰ Based on its data, PEPFAR is pivoting from a presence in more than 500 LGAs across the country to focus on and scale up in 32 LGAs.

Barriers to full integration of HIV and TB services exist at multiple levels. At the federal government level, there are three national agencies or programs involved, namely, the NTBLCP, which is responsible for TB policies and programs; NACA, which oversees HIV/AIDS policy and coordination; and the National AIDS and STD Control Program, which manages HIV/AIDS program implementation. At the facility level, full integration is logistically impossible because there are approximately 800 antiretroviral treatment (ART) clinics and just under 6,000 TB DOTS clinics. Sometimes these sites are even in two different LGAs. PEPFAR funding supports HIV testing in TB patients at DOTS clinics. The latest WHO figures show that all notified TB cases in 2015 were tested for HIV, and 75 percent of those who tested HIV-positive were placed on antiretroviral therapy, which is consistent with average data for sub-Saharan Africa. To improve linkage to care for TB/HIV coinfecting patients, PEPFAR is supporting a new initiative to engage referral volunteers in high-volume ART sites in the 32 priority LGAs. On the flip side, PEPFAR has supported the procurement and deployment of GeneXpert machines at selected sites and supported the transportation of samples for testing, in order to increase TB testing in people living with HIV.

Enhancing TB Data Systems and Reliability

Lack of availability of reliable data was cited by many Nigerian health experts as one of the biggest weaknesses of the health system, and a barrier to advancing progress in the control of TB and other diseases. As noted earlier, more accurate data are needed to assess the burden of TB in children and the extent of TB/HIV coinfection. A major priority for the national TB program is to implement a switch from paper TB records to all-electronic records throughout the country. Currently, patient data are manually recorded in paper TB registries. The TB officer in each LGA is responsible for transferring data into electronic records and submitting the data quarterly to the state TB program, which reviews the data and submits it to the national program. It is critical for new data systems to be compatible with existing systems in other disease areas and for systems to be compatible throughout the state and country. New information technology (IT) modules should therefore be compatible with the national health management information system, DHIS. Representatives of the NTBLCP cited an instance in which Challenge TB wanted to implement a separate, parallel information system for its LGAs. While this would certainly improve data for those LGAs in the short term, in the long term parallel systems do not necessarily contribute to building national systems, infrastructure, and capacity. USAID also endorses ongoing efforts to develop electronic TB records that are integrated with the DHIS and the national disease registry.

Rebuilding the Health System

In some respects, TB is a sentinel disease, and weaknesses in combating TB reveal weaknesses in a country's health system. Rebuilding Nigeria's health system will be a long-term process, but it is a problem that must be faced in order to make sustainable progress in the fight against TB.

⁴⁰ Interview with current NACA representative.

A greater focus should be placed on ensuring that health facilities are well-distributed throughout a given locale and are adequately resourced with human capacity, infrastructure, and commodities. The government of Nigeria has not invested sufficiently in human resources for health by adequately funding salaries for government staff positions and providing sufficient training support. Increased funding from the federal, state, and local government can create additional support and ensure that the government is not in arrears over staff salaries, as long as there is commitment from government leaders to spend funds as intended.

Many health facilities and resources are clustered in certain locations, perhaps due in part to political reasons, leaving huge gaps in some areas. Challenge TB has undertaken assessments of health facilities in each of its 14 program states, with the goal of fixing existing facilities where possible and expanding where needed to improve TB service coverage. Such an approach would likely be effective throughout the country. Challenge TB is also increasing the program's utilization of private health care facilities because of the increasing frequency of industrial action in the public health sector. While this may work as a short-term solution, it is unlikely to be a feasible long-term solution because patients have to pay more out of pocket to use private health care facilities for TB services. Finally, systems such as health management information systems and logistics systems for commodity management need to be strengthened. It would be helpful for donor-funded programs to consider providing support for these services in ways that contribute to building up the country's indigenous systems and improving the likelihood of sustainability.

Meeting the Financing Gap for TB

Approximately 55 percent of the estimated funds needed to control TB in Nigeria are currently not available through domestic or international sources. Nigeria funded 12 percent of the TB budget in 2016 and, as a lower-middle-income country with a significant burden of TB, could pledge more of its domestic financial resources to fighting the disease and improving the health of its people. The federal and state governments should make a political commitment to fight TB with increased and sustained financing. While Nigeria's current economic recession does not provide a favorable environment for increased health financing, Nigeria's leaders have made earlier commitments that they have failed to meet. As noted earlier, state governments had committed to providing counterpart funding in the form of salaries for state health workers, but many have been delinquent in supporting the health workforce in this manner. In 2014, the Nigerian legislature passed the National Health Act, which requires that at least 1 percent of total federal revenue be allocated to a Basic Health Care Provision Fund. Half of the money would be spent on providing basic health services through the National Health Insurance Scheme (NHIS), and most of the rest spent on primary health care. Although the National Health Act was signed by former president Goodluck Jonathan, it has not yet been implemented.

There are several avenues through which Nigeria's domestic financing for TB could be increased. The fledgling NHIS does not currently cover TB services, and could be expanded to do so. Although NHIS currently enrolls only federal workers, getting coverage for TB may be easier for a smaller program, and the coverage would likely continue if the scheme expands in the future. Additionally, several states are establishing or exploring state insurance schemes. Having TB covered on the federal level would set a good precedent for coverage by states.

Although Nigeria's economy is now in recession, the country is still a lower-middle-income country whose policymakers could be persuaded to invest more on TB and other disease areas. Unfortunately, the Ministry of Health does not always have the right tools and sufficient data to make a strong financial argument for additional government investments in TB. Dr. Eric Goosby, the UN special envoy for TB, and his staff worked with Minister Adewole and his staff to analyze spending on TB from domestic and external sources. A strong financial analysis provides accurate and reliable information on the impact of spending, such as the volume of drugs and commodities purchased, numbers of patients treated, and the volume of diagnostic tests performed. With such an analysis, a better case can be made for more government spending because it will translate into a specified number of patients treated, drugs purchased, and diagnostic tests performed.

Finally, there is ample opportunity for public figures, celebrities, leaders in business and other sectors, and civil society advocates to raise awareness and advocate for TB. The wife of President Buhari, Mrs. Aisha Buhari, has taken on TB as a special cause. As an ambassador for the Stop TB Partnership Nigeria, she raises awareness about the disease through speaking at high-profile gatherings in Nigeria and at international meetings. The wives of state governors throughout Nigeria have joined Mrs. Buhari as TB ambassadors. The Nigerian Medical Association organized rallies in states across Nigeria in October 2016 to advocate for implementation of the 2014 National Health Act. The rallies were joined by other groups, including market women in Abuja.⁴¹ Such efforts can be expanded and intensified in an effort to convince Nigeria's leaders and policymakers to invest more in the population's health.

From Malaria Control to Malaria Elimination

Malaria is endemic in Nigeria, and the country carries the highest burden of malaria globally, accounting for 29 percent of total malaria cases and 26 percent of total malaria deaths in the world in 2015.⁴² A primary goal of the previous malaria control strategy was to scale up preventive methods, including use of long-lasting insecticide-treated nets (LLINs), from solely vulnerable populations to the general population. Malaria prevalence in the country has been reduced from 42 percent as measured in the 2010 National Malaria Indicator Survey (NMIS)⁴³ to 27 percent as measured in the 2015 NMIS.⁴⁴ Based on the success of the last few years in driving down malaria cases and deaths, the National Malaria Strategic Plan (2014-2020) is intended to guide transition from malaria control to malaria elimination.⁴⁵ In accordance, the National Malaria Control Program was redesignated the National Malaria Elimination Program (NMEP),

⁴¹ Penzaarville Africa, "Market Women Join One & The Nigerian Medical Association to Storm Aso Rock for National Health Act," October 28, 2016, <http://penzaarville.com/2016/10/28/market-women-join-one-the-nigerian-medical-association-to-storm-aso-rock-for-national-health-act>.

⁴² WHO, *World Malaria Report 2016*.

⁴³ National Population Commission (NPC), National Malaria Control Programme (NMCP), and ICF International, *Nigeria Malaria Indicator Survey 2010: Final Report* (Abuja, Nigeria: NPC, NMCP, and ICF International, 2012), <https://dhsprogram.com/pubs/pdf/MIS8/MIS8.pdf>.

⁴⁴ National Malaria Elimination Programme (NMEP), National Population Commission (NPopC), National Bureau of Statistics (NBS), and ICF International, *Nigeria Malaria Indicator Survey 2015: Final Report* (Abuja, Nigeria: NMEP, NPopC, NBS, and ICF International, 2016), <http://dhsprogram.com/pubs/pdf/MIS20/MIS20.pdf>.

⁴⁵ Federal Republic of Nigeria, *National Malaria Strategic Plan 2014-2020*, http://www.nationalplanningcycles.org/sites/default/files/planning_cycle_repository/nigeria/nigeria_national_malaria_strategic_plan.pdf.

emphasizing the country's focus on achieving pre-elimination status by 2020. The Strategic Plan prioritizes the following interventions:

- Integrated vector management, including universal coverage of LLINs, scale-up of indoor residual spraying (IRS), and strategic use of larval source management
- Use of intermittent preventive therapy (IPT) in pregnant women
- Deployment of seasonal malaria chemoprevention (SMC) in the Sahel region
- Universal diagnostic confirmation and access to artemisinin combination treatment (ACT)

State malaria programs work in close coordination with the NMEP, and many produce their own annual operational plans for malaria.

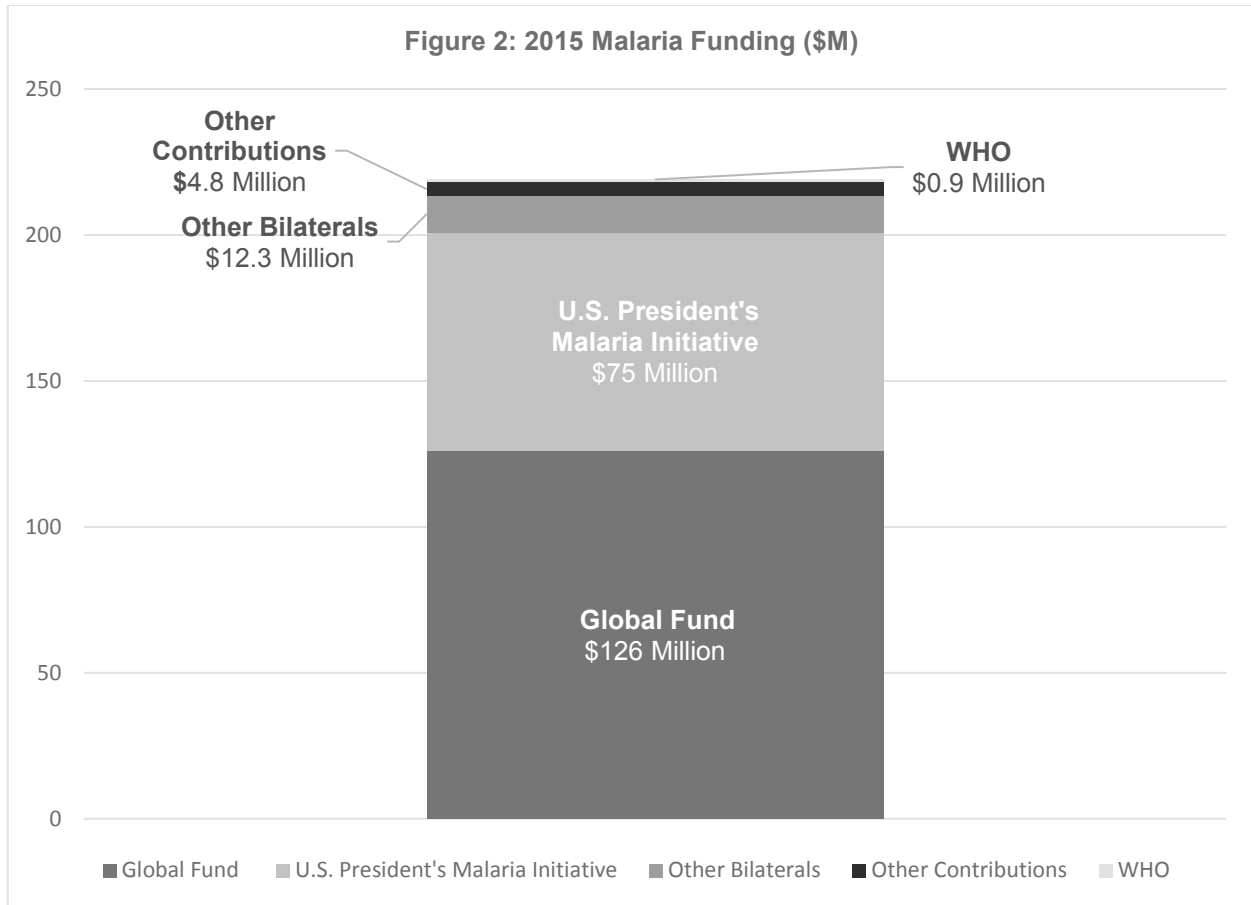
Financing for Malaria Control

According to Nigeria's National Malaria Strategic Plan 2014–2020, it will cost \$4.1 billion over the seven-year time period to achieve pre-elimination status by 2020, and the current gap in resources is \$1.5 billion, a gap of about 37 percent in financing.⁴⁶ In 2015, the country reported \$219.3 million in malaria contributions, all from external donors.⁴⁷ Major external donors include the Global Fund (present in 24 states), the U.S. President's Malaria Initiative (PMI) (present in 11 focus states), and the UK Department for International Development (DFID), which pulled its funding from 10 states in 2015 but plans to relaunch in 6 states in 2017. Conversations with USAID/PMI staff suggested that funding from the Global Fund, which began in 2004, had a substitution effect on domestic financing for malaria control. Much of the external financing, \$126 million, was received through grants from the Global Fund, of which the United States contributes about a third of funds. Bilateral contributions to Nigeria from (PMI) amounted to \$75 million in FY 2015, FY 2016, and FY 2017.

PMI began in 2005 with the goal of reducing malaria mortality by half in 15 sub-Saharan African countries through the scale-up of four interventions: insecticide-treated nets, indoor residual spraying, accurate diagnosis and treatment with artemisinin-based combination therapies, and intermittent preventive therapy in pregnant women. Nigeria was not one of the original 15 countries, but was added in FY 2011. PMI supports 11 focus states in Nigeria and is collocated with the Global Fund in 9 states. We visited malaria programs and facilities in Oyo State, which is supported by both PMI and the Global Fund, and in Nasarawa State, which is supported only by PMI.

⁴⁶ Ibid.; interview with NMEP, September 2016.

⁴⁷ WHO, *World Malaria Report 2016*.



Source: WHO, *World Malaria Report 2016* (Geneva: WHO, 2016), <http://apps.who.int/iris/bitstream/10665/252038/1/9789241511711-eng.pdf?ua=1>.

Household Coverage and Use of Long-Lasting Insecticide-Treated Nets

Widespread distribution and use of LLINs has been a major goal of Nigeria's malaria control strategy for the last few years. Through the use of mass distribution campaigns and routine distribution through schools, antenatal care visits, and other distribution channels, 120 million nets have been distributed since 2009, and access to LLINs has increased.⁴⁸ Households with at least one net for every two people—the WHO indicator for universal access to bed nets—increased from 22 percent in the 2013 Demographic and Health Survey (DHS) to 35 percent in the 2015 National Malaria Indicator Survey (NMIS). However, the proportion of those with ITNs who used them stayed the same at roughly half. Indeed, for children under five and pregnant women, two of the most vulnerable groups, use of nets actually decreased slightly, from 59 percent and 65 percent, respectively, in the 2010 NMIS, to 57 percent and 62 percent, respectively, in the 2015 NMIS.

⁴⁸ Interview with NMEP, September 2016; U.S. President's Malaria Initiative (PMI), *Nigeria: Malaria Operational Plan FY 2017*, <https://www.pmi.gov/docs/default-source/default-document-library/malaria-operational-plans/fy17/fy-2017-nigeria-malaria-operational-plan.pdf?sfvrsn=6>.

Federal and state malaria program staff have questioned why use of LLINs remains relatively low, despite increasing access to nets. One of the most common reasons offered is that the environmental temperature becomes too hot for the person sleeping under the net. According to one program staff person, users have discerned a difference in the heat generated by different types of nets. In another example from Nasarawa, many did not want to sleep under the white nets because white is associated with the dead. Size of the nets and a mismatch with the types of beds used in that region was another issue raised. Finally, an anecdotal example underscored that the insecticide-treated net was more valuable to the recipient as a method of keeping pests away from his crops, and so he used the net in the field rather than as a bed net. It is unclear whether programs and donors can utilize any of this information in making procurement decisions, but programs can at least consider some of these dynamics affecting the use of bed nets and determine whether making some changes might increase use. Systematic operational research would help the NMEP and donors to assess the key characteristics of a successful LLIN intervention in different states in Nigeria.

Mass distribution of LLINs through campaigns has necessitated investments in both commodities and service delivery. LLINs must be replaced approximately every three to five years, and we visited the Oyo State malaria program during a net replacement campaign. Warehouses had been improved to enable proper net storage, and distribution centers had been set up throughout the state. Campaign workers went door to door, gathering household information and delivering an appropriate number of cards depending on the number of residents. Residents were then able to redeem their cards for their free nets at the correct distribution center on a specified day.

Improving Diagnosis and Access to Quality-Assured ACTs

Investments are needed to increase the number of malaria cases that are diagnosed and confirmed through either a rapid diagnostic test (RDT) or microscopy. A diversity of approaches is needed to bring access to hard-to-reach populations. For example, in northern states where health care workers are fewer and health facilities are more scarce, there is greater reliance on community-based interventions such as community health workers. PMI staff have been working with Nigeria malaria program staff to scale up interventions through patent proprietary medicine vendors (PPMVs), who are often the first access points to the health care system for a patient suffering from fever who seeks out malaria medicine. Outreach programs for PPMVs provide training, RDTs, and quality-assured ACTs, and counsel vendors about not selling chloroquine and other malaria medicines that are no longer recommended for treatment. Donors are also investing in regulatory systems, providing subsidies to manufacturers of quality-assured medicines and using mobile phone applications to allow the reporting of poor-quality medicines.

Domestic Resource Mobilization

Much of Nigeria's government financing for malaria was through counterpart financing for the Global Fund malaria grant. However, due to a recent scandal over mismanagement of funds in Global Fund grants, disbursement of the grant through the NMEP was suspended. The grant was due to end in December 2016 but Nigeria received an extension through December 2017.

Malaria programs benefit indirectly from increased funding for programs in maternal and child health and primary health care, among others. If the federal government implements the 2014 National Health Act, malaria care would benefit from the Basic Health Care Provision Fund.

While some local and multinational companies already contribute to malaria control, for example by providing malaria interventions for their employees, private-sector engagement can be enhanced by coordinating the strategy and execution of these interventions. GBCHealth has played a role in coordination of the private sector through its Corporate Alliance on Malaria in Africa.⁴⁹ The forum runs technical forums and workshops for companies, provides opportunities for companies to share best practices, and has catalogued the programs being run by companies throughout the country as a mechanism of information-sharing and coordination. In November 2016, the NMEP launched a private-sector engagement strategy for malaria, spearheaded by Aliko Dangote, a prominent Nigerian billionaire businessman who serves as a malaria ambassador.⁵⁰ The strategy provides a framework to stimulate different types of contributions from companies, including direct financial contributions, in-kind contributions of commodities such as bed nets, and technical assistance such as mobile technology services for public awareness campaigns. Dangote has offered to fund a national private-sector coordinator for four years to manage implementation of the strategy.

Additional Challenges to Malaria Elimination

The \$1.5 billion gap in financing the national malaria strategy means that there are no resources available for some costly but highly effective interventions, such as indoor residual spraying (IRS). PMI supported pilot studies of IRS use in Nasarawa from 2013 to 2015 but does not have the resources to implement IRS more widely. PMI currently provides technical assistance and capacity building on vector surveillance to several states, which is a critical first step for states that are interested in implementing IRS with other resources. Low attendance at antenatal care visits by pregnant women and low provision of IPT to pregnant women remains a challenge. Continuous distribution of LLINs at antenatal care visits serves as a supplement to periodic mass distribution campaigns. A state malaria program manager noted that distribution of LLINs at antenatal care visits also motivates some women to go to a health facility for the antenatal visit. As is true for TB and many other disease areas, coverage by health care workers in some areas is inadequate, and the fluid security situation in the northeast, the Niger Delta, and other parts of the country remains a serious challenge for health care delivery. Training for health care workers is needed particularly for treatment of severe malaria, which requires management with intravenous drugs.

Ensuring distribution of resources across the country can also be a challenge. Oyo State, one of the wealthier states in the country, receives support from PMI and the Global Fund. The state malaria program reports that Oyo is ranked third in the country for malaria control, and the program generally seemed satisfied with the progress of malaria control activities in the state. Nasarawa State, on the other hand, one of the poorest states in the country, receives support only from PMI. Although PMI supports various activities—including entomological surveillance,

⁴⁹ Interview with Nigeria country manager, GBCHealth Corporate Alliance on Malaria in Africa.

⁵⁰ Federal Ministry of Health (FMOH), Dangote Foundation, NMEP, *Engaging the Private Sector to Eliminate Malaria in Nigeria* (Abuja, Nigeria: FMOH, Dangote Foundation, NMEP, 2016).

IPT for pregnant women, procurement and distribution of commodities, and training of health workers, a disconnect was observed upon speaking to health care workers in one site visit. Health facility and program staff in Karu, Nasarawa, reported that current donor malaria activities centered on behavior change communication and stated that they wanted additional support in multiple areas, including training for health care workers on severe malaria; improved delivery of malaria drugs, including intravenous artesunate for severe malaria to overcome an ongoing shortage of the drug; and staff capacity to improve data acquisition and reporting. Health facility staff also noted that due to a lack of staff capacity, they did not report their malaria burden figures in a timely fashion to state and federal databases, resulting in incorrectly low numbers. They speculated that this situation may contribute to the lower resources the program received from state, federal, and international donors.

Recommendations to the U.S. Government

The work of U.S. government agencies has been invaluable to progress in addressing both TB and malaria in Nigeria. PMI has contributed significantly to the fight against malaria since 2011 by supporting the scale-up of a core set of proven, evidence-based interventions through a stable and predictable source of funds. Through the strong partnership between the government of Nigeria and the United States and other international donors, malaria control programs have aimed at expanding coverage of core interventions to as much of the population as possible. Universal coverage has not yet been achieved and is still the primary goal, as Nigeria sets its sights on malaria elimination. In addition to striving for universal coverage, new efforts are needed to understand how to serve hard-to-reach populations, understand the barriers to uptake of certain interventions, and overcome those barriers.

TB control in Nigeria is at a much less advanced stage than malaria control. There is a clear difference in available resources: a gap of 55 percent in needed financing for TB versus 37 percent for malaria. Clinic-based approaches for TB control have relied on Nigeria's weak primary health care system, resulting in poor outcomes. The national and state TB control programs and international partners have been experimenting with different community interventions to increase case-finding. Lessons from community interventions implemented in other countries, as well as community interventions implemented for malaria in Nigeria, may have some value for TB programs.

At the beginning of a new administration and Congress, U.S. foreign assistance funding is facing increased budgetary pressures and higher scrutiny. We recommend that the U.S. government fund TB and malaria programs in Nigeria in ways that emphasize greater accountability, operational management to maximize return on investments, and high-level diplomacy to stimulate domestic resource mobilization. By investing wisely, demonstrating U.S. commitment with continued funds and technical assistance, and using the persuasive power of U.S. diplomacy, the United States can build on its role as a leader in fighting global TB and malaria. The U.S. government should work through its bilateral relationship and through multilateral organizations to implement the following recommendations:

- **Through high-level diplomacy, encourage higher prioritization of TB and malaria programs in Nigeria, matched by increased government budgetary commitments**

- **Senior U.S. government officials should engage with the Office of the President, Minister of Health, Minister of Finance, and select state governors to promote greater federal and state investment in TB and malaria programs.** The U.S. government should incentivize increased Nigerian government investments with continued bilateral and multilateral commitments of funding and technical assistance.
- **The United States should promote greater investments by the private sector in TB and malaria and help the government of Nigeria develop coordinated strategies to boost private-sector engagement.** Nigerian and American companies in Nigeria have a vested interest in a healthy workforce. The United States should prioritize working with the government of Nigeria to develop a common private-sector strategy for TB, as has been done for malaria; to align existing disparate private-sector efforts around a common strategy; to stimulate increased investments from the private sector through delivery of services, medical products, and commodities; and to promote the development of public-private partnerships that amplify government investments.
- **Support capacity building that will enhance sustainability and accountability**
 - **Invest in information technology (IT) systems to improve data gathering and enhance the reliability of available data.** Lack of data is a significant barrier to greater progress in improving health outcomes in Nigeria. The U.S. government is already investing in health information technology for TB and malaria programs. These investments should continue, with an emphasis on IT systems that are not stand-alone or that exist only in a few focus states, but, rather, are interoperable with the national health data system and can be used throughout the country.
 - **Identify opportunities to strengthen training and capacity building at the local level.** Gaps in the numbers and capacity of health care workers represent one of the biggest challenges in Nigeria and one of the best targets for investments to improve sustainability of health programs. As one example, training funds from Global Fund grants are accessible only by the principal recipient organization, not by sub-grantees. As the sub-grantees are often doing much of the work on the ground, their staff would also benefit from training opportunities.
 - **Strengthen the capacity of civil society organizations to engage in health advocacy.** The United States should provide support, educational resources, and training opportunities for civil society organizations (CSOs) to build the capacity of their staff and network with other CSOs. Active CSOs would then be empowered to advocate for increased health funding from their policymakers, organize public discussions on health with state and local candidates, and otherwise enhance the ability of civil society to hold officials accountable for improving health delivery.

- **Identify areas where IT, product and commodity delivery, and other health care delivery systems funded by the U.S. government, including the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the U.S. President's Malaria Initiative (PMI), and TB programs, can be combined or integrated.** For example, PEPFAR and PMI are now working to integrate their independent, parallel medical reporting systems into Nigeria's health management information system, and to integrate disparate commodity delivery systems. Similar opportunities may exist for TB and with the Global Fund. Coordinating with the Global Fund and other international donors presents additional complexities, but ultimately such efforts will strengthen national delivery systems and enhance the sustainability of health programs.
- **Fund operational research to understand barriers to the uptake of some malaria interventions.** PMI currently supports behavior change communication regarding community and health care worker behavior, such as sleeping under bed nets and only treating malaria after a diagnostic test confirmation. Behavior change communication will be enhanced by understanding the reasons for the local population's responses to some interventions, such as low bed-net utilization and low use of intermittent preventive therapy (IPT) for pregnant women.

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